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# *Appendices*

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# ***Appendix I: Childcare related statistics for 15 OECD countries***

		OECD Average	Iceland	Denmark	Sweden	Finland	Norway	Slovenia	UK
Total population '000 persons, 2012		-	320	5,505	9,551	5,414	5,019	2,056	63,705
% of population aged < 15, 2012		-	20.7	17.7	16.9	16.4	18.4	14.4	17.6
Compulsory school age, 2010		-	6 years	7 years	7 years	7 years	6 years	6 years	5 years
% employment rates, 2011	Female	56.7	77.3	70.4	71.9	67.5	73.4	60.9	65.3
	Male	73.0	80.8	75.9	76.3	70.9	77.2	67.7	75.5
	Total	64.8	79.0	73.1	74.1	69.2	75.3	64.4	70.4
	Employment rate gap (men-women)	16.3	3.5	5.5	4.4	3.4	3.8	6.8	10.2
% full-time jobs i.e. >30 hours per week, 2011	Female	74.7	75.9	74.8	81.6	84.0	70.0	89.1	60.7
	Male	91.4	89.6	86.2	90.2	90.4	89.0	93.3	88.3
% part-time jobs i.e. <30 hours, 2011	Female	25.3	24.1	25.2	18.4	16.0	30.0	10.9	39.3
	Male	8.6	10.4	13.8	9.8	9.6	11.0	6.7	11.7
% female employment rate 25 to 54 age group, 2009		70.9	85.7	82.9	81.9	80.4	n.a.	83.2	74.4
% maternal employment rate, 2009		66.2	84.8	84.0	80.3	77.2	n.a.	85.7	67.1
% maternal employment rates by age of youngest child, 2009	< 3 years	51.4	n.a.	71.4	71.9	51.8	n.a.	78.1	55.9
	3 to 5 years	64.3	83.6	77.8	81.3	76.0	n.a.	82.2	58.2
	6 to 14 years	72.7	86.5	77.5	76.1	76.0	n.a.	86.1	73.8
	Gap between rate <3 and 6 to 14 years	21.3	n.a.	6.1	4.2	24.2	n.a.	8.0	17.9
% maternal employment rates by no. of children aged <15, 2009	One child	69.2	88.5	n.a.	75.7	76.7	n.a.	81.4	70.2
	Two children	65.7	82.3	n.a.	85.9	82.3	n.a.	85.5	66.5
	Three or more children	50.9	n.a.	n.a.	77.0	69.0	n.a.	77.0	40.7

		OECD Average	France	Netherlands	Switzerland	Ireland	Australia	New Zealand	USA	Canada
Total population '000 persons, 2012		-	63,294	16,778	7,955	4,441	22,684	4,433	313,914	34,880
% population aged < 15, 2012		-	18.3	17.3	14.4	21	18.8	20.1	19.5	16.2
Compulsory school age, 2010		-	6 years	5 years	6 years	6 years	6 years	5 years	6 years	6 years
% employment rates, 2011	Female	56.7	59.7	69.9	73.2	56.0	66.7	67.2	62.0	68.9
	Male	73.0	68.1	79.8	85.3	63.3	78.7	78.2	71.4	75.0
	Total	64.8	63.8	74.9	79.3	59.6	72.7	72.6	66.6	72.0
	Employment rate gap (men-women)	16.3	8.4	9.9	12.1	7.3	12.0	11.0	9.4	6.1
% full-time jobs i.e. >30 hours per week, 2011	Female	74.7	77.9	39.5	54.5	60.7	61.5	65.7	82.9	72.8
	Male	91.4	94.1	82.9	90.6	87.4	86.8	88.8	91.6	87.1
% part-time jobs i.e. <30 hours, 2011	Female	25.3	22.1	60.5	45.5	39.3	38.5	34.3	17.1	27.2
	Male	8.6	5.9	17.1	9.4	12.6	13.2	11.2	8.4	12.9
% female employment rate 25 to 54 age group, 2009		70.9	76.6	79.3	77.6	67.1	72.1	74.2	72.0	74.3
% maternal employment rate child under 15, 2009		66.2	73.6	78.5	69.7	58.7	61.9	62.2	66.7	70.5
% maternal employment rates by age of youngest child, 2009	< 3 years	51.4	59.3	77.8	58.3	55.1	n.a.	42.2	54.2	58.7
	3 to 5 years	64.3	73.7	77.0	61.7	52.9	48.7	61.3	62.8	68.1
	6 to 14 years	72.7	79.7	78.1	77.0	60.9	73.9	78.0	73.2	71.1
	Gap between rate<3 and 6 to 14 years	21.3	20.4	0.3	18.7	5.8	n.a.	35.8	19.0	12.4
% maternal employment rates by no. of children aged<15, 2009	One child	69.2	75.8	78.2	69.5	63.1	65.7	62.4	n.a.	70.1
	Two children	65.7	73.6	79.9	65.4	56.4	63.5	62.8	n.a.	73.2
	Three or more children	50.9	52.3	70.8	58.0	49.2	50.1	45.9	n.a.	66.3

