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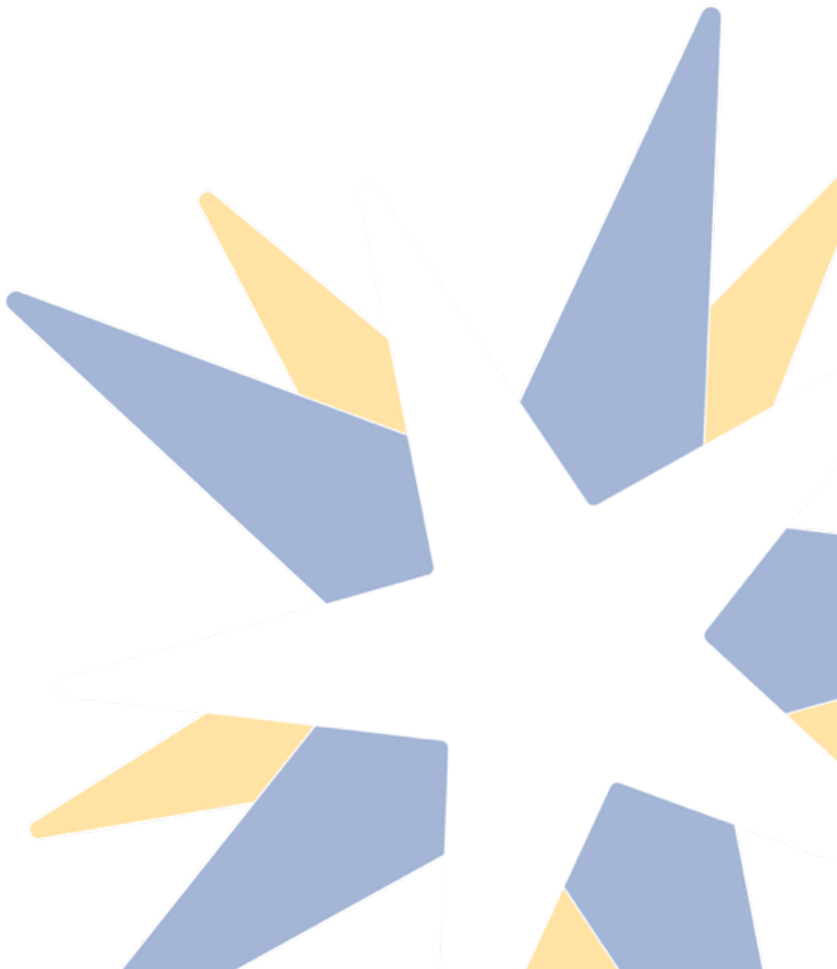

Will childcare subsidies increase the labour supply of mothers in Ireland?[1]

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Abstract

The cost of childcare has a significant impact on the decision of parents – particularly mothers – to work. Prior to the introduction of subsidies for formal childcare in Ireland in 2019 through the National Childcare Scheme (NCS), the cost of full-time centre-based childcare was among the most expensive in the OECD. In this paper, we investigate the effects of the scheme on the labour supply and childcare choices of mothers. We model the joint decision of labour supply and childcare for lone and coupled mothers of children under six. Mothers are likely to respond to the introduction of childcare subsidies in 2019 by switching from informal childcare to formal childcare (11ppt), but not by increasing their participation in the labour market. A hypothetical abolition of all childcare costs would close the gender employment gap, increasing mothers' participation by 30 ppt.

JEL codes: J13, J22, C25

Keywords: female labour supply, childcare, discrete choice

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[1] The results presented here are based on The ESRI's tax-benefit model, SWITCH version 5.3 which makes use of the EUROMOD platform. Originally maintained, developed and managed by the Institute for Social and Economic Research (ISER), since 2021 EUROMOD is maintained, developed and managed by the Joint Research Centre (JRC) of the European Commission, in collaboration with EUROSTAT and national teams from the EU countries. We are indebted to the many people who have contributed to the development of EUROMOD. The results and their interpretation are the authors' responsibility. We are grateful to the Central Statistics Office (CSO) for providing access to the Survey of Income and Living Conditions (SILC) Research Microdata File, on which the SWITCH tax-benefit model is based. This work was carried out as part of the ESRI's Tax, Welfare and Pensions work program. Funding from the Department of Social Protection, the Department of Children, Equality, Disability, Integration and Youth, the Department of Public Expenditure and Reform, the Department of Health and the Department of Finance is gratefully acknowledged.

1 Introduction

A series of studies have found that parents in Ireland face some of the highest childcare costs in the OECD (OECD 2007; OECD 2015; OECD 2020; OECD 2021). In 2019, the average monthly fee for full-time childcare for children under 3 in Ireland was estimated to be €771, which is among the highest in the EU (Motiejunaite-Schulmeister et al. 2019). For a two-earner couple with two children (aged 2 and 3) in full-time care, the out-of-pocket childcare costs amounted to more than one-third of women's median full-time earnings in Ireland in 2019, which was one of the highest ratios in the OECD (OECD 2020).

These standardised cross-country comparisons of full-time formal childcare costs tell only part of the story as Doorley et al. (2021) show that parents in Ireland use considerably less than full-time formal childcare on average, supplementing with informal and unpaid childcare. Nonetheless, in 2017, one-tenth of households in Ireland faced childcare costs of more than 20% of their disposable income.

To improve childcare affordability, in 2019, the government introduced the National Childcare Scheme (NCS), which awards universal and means-tested childcare subsidies to families using registered childcare, replacing all previously available childcare subsidies. Registered childcare, in practice, equates to formal and centre-based care and excludes childminders and other informal childcare.[1] There has been no research to date on how this policy development is likely to affect the labour supply of mothers in Ireland.

Previous literature for the UK, the US and Canada has found a significant negative effect of childcare costs on female labour supply, and a weak and often insignificant effect of childcare costs on male labour supply (Blau and Hagy 1998; Blau and Robins 1988; Ribar 1995; Powell 1988; Michalopoulos and Robins 2002;Blundell et al. 2000; Viitanen 2005; Francesconi and van der Klaauw 2007; Brewer et al. 2016). As emphasised by Del Boca (2015), the largest childcare-price elasticities of labour supply have been found in countries where childcare is or has been provided predominantly by the private sector, such as is the case in Ireland, and subsidisation is low. The estimated effect of childcare costs on labour supply in studies focusing on European countries, which typically have a higher provision of affordable public childcare, has been considerably smaller (Viitanen 2004; Choné et al. 2003; Kornstad and Thoresen 2007; Thoresen and Vatto 2019; Narazani et al. 2022). Childcare characteristics such as availability and quality have been found to have a relatively more important effect on labour supply in these countries, and European studies have tended to feature a greater focus on these characteristics.

In this paper, we investigate how the introduction of the Irish NCS affects mothers' labour supply and childcare choice. We estimate a decision model for labour supply and the choice of formal and informal childcare in Ireland using pre-subsidy data (as in Kornstad and Thoresen 2007). Using this model, we predict the effects of the introduction of the subsidy on labour supply, including subsequent reforms to the subsidy up to the

[1] Children who are cared for by childminders who are registered with Tusla are also eligible for the NCS subsidy. However, 2020 figures from Tusla indicate that very few childminders are registered (14 out of over one thousand registered providers in Dublin were childminders (*https* : *//www.tusla.ie/uploads/content/Dublin_July.pdf*).

end of 2023.