		OECD Average	Iceland	Denmark	Sweden	Finland	Norway	Slovenia	UK
% of children ages 0 to 14 in couple households by parental employment status, 2010	Both parents working full-time	39.7	n.a.	n.a.	n.a.	51.7	n.a.	76.2	21.1
	One parent full-time	34.2	n.a.	n.a.	n.a.	32.8	n.a.	14.9	27.1
	One parent full-time, One part-time	19.1	n.a.	n.a.	n.a.	10.2	n.a.	5.9	40.0
	Neither parent working	4.9	n.a.	n.a.	n.a.	3.6	n.a.	1.3	6.6
	Other	3.1	n.a.	n.a.	n.a.	1.8	n.a.	1.8	5.2
% of children in lone parent households by parental employment status, 2010	Parent working full-time	50.1	n.a.	n.a.	n.a.	59.5	n.a.	84.3	22.7
	Parent working part-time	15.4	n.a.	n.a.	n.a.	10.3	n.a.	3.1	26.4
	Parent not working	35.2	n.a.	n.a.	n.a.	30.1	n.a.	12.6	50.9
% poverty rates, 2010	Total population	11.2	6.4	6.0	9.1	7.3	7.5	9.2	9.9
	Children <18 years old	13.3	7.1	3.7	8.2	3.9	5.1	9.4	9.8
% poverty rates for children and households with children by household characteristics, 2010	Lone parent - Not working	58.0	31.2	26.7	56.7	43.0	42.3	82.2	27.8
	Lone parent- Working	20.9	26.2	5.6	10.9	6.8	9.9	23.9	4.8
	Couple - No workers	53.6	30.0	30.5	58.4	43.2	42.4	73.4	30.3
	Couple - One worker	18.6	14.6	9.3	18.2	7.3	12.6	27.1	8.6
	Couple - Two or more workers	4.1	2.3	0.9	1.2	1.4	1.0	7.5	1.0
% poverty rates by household type, 2010	All households with children	11.6	6.3	3.0	6.9	3.7	4.4	8.2	9.2
	Lone parents with children	31.0	27.1	9.3	18.6	11.4	14.7	33.4	16.9
	Couple families with children	9.9	3.4	2.6	4.3	3.0	2.8	6.7	7.9
All social protection spending % of GDP, 2009		22.1	18.5	30.2	29.8	29.4	23.3	23.7	24.1
% social spending on children by age group, 2009	Early, ages 0 to 5 years	24.8	36.8	24.5	27.9	30.2	29.3	29.0	27.6
	Middle, ages 6 to 11 years	35.7	33.5	39.7	35.5	29.7	34.1	37.0	35.1
	Late, ages 12 to 17 years	39.5	29.7	35.8	36.7	40.1	36.6	34.0	37.3