The advantages of a structural model over reduced-form estimates of how decision makers respond to tax-benefit policy changes is i) the ability to carry out ex ante analysis of reforms that have not yet been implemented or for which we do not yet have data and ii) the ability to generalise the results to alternative policy reforms. The structural approach is necessary for this analysis as the NCS was fully rolled out only at the end of 2019. As childcare facilities were shut down for much of 2020 and 2021 in response to the Covid-19 pandemic, any reduced form estimate of the effect of the NCS using a pre- and post-design is contaminated by this supply-side shock.

We focus on the subsample of mothers (married or cohabiting and lone parents) with at least one child who is not yet in school as these are likely to be most affected by childcare subsidies. They may also be more responsive to financial incentives to work as national and international studies show that the gender work and earnings gap opens up straight after parenthood (Albrecht et al. 2018, Kleven et al. 2019, Doris et al. 2022). We use the ESRI's tax-benefit model, SWITCH, linked to SILC data for 2019 and a discrete choice labour supply model which accounts for childcare choices and cost – formal and informal. By using 2019 survey data (collected before the roll-out of the NCS), linked to a microsimulation model, we model labour supply and childcare choices in a pre-pandemic and pre-NCS setting. The results of our simulation suggest how the introduction and expansion of childcare subsidies in Ireland is likely to increase mothers' labour supply in the medium-term, abstracting from the effects of the pandemic on both labour supply and childcare provision and choice.

We find that mothers of young children in Ireland are likely to respond to the introduction of formal childcare subsidies through the NCS by (i) switching from informal childcare to formal childcare and (ii) joining the labour market. We estimate that the introduction of the NCS led to little change in the participation rate of mothers of young children but an increase in their usage of formal childcare, of 25%. Subsequent reforms to the NCS, which came into effect in early 2023 and increased its coverage and generosity, are likely to increase the proportion of mothers of young children working full time by 3% and significantly decrease the demand for informal childcare (which is not subsidised). We estimate that, compared to the current (2023) parameters of the NCS, extending the subsidy to providers of informal childcare would further increase the labour supply of mothers by 1% on the extensive (participation) and 1.5% on the intensive (full-time) margin, while restoring demand for non-centre-based care.

The exchequer cost of the introduction and extension of the NCS is amplified by behavioural responses. In particular, we estimate that families switching from informal to formal childcare as a result of formal childcare subsidies substantially increases the cost of these subsidies. On the other hand, the exchequer loss is slightly reduced by the increased tax and decreased welfare expenditure associated with higher mothers' labour supply.

This research adds to the literature on the effect of childcare costs on labour supply using the case study of Ireland: a country which combines a strong tradition of mothers staying home to care for children, very high childcare costs and limited subsidisation of

these by the state. Our simulations show that abolishing childcare costs altogether - while likely to be infeasible from a cost perspective in the medium term - could significantly increase the labour supply of mothers of young children, resulting in a participation rate of 80%. With the current participation rate of men around 78%[2], the gender employment gap would effectively close. This could have significant knock-on consequences for gender equality in general, and, more specifically, the gender gap in earnings, pensions and likelihood of falling into poverty later in life.

2 The institutional setting

2.1 Historical background of female labour supply and childcare in Ireland

Formal childcare "did not really exist in Ireland (apart from some exceptions) until the 1980s and 1990s... childcare was usually provided by family members or childminders located in the community and known to the family" (Flood and Hardy 2013). The nonexistence of formal childcare until relatively recently is explained by the fact that, by and large, mothers in Ireland did not work outside the home: female labour force participation in 1971 was estimated at around 20% (Fahey 1990).[3] There was accordingly little need for childcare services, and what need existed seems to have been serviced by informal care provided by relatives and friends.

This labour market environment was itself a product of both legal obstacles and cultural opposition to maternal employment. For example, until 1973 female civil servants were obliged to resign upon becoming married (the so-called "marriage bar"); and the Constitution of Ireland, enacted in 1937, still contains a passage requiring the State "to ensure mothers shall not be obliged by economic necessity to engage in labour to the neglect of their duties within the home" (*Bunreacht na hÉireann* 2018). More generally, the values and cultural norms enshrined in the Constitution include a respect for what has been called "the essential privacy of family life", a disposition against the involvement of the State in the raising of children. Against this legal and cultural backdrop, it is not surprising that a "non-interventionist policy with respect to childcare provision" has prevailed in Ireland until relatively recently (Horgan 2001).

One exception to this trend of non-intervention has been noted in the literature and is of some importance in understanding the background to childcare in Ireland (Horgan 2001; O'Kane 2004; Russell et al. 2018; Flood and Hardy 2013;Hayes and Bradley 2008). Although the government did not intervene in or regulate the provision of childcare in general before the 1990's, some specific interventions did occur to address the preschool care of disadvantaged children, e.g., the construction of the "Early Start" preschools in the 1960's and 1970's to offer free preschool care to disadvantaged children (Flood and Hardy, 2013). This focus on targeted rather than universal childcare supports has been characteristic of government policy until the recent past. The 1980's saw the beginning of

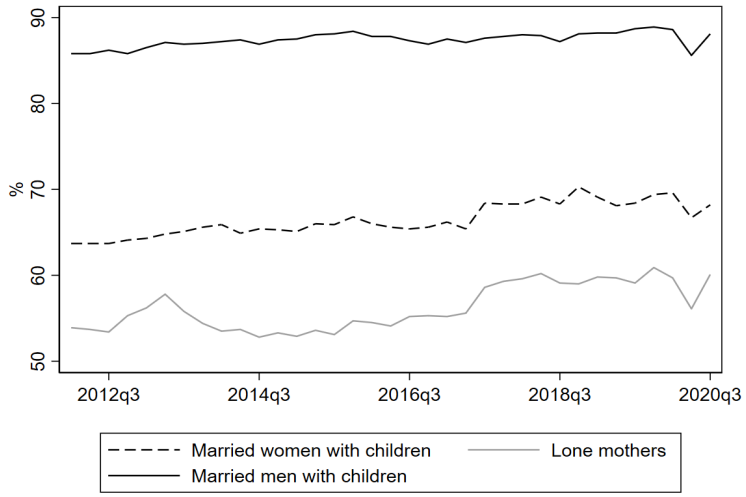
[2]Central Statistics Office data take from the Irish Labour Force Survey (https://data.cso.ie/table/QLF18).

[3]Official Census figures for "gainful occupation" are even lower, at only around 7% (ibid., pp194); however, Fahey argues that these figures underestimate supply of labour by women in and around the home, e.g., on family farms.

a large growth in the female participation rate, rising from around 30% in 1981 to nearly 50% in 1996 (Fahey 1990; Bercholz and Fitzgerald 2016). With more mothers entering the labour force, the issue of childcare became increasingly prominent, which prompted government intervention in the sector.[4] This intervention has proceeded in roughly two stages. In the first stage, the government began to regulate the provision of childcare to ensure a minimal standard of adequacy without directly influencing the cost of provision; in the latter stage, the government has begun to more directly influence provision through the social welfare system.

Figure 1 plots the participation rates of men and women with children, distinguishing between married men and women and lone mothers since 2012. The female participation rate has been steadily rising and in 2019, the year that the NCS was introduced, was around 70% for married mothers and 60% for lone mothers. Both participation rates were still well below the participation rate of 89% of married men with children.

Figure 1: Labour market participation of parents by marital status



Notes: Central Statistics Office https://data.cso.ie/table/LFH18 (accessed 15/12/2022).

At the close of the millennium, estimates of the use of paid childcare were still comparatively low by modern standards: 75% of children aged zero to two were cared for by parents in their own home, and the usage of paid childcare services by parents was 38% for parents with children aged zero to four and 18% for parents with children aged five to nine (Williams and Collins 1998). Contemporary research evidenced both unmet need and inequality of access.