		OECD Average	France	Netherlands	Switzerland	Ireland	Australia	New Zealand	USA	Canada
% of children ages 0 to 14 in couple households by parental employment status, 2010	Both parents working full-time	39.7	37.8	4.8	n.a.	n.a.	n.a.	33	61.8	n.a.
	One parent full-time	34.2	28.9	20.6	n.a.	n.a.	n.a.	35	35.5	n.a.
	One parent full-time, One part-time	19.1	24.4	59.2	n.a.	n.a.	n.a.	24	0.0	n.a.
	Neither parent working	4.9	4.6	3.3	n.a.	n.a.	n.a.	6	2.8	n.a.
	Other	3.1	4.3	12.2	n.a.	n.a.	n.a.	2	0.0	n.a.
% of children in lone parent households by parental employment status, 2010	Parent working full-time	50.1	46.1	14.5	n.a.	n.a.	n.a.	32	35.5 <i>All parents working</i>	n.a.
	Parent working part-time	15.4	20.7	48.3	n.a.	n.a.	n.a.	18		n.a.
	Parent not working	35.2	33.2	37.2	n.a.	n.a.	n.a.	49	64.5	n.a.
% poverty rates, 2010	Total population	11.2	7.9	7.5	9.5	9.0	14.5	10.3	17.4	11.9
	Children <18 years old	13.3	11.0	9.9	9.8	10.2	15.1	13.3	21.2	14.0
% poverty rates for children and households with children by household characteristics, 2010	Lone parent - Not Working	58.0	49.7	58.2	31.6 <i>All lone parents</i>	36.9	73.1	47.4	90.7	87.0
	Lone parent – Working	20.9	18.4	22.6		2.1	14.4	13.8	31.1	27.4
	Couple - No workers	53.6	24.8	66.4	7.2 <i>All couples</i>	30.0	67.5	46.9	86.9	68.5
	Couple - One worker	18.6	11.4	15.4		14.6	10.3	13.0	28.1	23.2
	Couple - Two or more workers	4.1	2.9	2.0		2.3	1.9	2.5	5.8	4.4
% poverty rates by household type, 2010	All households with children	11.6	8.7	7.9	8.7	9.7	12.5	10.4	18.6	11.6
	Lone parents with children	31.0	25.3	31.3	31.6	19.5	44.9	28.8	45.0	31.0
	Couple families with children	9.9	5.6	5.4	7.2	8.3	8.6	7.9	15.2	9.9
All social protection spending % of GDP, 2009		22.1	32.1	23.2	18.4	23.6	17.8	21.2	19.2	19.2
% social spending on children by age group, 2009	Early, ages 0 to 5 years	24.8	30.4	24.8	11.1	22.4	29.5	26.0	12.0	n.a.
	Middle, ages 6 to 11 years	35.7	30.1	32.4	40.6	34.9	33.3	34.7	41.9	n.a.
	Late, ages 12 to 17 years	39.5	39.5	42.8	48.3	42.7	37.2	39.3	46.1	n.a.

		OECD Average	Iceland	Denmark	Sweden	Finland	Norway	Slovenia	UK
Public spending on family support as % of GDP, 2009	Cash	1.41	1.58	1.63	1.58	1.67	1.42	0.76	2.46
	Services	0.94	2.38	2.27	2.17	1.62	1.79	0.53	1.38
	Tax measures	0.28	0.00	0.00	0.00	0.00	0.13	0.8	0.38
	Total	2.61	3.96	3.90	3.75	3.29	3.34	2.1	4.22
Public spending on pre-school childcare and pre-primary as % of GDP, 2009	Childcare	0.3	0.9	0.7	0.9	0.8	0.9	0.0	0.5
	Pre-primary	0.4	0.8	0.7	0.5	0.3	0.3	0.5	0.7
	Total	0.7	1.7	1.4	1.4	1.1	1.2	0.5	1.2
Public spending per pre-school child in \$ PPP converted, 2008	On pre-primary education	3,662	4,589	3,743	3,628	2,420	4,127	n.a.	4,255
	On childcare support	5,429	5,733	6,376	5,928	7,118	6,425	n.a.	3,563
Childcare fees per 2 year old as % of average wage, 2008		21.4	7.2	13.6	5.0	12.2	12.1	n.a.	24.7
Net full-time childcare costs (two 2 year olds) for a dual earner family with total income 167% of the average wage, % of disposable income, 2008		11.8	5.0	8.9	4.7	n.a.	10.8	13.7	26.6
Participation rate in childcare and pre-school services among children under 3 years, 2010		32.6	55.7	65.7	46.7	28.6	51.3	33.8	40.8
Participation by FTEs		n.a.	65.2	74.4	51.1	32.9	55.1	40.3	22.2
Average hours of attendance per week		n.a.	32.0	36.0	33.0	31.0	38.0	30.0	32.0
% enrolment in formal care for the under 3s and pre-school from 3 to 5 years, 2008	Under 3 years	30.1	55.0	65.7	46.7	28.6	51.3	33.8	40.8
	3-5 years	77.3	95.9	91.5	91.1	74.2	94.5	77.5	92.7
% using informal childcare, 2008	0 to 2 years old	22.6	2.2	0.6	1.5	1.3	4.3	40.9	31.7
	3 to 5 years old	24.2	0.1	0.1	0.5	4.2	2.3	49.6	36.9
	6 to 12 years old	16.4	2.1	0.0	1.7	4.4	6	32.3	32.2