Accordingly, government intervention in the childcare sector from the end of the 1990's began to involve a more than purely regulatory aspect. From 2000 to 2021, five or six different policies providing childcare support were effective at some point: new enrolment in these schemes began phasing out from 2017, when the comprehensive National

[4] O'Kane (2004) summarises the sequence of reports, white papers, frameworks, and national strategies set out during the period.

Childcare Subsidy (NCS), which is the focus of this paper, was announced.[5]

The "legacy policies" of this period were mostly targeted supports to ease childcare costs for disadvantaged families as opposed to universal benefits. In 2016, the last year before the announcement that the schemes were to begin winding up, these programmes combined were estimated to affect around 32,000 children, fewer than 10% of preschool-age children in Ireland (Callan et al. 2009; Ireland 2017). During the period after 2010, the government replaced all previous schemes with two new childcare policies which are still in effect: the Early Childhood Care and Education Programme (ECCE) and the NCS.

ECCE constitutes the first universal and free provision of early childhood education in the history of the State. Although its provisions have changed slightly over the years, the programme currently provides three hours per day of free pre-school for qualifying children during the school year. Children are eligible from September of the year that they turn three and cease to be eligible if they will turn five-and-a-half during the following school year. Providers are paid directly by the government under ECCE and in return provide their services for free to qualifying children. The impact of ECCE on maternal labour supply has been investigated by (Keane and Logue 2018), who exploit the age thresholds for eligibility to employ a regression discontinuity design. The authors find no statistically significant effect of the policy on maternal labour supply, which is explained by the observation that three hours a day during the week is simply not enough time for most women to significantly increase their labour supply, particularly at the extensive margin.

2.2 National Childcare Scheme and subsequent reforms

The NCS, which is the subject of this research, was announced in 2017 (initially as the Affordable Childcare Scheme) and became operational at the end of 2019. It replaced all the existing schemes, although there is a transition period during which parents could make the switch to the NCS. Children who avail of ECCE can also avail of the NCS for hours of formal childcare used outside of the pre-school day and/or term. It was envisaged that the NCS would address the high cost of childcare in Ireland by providing a progressive childcare subsidy and that this would reduce barriers to labour

[5]These "legacy schemes" are: (i) The Community Childcare Subvention Scheme (CCS) and CCS Plus, 2007 to 2021, provided support to low-income parents (particularly social welfare recipients) to obtain lower childcare costs from certain providers. Since it replaced existing grants to community childcare providers, the biggest criticism of the CCS Scheme was that it left most such providers worse off monetarily (O'Donoghue Hynes and Hayes 2011; (ii) The After-School Child Care Scheme (ASCC), 2015 to 2021, provided subsidised childcare to parents claiming unemployment benefits or in-work benefits (the Working Family Payment) who increased their hours of work. (iii) The Childcare Educational and Training Support (CETS), 2014 to 2021, provided capped daily childcare rates for parents completing approved vocational and training courses or finishing secondary-level education. (iv) The Community Employment Childcare Programme (CEC), provided capped daily childcare rates for parents in the Community Employment Scheme. (v) The Early Childcare Supplement (ECS), 2006-2009, was a universal supplement of €1000 a year, paid monthly towards childcare costs for eligible families. In contrast to the supports discussed above, the ECS was not targeted: it was paid to all eligible families even if they had no intention of using it to pay for formal childcare or, indeed, of using formal childcare at all. The policy was criticised for being costly and was discontinued in the aftermath of the financial crisis. For more detail, see (Russell et al. 2018; Russell et al. 2018).

force participation, among other objectives.

The NCS is a subsidy for users of formal childcare. Formal, for the purposes of the subsidy, means that the childcare provider must be registered with the state. In practice, this limits the subsidy's reach to creches and other childcare centres. So called "informal" childcare, provided in the child's home or in the provider's home, is not eligible for the subsidy. The NCS has two main components: the universal hourly subsidy (UHS) and the income-assessed hourly subsidy. The income-assessed hourly subsidy is further available in two forms: the standard hourly subsidy (SHS) and the enhanced hourly subsidy (EHS). Parents can only receive one of the subsidies per child, i.e., a parent receiving the more generous income-assessed subsidy cannot also receive the UHS. No payments are made directly to parents under the NCS: subsidies are paid to the childcare provider and subtracted from the fee charged to parents.

In 2019, when the NCS was introduced, the UHS was targeted at children aged over 24 weeks and under three years of age, in registered childcare. It consisted of a subsidy of €0.50 per hour of childcare per child, up to a maximum of 40 hours. The UHS is not means-tested and predominantly benefits higher-income households. The maximum monthly universal subsidy was €87 in 2019. This puts it at 9% of average full-time formal childcare costs at the time.[6]

The income-assessed subsidy was originally targeted at children aged over 24 weeks and under 15 years of age in registered childcare. The subsidy varies based on parental employment/educational status. In 2019, if both parents were in work, education, or training, the household was entitled to up to 40 hours per week of subsidised childcare. If at least one parent was not in work, education, or training, the household was entitled up to 15 hours per week. Additionally, the claimant household must have had a "reckonable income" of less than €60,000 a year[7] with the subsidy subject to graduated withdrawal for reckonable incomes below €60,000 but in excess of €26,000 a year. Doorley et al (2021) argue that the withdrawal rate of the NCS between these two income points (which is especially steep for families with multiple eligible children) provides a disincentive to earn or work more. They estimate that almost one-fifth of workers eligible for the NCS face a Marginal Effective Tax Rate (METR) of more than 60%.

Since its introduction in 2019, the maximum number of hours eligible for subsidy has increased to 45 per week (or 20 per week for parents who are not in work) and, since 2022, hours of free pre-school and school are no longer deducted from this total. In 2022, the non-means tested component of the scheme was extended to children up to age 15 and in 2023, it was increased from €0.50 to €1.40 per hour of formal childcare.

[6] Using SILC 2019, average hourly costs for formal childcare are €4.70.

[7] "Reckonable income" in this context means net of taxes, social insurance contributions, and social welfare payments; with the exception of "allowable deductions" (see National Childcare Scheme (NCS) (citizensinformation.ie)). Furthermore, reckonable income is subject to a multiple child discount: if one has two children aged under 15 in the household, one may deduct €4,300 from reckonable income, and if one has more than two children aged under 15 in the household one may deduct €8,600 from reckonable income.

3 Joint model of labour supply and childcare choice

3.1 The discrete choice model

To characterise the labour supply of mothers in Ireland, we model labour supply decisions as the choice between a finite set of alternatives (Aaberge et al. 1995; van Soest 1995; Hoynes 1996). This approach is considered more realistic than a continuous choice set given the constraints faced by individuals when searching for a particular set of labour supply hours. In addition to the choice of hours worked, we model the choice between formal and informal childcare for mothers who work, as in Kornstad and Thoresen (2007).

We simplify the choice set faced by mothers in two important ways. First, mothers must choose between formal, informal and parental care. Formal childcare is centre-based care and is subsidisable by the NCS. Informal childcare is that performed by a paid childminder or nanny in the childminder or child's home.[8] Parental care is that performed by the mother if she chooses not to work. Our model does not allow fathers to perform parental care. By limiting the sample to lone mothers and coupled mothers with full-time working partners, this option is excluded. It could be relaxed in future work but, given the well-documented inelastic labour supply of fathers, the restriction is unlikely to substantially affect out results. We also do not allow unpaid care by relatives or others in the model and exclude families who make use of unpaid care from the analysis as we have no information on access to this type of care for those who are not working.

Mothers face 4 hours choices: j=1,. . . ,4 which correspond to discrete hours worked: H=0,16,32,40[9], and 3 childcare choices m = 1,2,3, where 1 is a choice of formal childcare, 2 informal childcare and 3 represents parental childcare. Families can choose parental childcare only if the mother chooses 0 hours of work. We specify consumption-leisure preferences using a quadratic utility function including fixed costs of work. The deterministic utility of a couple i at each discrete choice j=1,. . . 4 is:

$$U_{ijm} = \alpha_{ci}C_{ijm} + \alpha_{cci}C_{ijm}^2 + \alpha_{li}L_{ijm} + \alpha_{ll}L_{ijm}^2 + \alpha_{cl}C_{ijm}L_{ijm} - \varphi_j' \cdot 1(H_{ijm} > 0) + \epsilon_{ijm} \quad (1)$$

Where C_{ijm} is consumption, proxied by household disposable income minus childcare costs, L_{ijm} is leisure, measured as (80-H_{ijm}), H_{ijm} are weekly hours worked by the mother and ϕ_j' is a vector of parameters coefficients for fixed costs of work.[10] These costs of work are nonzero for any positive number of hours worked and vary with demographic characteristics.

We estimate separate models for couples with children and lone parents, with two main differences. First, the model for couples takes into account male hours worked, which are treated as constant. This is justified by the well-documented low wage- and

[8]The SILC data does not allow us to distinguish between these two types of informal care.

[9]Actual choices are classified as follows: 1-16 corresponds to 16 hours, 17-32 corresponds to 32 hours, and >= 33 corresponds to 40 hours.

[10]The fit of the model is improved by the introduction of fixed costs of work, estimated as model parameters as in Callan et al. (2009) or Blundell et al. (2000). Fixed costs explain the fact that there are very few observations with a small positive number of worked hours.

income-elasticities of male labour supply and the fact that research has also found that childcare costs have little effect on the labour supply of married men (Blundell et al. 2000; Doiron and Kalb 2005). The taste-shifters in the model for couples also differ somewhat to those used for lone parents. Married women's coefficients on consumption and leisure hours vary with age, presence of children under ages of 3, 6 and 12, and work experience:

$$\alpha_{ci} = \alpha_c^0 + \alpha_c^1 \text{child3}_i + \alpha_c^2 \text{child6}_i + \alpha_c^3 \text{child12}_i + \alpha_c^4 \text{experience}_i \tag{2}$$

$$\alpha_{li} = \alpha_l^0 + \alpha_l^1 \text{age}_i + \alpha_l^2 \text{age}_i^2 + \alpha_l^3 \text{age}_i^3 + \alpha_l^4 \text{child3}_i + \alpha_l^5 \text{child6}_i + \alpha_l^6 \text{child12}_i + \alpha_l^7 \text{experience}_i + \alpha_l^8 H_{\text{partner}} \tag{3}$$

$$\alpha_c^0 = \alpha_c^1 + u_{ci} \tag{4}$$

Fixed costs of work for couples vary with the number and age of children, education level, nationality, work experience and age of the mother, an urban dummy and leisure hours of the father. In the model for lone parents, the coefficients on consumption and leisure vary with education level, dummy for urban environment, work experience, age and presence of children:

$$\alpha_{ci} = \alpha_c^0 + \alpha_c^1 \text{child3}_i + \alpha c^2 \text{child}_i + \alpha_c^3 \text{Irish}_i + \alpha_c^4 \text{experience}_i + \alpha c^5 \text{tertiary}_i \tag{5}$$

$$\alpha_{li} = \alpha_l^0 + \alpha_l^1 \text{age}_i + \alpha_l^2 \text{experience}_i + \alpha_l^3 \text{tertiary}_i + \alpha_l^4 \text{child}_i + \alpha_l^5 \text{urban}_i \tag{6}$$

$$\alpha_c^0 = \alpha_c^1 + u_{ci} \tag{7}$$

Fixed costs of work for lone parents vary with the number and age of children, education level and age of the mother and an urban dummy.

Unobserved preference heterogeneity is included through the error term in α_c^0 so that the model allows random taste heterogeneity and unrestricted substitution patterns between alternatives. We assume u_{ci} is normally distributed and independent of other error terms and independent variables in the model. For each potential choice of labour supply, j, the individual is faced with disposable income net of childcare costs (equivalent to consumption in this static framework):

$$C_{ijm} = d(w_i H_{ij}, n_i, m_i)$$

Non-labour income is denoted n_i. m_i denotes the choice between formal, informal and parental childcare. Function d is approximated by numerical simulation of tax and benefit rules in 2019 for Ireland using the ESRI's tax and benefit microsimulation tool – SWITCH.

Female wage rates w_i^f are calculated using Heckman-corrected predictions for both workers and non-workers (model coefficients are available in the Appendix A). Assuming that the error terms in the wage models are normally distributed, we add a single random

error term to each wage prediction as ignoring these in a nonlinear labour supply model would lead to inconsistent estimates of the structural parameters.

The cost of childcare is calculated using the usual weekly hours and cost of childcare in the SILC data. We estimate an average hourly cost for formal and informal childcare, by age of child. We calculate the total childcare cost in each counterfactual labour supply scenario by multiplying the derived average hourly cost by the childcare hours needed in each counterfactual. This cost is then subtracted from disposable income to arrive at a net-of-childcare-cost disposable income concept, C. The total childcare cost is dependent on the child's age and mothers' hours worked. One complication is the cost of formal childcare for children aged between three and five. These children are entitled to fifteen hours of free care a week, equivalent to the free preschool hours available in the ECCE scheme. To calculate the cost of formal childcare for this group outside of these hours, we use the average hourly cost of childcare for children aged 6-12, which is not downward biased by the provision of free preschool.

Deterministic utility is completed by i.i.d. error terms ϵ_{ij} for each choice. Under the assumption that error terms follow an extreme value type I (EV-I) distribution, the (conditional) probability for each household of choosing a given alternative has an explicit logistic form, which is a function of deterministic utilities at all choices. The unconditional probability is obtained by integrating out the disturbance terms (unobserved heterogeneity and the wage error term) in the likelihood function. In practice, this is done by averaging the conditional probability over 50 draws, and the simulated likelihood function is maximized to obtain all estimated parameters (Train 2009).

3.2 Data

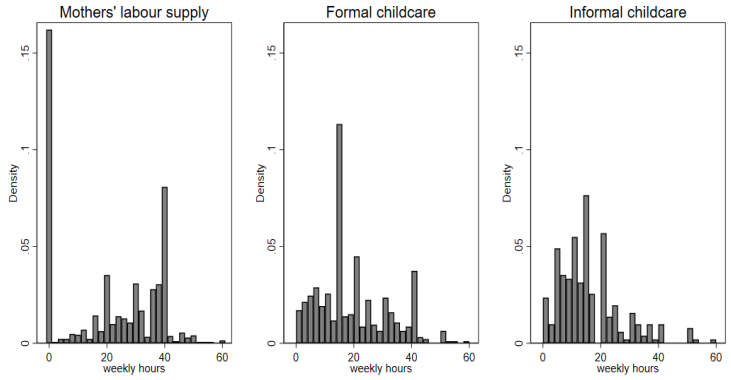
We use the Irish microsimulation model SWITCH (described and validated in Keane et al. 2022) linked to the Irish component of the Survey on Income and Living Conditions in 2019, which contains administrative information on earnings and welfare from the Irish Revenue Commissioners and the Department of Social Protection. It also contains detailed information on typical childcare usage and cost (see Appendix B for details of survey questions).

Formal schooling typically begins at age 5 in Ireland, although some children start at age 4 and others do not start school until age 6. We restrict the sample to mothers aged 18-65 whose youngest child is six or under and whose partner (if they have one) works full-time - defined in this case as thirty-five hours or more per week. We drop households who are using unpaid childcare, such as relatives. This simplifies the childcare requirements of mothers in our sample in any counterfactual simulations. A mother working full-time whose partner is also working full-time is likely to need full-time paid childcare as long as their youngest child has not yet started school.

Figure 2 shows the distribution of hours worked by the women in the sample as well as the distribution of formal and informal childcare hours used. The typical spikes in labour supply are observable at 0, 20, 30 and 40 hours per week. The most frequent labour supply choice is non-participation, followed by full-time (40 hours per week) and part-time (20 or 30 hours per week). In our model, we discretise actual hours work

as follows: 1-16 corresponds to 16 hours, 17-32 corresponds to 32 hours, and >= 33 corresponds to 40 hours.

Figure 2: Mothers' weekly work and childcare hours in Ireland (2019 SILC)



Notes: Weekly hours of maternal labour supply, formal (centre-based) and informal (in the child or childminder's home) hours of childcare calculated for the sample of mothers aged 18-65 who are fit to work, whose youngest child is no older than six and whose partner (if any) works at least 35 hours per week from 2019 SILC.

Formal childcare hours are concentrated around 15 hours per week (the universal pre-school hours for three- and four-year-olds). There are also noticeable density spikes at 20 and 40 hours per week. This is likely to partly reflect the demand for part- and full-time childcare, but also rationing by childcare providers which, in many cases, leads to them offering only part-time or full-time options. The distribution of informal childcare hours, by contrast, is more evenly spread. There are multiple spikes observable around 5, 10, 15 and 20 hours but there are also plenty of observations in between these levels, suggesting that informal childcare may be more flexible in terms of hours of use. For this reason, we ration formal childcare in the discrete choice model such that only 15, 20 or 40 hours of formal childcare is possible (and the number of hours used must be greater than or equal to the number of hours of labour supplied by the mother). We allow informal childcare to be more flexible, with the hours used corresponding exactly to the number of hours worked by mothers.

Table 1 describes income and childcare of mothers in our sample, separated by the type (if any) of childcare used. Given the focus of this paper on subsidies for formal childcare. if a household uses both formal and informal childcare, we categorise them as formal childcare users.[11] We group lone parents and married mothers together to report these statistics as the sample size for lone parents prevents detailed reporting of descriptive statistics.[12] Average household disposable income is higher for mothers who use formal and informal childcare - at €1,599 and €1,803 per month respectively. – but is much lower for households who do not use childcare (€799 per week). This is consistent with the latter not engaging in paid work on the labour market. Average hours worked by

[11] 7% of the sample use both formal and informal childcare so we expect this simplification to have a small impact on our estimates.

[12] The Statistical Disclosure Controls of the Irish Central Statistics Office require that we do not report averages where the sample size is <30 and that we do not report percentages where the sample size is < 100.

mothers using formal (31 per week) and informal (32 per week) childcare are reasonably similar. Average hours of paid childcare used – which counts the sum of hours for each child in multiple child households - are slightly higher in the case of formal (32) than informal (28) childcare.

Table 1: Employment, income and childcare statistics of mothers of young children in 2019

	Childcare type		
	Formal	Informal	None
Market income	1599	1803	799
	(925)	(911)	(697)
Disposable income	1256	1372	766
	(482)	(452)	(351)
Female work hours	30.8	31.6	0
	(9.6)	(9.2)	(0)
Hours of childcare	31.8	27.6	
	(25.1)	(15.5)	
Median Hourly cost	4.1	5	
	(3.3)	(14.7)	
Mean Hourly cost	4.7	7.3	
	(3.3)	(14.7)	
Total cost of childcare	224	260	
	(127)	(107)	
Disposable income - childcare cost	1032	1121	
	(444)	(452)	
Proportion eligible for NCS	0.77		
	(0.42)		
Proportion eligible for NCS 2023	1		
	(0)		
Amount of NCS given receipt	11.41		
	(10.4)		
Amount of NCS 2023 given receipt	18.89		
	(9.14)		
N	165	82	130

Notes: Calculations using the microsimulation model, SWITCH linked to 2019 SILC. Sample is mothers aged 18-65 who are fit to work, whose youngest child is no older than six and whose partner (if any) works at least 35 hours per week. Monetary values are weekly unless otherwise specified.

We calculate the average hourly cost of both types of childcare and find that the median hourly cost is €4.10 for formal and €5 for informal childcare. The mean cost is also higher for informal childcare (€7.30) than for formal childcare (€4.70). We use these estimated hourly childcare rates in calculating counterfactual childcare costs when mothers change their labour supply.[13] As children aged between three and five are likely

[13]We calculate average childcare costs by age of the child (<3, 3-6 and >6) and use these to estimate childcare costs in each counterfactual simulation. As some of the samples used to calculate these costs

to be availing of fifteen hours per week of free preschool, we proxy the hourly cost of childcare for any additional hours for this group using the average hourly cost of childcare for older children.

The average cost of childcare for households using formal and informal childcare is €224 and €260 per week, respectively. Subtracting the cost of childcare from disposable income, gives the income (consumption) concept used to model labour supply and this is slightly lower for households using formal (€1,032 per week) compared to informal (€1,121 per week) childcare.

Simulating receipt of the NCS based on the eligibility criteria announced at the end of 2019, we find that 77% of the households in our sample who use formal childcare would be eligible for the subsidy and would receive an average of €11.4 per week. Following the extension to the subsidy scheme up to 2023, this rises to 100% eligibility, thanks to the expansion of the universal component of the subsidy, and an average subsidy of €18.9 per week.

4 Results

4.1 Model fit

Coefficients from the labour supply model are displayed in Appendix A.[14] Separate models are run for single mothers and married mothers, according to model specifications in Section 3.1. As expected, utility increases with consumption and leisure and varies with taste-shifters. Due to the size of the lone parent sample and Statistical Disclosure Controls governing the use of the underlying data, in what follows, we present results for all mothers grouped together.

The predicted and actual labour supply choices are shown in Figure 3. Due to the small number of mothers choosing the band corresponding to 16 hours of work per week, we group this category with the next and show hours choices between 1 and 32 together. Overall, predictions are quite close to actual choices made, with mothers concentrated at 0 hours of work, followed by full-time and then part-time work. Compared to the underlying data, the model over predicts zero hours of work compared to part-time work. Predictions for full-time work are very close to the underlying data.

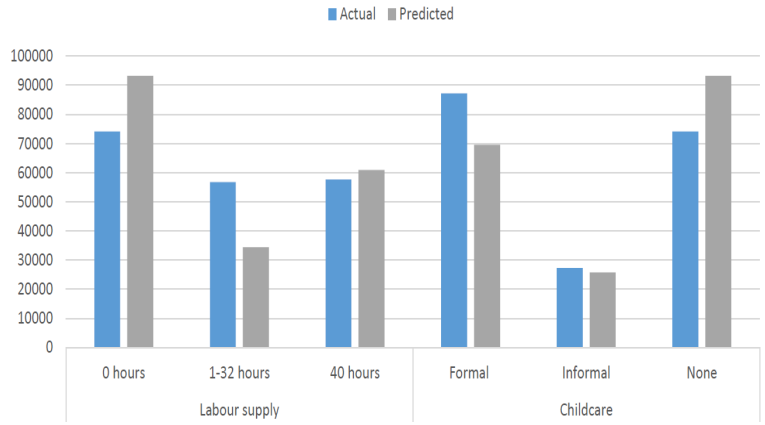
Predictions for formal vs. informal childcare are also quite close to the relative usage of each in the underlying data. However, as the model slightly underestimates labour supply, it also underestimates the usage of each type of childcare – particularly formal care – and overestimates the choice of no paid childcare (or parental care).

Based on the simulated choice of hours worked, we calculate the elasticity of mothers' labour supply with respect to income at the extensive margin (participation elasticities) and intensive margin (hours worked). To do this, we simulate a 10% increase in childcare costs and use our model estimates to predict mothers' labour supply, account-

violate the Irish Central Statistics Office's Statistical Disclosure Controls, we do not report them here.

[14] Estimations are carried out in Stata using the user written command mixlogit (Hole 2007).

Figure 3: Actual vs. Predicted labour supply and childcare usage of mothers of young children in 2019



Notes: Own calculations using the 2019 SWITCH policy linked to 2019 SILC data. Sample is restricted to mothers aged 18-65, whose youngest child is under six and who is available for the workforce (i.e. not disabled, in education or retired). In the case of partnered mothers, the sample is restricted to those with partners working full-time (at least 35 hours). Predictions are based on a discrete choice labour supply model as outlined in Section 3.1. Coefficients for each model are shown in the Appendix A.

ing for this change. We find that for a 10% increase in childcare costs, mothers decrease their labour market participation by 1.2%, and decrease hours worked by 0.9%. Dividing by ten gives elasticities of -0.12 and -0.09 at the extensive and intensive margin. This suggests that mothers with young children could be quite responsive to a decrease in childcare costs, particularly at the extensive margin.

Table 2: Childcare price elasticities of labour supply for mothers of young children

	Extensive margin	Intensive margin
Elasticity with respect to childcare costs	-0.120	-0.092

Notes: Calculations using the models described in Section 3.1 and the microsimulation model, SWITCH linked to 2019 SILC. Sample is mothers aged 18-65 who are fit to work, whose youngest child is no older than six and whose partner (if any) works at least 35 hours per week from 2019 SILC. Elasticities are estimated as the percentage change in participation rates (extensive) and percentage change in expected weekly hours of work (intensive) following a 10% increase in childcare costs and are divided by 10.

These elasticities are similar those found in the international literature for the US; Canada and the UK and above what has been estimated for Germany; France and Norway. Research for the US and Canada estimates participation elasticities of married women of -0.16 (Michalopoulos and Robins 2002). For the UK, Blundell et al. (2000) estimate participation elasticities of -0.08 to -0.07 for married women while Viitanen (2005) obtains a price elasticity of participation of -0.14 for men and women. Viitanen (2004) considers the effect of childcare costs on the labour supply of married women and mothers respectively in Germany, finding very small participation and hours elasticities ranging from -0.02 to -0.09. Choné et al. (2003) obtain cost elasticities of participation and hours worked of -0.01 (-0.01) and -0.02 (-0.01) respectively for French married women

with children under three (between three and seven) while Thoresen and Vatto (2019) find participation and hours elasticities close to zero for Norway.

4.2 Simulating childcare subsidies

Using estimates from the labour supply models for married and lone mothers (model coefficients displayed in Appendix A), we next investigate the labour supply effect of several alternative childcare subsidy reforms. In each case, we treat the subsidy for childcare as income, adding it to disposable income net of childcare costs. This requires the explicit assumption that childcare providers do not change their prices in response to the subsidy and that parents consider the reduction in childcare costs in a similar manner to extra income. Altering the net income under each counterfactual scenario allows us to compute a new utility maximising choice for each household and, by comparing to the baseline scenario, we can estimate how labour supply changes in response to the reform.

We simulate five childcare reforms. The first is a simplistic one in which we abolish childcare costs so that each household can avail of free childcare. Reform two introduces the NCS, a subsidy for some users of formal childcare, using the parameters of the subsidy, as introduced at the end of 2019. Reform three extends this subsidy to those who use informal childcare as well as formal childcare. Reform four replaces the NCS with the most recent, and more generous parameters of the subsidy for formal childcare only. The key parameter changes include an increase in the maximum hours of subsidy to 45 (or 20 for non-working parents) an increase in the hourly universal subsidy from €0.50 to €1.40, an increase in the number of subsidisable hours for preschool and school children and its extension to children up to age 15. Reform five extends this subsidy to users of informal childcare, a potential reform recently mooted by the Department for Children (DCEIDY).[15] In each case, we assume that there are no demand side reactions to the subsidy, i.e., that childcare providers do not change the price of childcare in response to the policy changes and that there is always sufficient supply to meet demand. This is likely to be a simplification as recent work by Narazani et al. (2022) indicates that parents in Ireland face substantial unmet need in formal childcare.

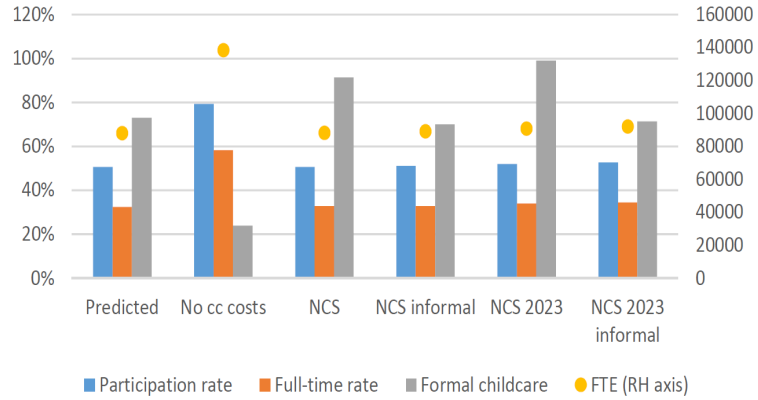
Figure 4 (and Table A4 in Appendix A) shows the effect of each of these reforms on childcare usage and labour supply, compared to the baseline 2019 prediction. In the baseline, the predicted participation rate of mothers in our sample is 50%, with the full-time rate estimated at 31%. Formal childcare usage is estimated at 78% and the number of workers in full-time equivalent (FTE) is around 87,062.[16] We estimate that abolishing childcare costs would increase female labour supply significantly, increasing the participation rate of mothers of young children by 29 ppt to 79%. The full-time rate would almost double, to 58% and the number of FTE female workers would increase by 53,000. Demand for formal childcare, however, would fall to 22%. This reflects higher preferences of parents for informal childcare over formal childcare, captured by the model parameters. Once the cost differential between the two is abolished, parents tend to

[15] In this research, informal childcare includes childminders who work in their own home and nannies who work in the child's home as these are indistinguishable from each other in the SILC data. It is likely that the reform proposed by DCEIDY will extend only to childminders who work in their own homes, who constitute the majority of informal childcare.

[16] The actual rates are 61% participation, 31% full-time, 76% formal childcare and 99,500 FTE workers.

prefer informal childcare.[17]

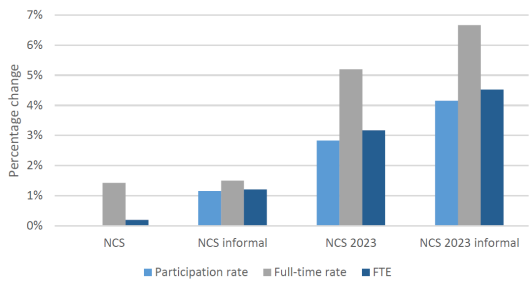
Figure 4: Predicted and counterfactual estimates of the labour supply and childcare usage of mothers of young children



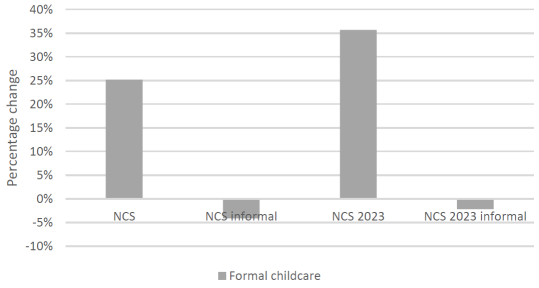
Notes: Own calculations using the 2019 SWITCH policy linked to 2019 SILC data. Sample is restricted to mothers aged 18-65, whose youngest child is under six and who is available for the workforce (i.e. not disabled, in education or retired). In the case of partnered mothers, the sample is restricted to those with partners working full-time (at least 35 hours). Predictions are based on a discrete choice labour supply model as outlined in Section 3.1. Coefficients for each model are shown in the Appendix A. The full-time equivalent (FTE) rate divides total work hours provided by 40.

Moving to simulations of the NCS, Figure 4 also shows how introducing the 2019 parameters and the more generous 2023 NCS parameters affects mothers' labour supply and the demand for formal childcare. Figure 5 shows this in more detail, focusing on actual and hypothetical NCS reforms and indexing the baseline model predictions of mothers' labour supply and demand for childcare at 100.

Figure 5: Estimates of percentage change in labour supply and childcare usage of mothers of young children following NCS reforms



(a) Labour supply



(b) Formal childcare

Notes: Own calculations using the 2019 SWITCH policy linked to 2019 SILC data. Sample is restricted to mothers aged 18-65, whose youngest child is under six and who is available for the workforce (i.e. not disabled, in education or retired). In the case of partnered mothers, the sample is restricted to those with partners working full-time (at least 35 hours). Predictions are based on a discrete choice labour supply model as outlined in Section 3.1. Coefficients for each model are shown in the Appendix A. The full-time equivalent (FTE) rate divides total work hours provided by 40. Changes are reported as a percentage of the 2019 pre-NCS baseline prediction.

[17]The labour supply effect estimated in this scenario is much higher than a similar simulation by (Narazani et al. 2022), whose model is constrained by the lack of information about informal childcare usage and childcare cost in their underlying data.

We estimate that the 2019 system of NCS does not increase mothers' participation rates but does increase their full-time rate, by 1%. Introducing the 2023 NCS policy results in an increase in the participation rate of mothers by 3%, compared to a no-subsidy baseline, with the full-time equivalent increasing by a similar amount. There is a significant increase in the demand for formal childcare compared to informal childcare as a result of the subsidy in each scenario.

With the most recent NCS parameters, demand for formal childcare reaches almost 100%. This reflects the underlying trade-offs captured by the labour supply model between the cost of and personal preference for each kind of childcare. Although demand for formal care reaches almost 100% in this NCS 2023 scenario, capacity constraints and other frictions which are impossible to capture using the survey data underlying the SWITCH model will almost certainly lead to continued usage of some informal care.

In a last set of simulations, we extend the parameters of the 2019 and 2023 NCS policies to informal childcare. The labour supply effect of this extended NCS is larger than the formal childcare-only NCS, signalling a preference for a more flexible – informal – childcare. The trend towards formal childcare precipitated by lower costs is reversed however and there is a small increase in the demand for informal childcare compared to the pre-subsidy baseline.

4.2.1 Exchequer effects of childcare subsidies and behavioural responses

Table 3 reports the net exchequer effect of the simulated reforms for the sample of families with children under 6 and full-time working fathers (in the case of couples). In the pre-NCS scenario, expenditure on childcare subsidies is zero. The column for each reform scenario shows how expenditure increases, accounting for the introduction of and reform to childcare subsidies and the induced change in childcare choice and labour supply of mothers.

The introduction of the NCS in 2019, increases government expenditure on childcare subsidies for our subsample to €200 million per annum in a morning-after setting. However, the childcare behavioural response – a shift from informal to formal care (Figure 4) – adds a further €100 million to the cost. On the other hand, higher mothers' labour supply increases tax revenue by €1.3 million, leading to a net exchequer loss of €307 million per annum. The loss would be higher in the absence of the labour supply response; we estimate that the resulting increase in tax revenue reduces the exchequer loss by around half a percent.

Simulating the effect of the 2023 NCS leads to higher government expenditure on childcare subsidies and a correspondingly higher increase in tax revenue, which mitigates the increased exchequer cost by 1.6%.

In general, extending the NCS (either the 2019 or 2023 version) to informal childcare results in slightly higher tax increases, possibly due to the higher average market income of those families using informal childcare (Table 1). It also results in a slight decrease in welfare payments as some of the labour supply increases come from single mothers in receipt of the One Parent Family Payment or from families in receipt of the Working

Family Payment, an in-work benefit. This increases the mitigating effect of tax and welfare on the cost of the subsidies to 2% in the case of the 2019 NCS and 4% in the case of the 2023 NCS.

In our final hypothetical scenario of free childcare, subsidies would cost over €2 billion per annum. The behavioural response in terms of childcare take-up accounts for around half of this. The resulting labour supply increase by mothers increases the tax take by more than half a million euro per annum in this scenario with welfare expenditure also decreasing by €48 million. In this high expenditure scenario, the mitigating effect of tax and welfare on the total cost is much higher, at 27%, relative to the other scenarios.

5 Conclusion

This paper has investigated how childcare costs affect the labour supply of mothers of young children in Ireland. Ireland presents a relatively unique case study, combining a strong history of gender inequality and low female labour supply with very high childcare costs which have only recently been tempered by significant and wide-ranging childcare subsidies.

Using a discrete choice labour supply model which is extended to allow a choice between formal and informal childcare, we model the labour supply of mothers with children who are not yet of school age. We find that their labour supply is quite sensitive to childcare costs. We estimate that abolishing all childcare costs would increase their labour market participation and full-time rate by almost 30 ppt.

We model the effect of the introduction of the National Childcare Scheme in Ireland at the end of 2019. This scheme subsidises users of formal childcare through both a universal and means-tested payment. We estimate that the scheme significantly increased the demand for formal childcare and increased the labour market participation of mothers of young children by 1 ppt. We estimate that reforms to the policy, which came into effect in 2023, will further increase labour supply by increasing the full-time rate of mothers with young children by 1 ppt.

However, this latest reform is likely to put pressure on the supply of formal childcare. Because informal childcare is not currently subsidised by the NCS, increasing its generosity substantially depresses the demand for informal childcare. However, if the NCS is extended to informal childcare providers, this is likely to further increase female labour supply and restore demand for informal childcare.

Simulating the exchequer cost of reforms to the NCS, we find that behavioural responses tend to increase it. In particular, the switch from informal to formal childcare as a result of subsidies for the latter puts upward pressure on the exchequer cost. There is a small mitigating effect from increased tax and decreased welfare as a result of mothers increasing their labour supply in response to more generous childcare subsidies.

Putting these results into context, we find that the elasticity of mothers' labour supply with respect to childcare costs is at the upper end of what has previously been

found in countries with similar reliance on private childcare provision in their histories (such as the UK, the US and Canada). Using childcare subsidies as a tool to increase female labour supply in this context would be an effective strategy. However, our modelling of the choice between formal and informal childcare reveals that, cost aside, parents in Ireland have a strong preference for informal childcare. For this reason, extending existing childcare subsidies to this type of provision would relieve the pressure on formal childcare provision while further increasing female labour supply.

Table 3: Exchequer effects of childcare and labour supply behavioural responses (€million per annum)

	No childcare costs	NCS	NCS informal	NCS 2023	NCS 2023 informal
Childcare subsidies and ECCE					
before behavioural response	1,167	201	291	375	536
after behavioural response (a)	2,207	309	323	589	592
Change in tax revenue (b)	534	1	3	10	21
Change in welfare expenditure (c)	-48	0	-4	0	-3
Net exchequer impact (b-a-c)	-1,625	-307	-317	-579	-568
Mitigating effect of tax and welfare ((c-b)/a)	-26.40%	-0.40%	-2.00%	-1.60%	-4.10%

Notes: Own calculations using the 2019 SWITCH policy linked to 2019 SILC data. Sample is restricted to mothers aged 18-65, whose youngest child is under six and who is available for the workforce (i.e. not disabled, in education or retired). In the case of partnered mothers, the sample is restricted to those with partners working full-time (at least 35 hours). The baseline scenario is no NCS. Childcare subsidies after the behavioural response take into account both labour supply and childcare type responses.

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A Appendix A

Table A1: Heckman corrected model of hourly wages for women

	Coefficient	Standard errors
Hourly wage		
Age	0.263	0.106
Age^2	-0.003	0.001
Secondary education	-0.212	0.858
Tertiary education	12.910	1.059
Irish	1.820	0.604
Married	0.869	0.381
Child	-1.063	0.298
Constant	-0.979	2.385
Selection equation		
Tertiary education	0.853	0.050
Non-labour income	0.000	0.000
Child	-0.060	0.021
Child<3	-0.057	0.030
Child 3-6	-0.084	0.031
Constant	-0.033	0.044
Inverse Mills Ratio	15.385	
N	2445	

Notes: Sample is all women aged 18-65 in 2019 SILC.

Table A2: Labour supply estimation for partnered mothers

	Coefficient	Standard errors
Leisure	0.828	0.020
Lesiure^2	-0.005	0.000
Leisure*Income	-0.000	0.000
Leisure*Age	-0.031	0.001
Leisure*Age^2	0.000	0.000
Leisure*Age^3	-0.000	0.000
Leisure*Child<3	0.026	0.001
Leisure*Child 3-6	0.050	0.001
Leisure*Child	-0.011	0.001
Leisure*Leisure M	0.004	0.000
Income^2	-0.000	0.000
Income*Child<3	-0.003	0.000
Income*Child 3-6	0.003	0.000
Income*Child	-0.002	0.000
Income*Tertiary F	-0.003	0.000
Income*Tertiary M	0.003	0.000
Income*Experience	-0.000	0.000
Income*Urban	0.004	0.000
Fixed cost of work	-1.719	0.193
FC*Child<3	0.249	0.048
FC*Child 3-6	0.923	0.043
FC*Child 6-12	-1.942	0.046
FC*Age	-0.560	0.005
FC*Tertiary	2.758	0.033
FC*Experience	0.470	0.003
FC*Leisure M	0.164	0.003
Income	0.009	0.000
Likelihood ratio	500.819	
p-value	0.000	
N	1063867	

Notes: Discrete choice model of labour supply with four weekly hours choices (0.16,32 and 40) and choice of formal, informal and parental childcare is estimated by maximum likelihood using the Stata command mixlogit (Hole, 2007). Counterfactual income and childcare costs calculated using the microsimulation model, SWITCH, linked to SILC 2019. Sample is restricted to married mothers aged 18-65, whose youngest child is under six, whose partner is working full-time (at least 35 hours) and who is available for the workforce (i.e. not disabled, in education or retired).

Table A3: Labour supply estimation for single mothers

	Coefficient	Standard errors
Leisure	0.713	0.017
Lesiure^2	-0.010	0.000
Leisure*Income	0.000	0.000
Leisure*Age	0.005	0.000
Leisure*Child	0.056	0.002
Leisure*Tertiary	0.084	0.003
Leisure*Urban	-0.126	0.003
Leisure*Experience	-0.022	0.000
Income^2	0.000	0.000
Income*Irish	-0.018	0.000
Income*Child<3	-0.009	0.000
Income*Child	-0.009	0.000
Fixed cost of work	-27.733	0.518
FC*Child 3-6	0.309	0.046
FC*Tertiary	3.033	0.115
FC*Urban	-2.419	0.117
FC*Age	1.195	0.030
FC*Age^2	-0.022	0.000
Income	0.014	0.001
Likelihood ratio	283.860	
p-value	0.000	
N	255360	

Notes: Discrete choice model of labour supply with four weekly hours choices (0.16,32 and 40) and choice of formal, informal and parental childcare is estimated by maximum likelihood using the Stata command mixlogit (Hole, 2007). Counterfactual income and childcare costs calculated using the microsimulation model, SWITCH, linked to SILC 2019. Sample is restricted to single mothers aged 18-65, whose youngest child is under six and who is available for the workforce (i.e. not disabled, in education or retired).

Table A4: Childcare subsidy simulations

		Actual	Predicted	No cc costs	NCS	NCS informal	NCS 2023	NCS 2023 informal
Labour supply	0 hours	74,104	93,805	38,701	91,828	91,828	89,626	88,515
	1-32 hours	56,747	35,912	41,226	36,102	36,456	36,100	36,359
	40 hours	57,610	58,744	108,534	60,531	60,177	62,735	63,587
Employment and childcare rates	Participation rate	60.7%	50.2%	79.5%	51.3%	51.3%	52.4%	53.0%
	Full-time rate	30.6%	31.2%	57.6%	32.1%	31.9%	33.3%	33.7%
	Formal childcare	76.2%	78.4%	21.7%	90.2%	76.8%	98.2%	76.4%
	Full-time equivalent	99,548	87,062	140,102	89,001	88,930	91,203	92,262

Notes: Own calculations using the 2019 SWITCH policy linked to 2019 SILC data. Sample is restricted to mothers aged 18-65, whose youngest child is under six and who is available for the workforce (i.e. not disabled, in education or retired). In the case of partnered mothers, the sample is restricted to those with partners working full-time (at least 35 hours). Predictions are based on a discrete choice labour supply model as outlined in Section 3.1. Coefficients for each model are shown in the Appendix A. The counterfactual scenarios are as follows: No cc costs formal and informal childcare are free; NCS The NCS is introduced with 2019 parameters; NCS informal The 2019 NCS is extended to informal childcare as well as formal childcare; NCS 2023 The NCS is introduced with 2023 policy parameters; NCS 2023 informal The 2023 NCS is extended to informal childcare as well as formal childcare.

B Appendix B

Childcare costs and hours are based on self-reported responses in 2019 SILC, the data underlying the SWITCH model. The SILC data contains information on hours used per week for each type of childcare in a "usual week". The average weekly cost of each type of childcare is also collected.

Table B1: Childcare variables in SILC 2019

SILC Variables	**Survey Questions**	**Childcare type**
pre_schl	During a usual week how many hours is <name>cared for by a pre-school or equivalent (kindergarten, Montessori)?	Formal
creche	During a usual week how many hours is <Name>cared for by a creche or day-care centre?	Formal
centre	During a usual week how many hours is <Name>cared for by a centre-based service outside school hours (before and/ or after school even if it is at the school)?	Formal
child_mindr	During a usual week how many hours is <name>cared for by a professional childminder at the child's home or the childminder's home? (This includes au pairs, friends and relatives when the friends or relatives are paid for child minding).	Informal
pre_scst	In a typical week how much do (did) you pay in Montessori (or equivalent) fees for <name>?	Formal
centre_c	In a typical week how much do (did) you pay in centre-based childcare for <name>?	Formal
creche_c	In a typical week how much do (did) you pay in creche fees for <name>?	Formal
mindr_c	In a typical week how much do (did) you pay in child minder fees for <name>?	Informal

Notes: Calculations using the microsimulation model, SWITCH linked to 2019 SILC. Sample is mothers aged 18-65 who are fit to work, whose youngest child is no older than six and whose partner (if any) works at least 35 hours per week. Monetary values are weekly unless otherwise specified.