		OECD Average	France	Netherlands	Switzerland	Ireland	Australia	New Zealand	USA	Canada
Public spending on family support as % of GDP, 2009	Cash	1.41	1.44	0.78	1.01	3.26	1.94	2.47	0.11	1.12
	Services	0.94	1.76	0.93	0.31	0.82	0.84	1.08	0.59	0.23
	Tax measures	0.28	0.78	0.77	0.14	0.15	0.05	0.02	0.52	0.21
	Total	2.61	3.98	2.48	1.46	4.24	2.83	3.56	1.22	1.33
Public spending on childcare and pre-primary as % of GDP, 2009	Childcare	0.3	0.4	0.5	0.1	0	0.3	0.1	0.1	0.0
	Pre-primary	0.4	0.7	0.5	0.1	0.4	0.3	0.9	0.3	0.2
	Total	0.7	1.1	0.9	0.2	0.4	0.6	1.0	0.4	0.2
Public spending per child on in \$ PPP, 2008	On pre-primary education	3,662	4,679	5,881	2,515	n.a.	5,709	6,001	4,660	4,052
	On childcare support	5,429	2858	1,092	1,129	n.a.	1,726	476	794	n.a.
Childcare fees per 2 year old as % of average wage, 2008		21.4	10.0	55.8	43.8	50.2	49.4	39.0	19.5	40.0
Net full-time childcare costs (two 2 year olds) for a dual earner family with total income 167% of the average, % of disposable income, 2008		11.8	10.4	10.1	50.6	25.6	14.5	18.6	23.1	18.5
Participation rate in childcare and pre-school services among children under 3 years, 2010		32.6	42.0	55.9	n.a.	30.8	29.0	37.9	31.4	24.0
Participation by FTEs		n.a.	43.4	34.5	n.a.	25.9	17.8	25.3	32.0	25.6
Average hours of attendance per week		n.a.	16.0	35.0	n.a.	18.0	37.0	n.a.	25.0	34.0
% enrolment in formal care for the under 3s and pre-school from 3 to 5 years, 2008	Under 3 years	30.1	42.0	55.9	n.a.	30.8	29.0	37.9	31.4	24.0
	3 to 5 years	77.3	99.9	67.1	47.5	56.4	54.6	94.1	55.7	56.8
% using informal childcare, 2008	0 to 2 years old	22.6	17.7	51.9	n.a.	13.6	n.a.	n.a.	n.a.	n.a.
	3 to 5 years old	24.2	19.6	47.5	n.a.	16.7	n.a.	n.a.	n.a.	n.a.
	6 to 12 years old	16.4	13.6	34	n.a.	9.9	n.a.	n.a.	n.a.	n.a.

		OECD Average	Iceland	Denmark	Sweden	Finland	Norway	Slovenia	UK
% distribution of children ages 0 to 14 by household type, most recent year	Proportion of children living in lone parent families	15.9	n.a.	17.4	21.0	15.3	n.a.	15.5	22.9
	Proportion of children living in couple families	82.9	n.a.	81.3	78.0	83.6	n.a.	83.3	75.6
	(Proportion of children living in couple families where cohabiting partners)	(8.2)	n.a.	(20.9)	n.a.	(18.1)	n.a.	(13.1)	(15.2)
	Proportion of children living in other types of households	1.8	n.a.	1.4	1.0	1.1	n.a.	0.7	1.5

		OECD Average	France	Netherlands	Switzerland	Ireland	Australia	New Zealand	USA	Canada
% distribution of children ages 0 to 14 by household type, most recent year	Proportion of children living in lone parent families	15.9	13.3	10.7	15.2 <i>All lone parent and couple families</i>	n.a.	16.8	21.4	25.8	22.1
	Proportion of children living in couple families	82.9	85.3	88.0		n.a.	81.0	69.0	70.7	77.9
	(Proportion of children living in couple families where cohabiting partners)	(8.2)	n.a.	(9.0)	84.7 <i>All other types of families</i>	n.a.	n.a.	n.a.	(4.1)	(14.1)
	Proportion of children living in other types of households	1.8	1.4	0.9		n.a.	2.6	n.a.	3.5	0.0

# Appendix II: Detailed analysis of childcare provision in four OECD countries

**Table 21: Summary of childcare and early education services in four OECD countries**

## Key features of childcare provision

### UK

#### *England<sup>87</sup>*

##### *Childcare governance and entitlements*

The Department for Education is responsible for ECEC but ECEC is administered by local authorities. There is no continuous entitlement from birth to school age. Parents have no guarantee of a childcare place for their child at the end of maternity/paternity leave. However, all 3 and 4 year olds are entitled to 15 hours of free early education each week for 38 weeks of the year, the Early Years Entitlement (EYE). There is some provision for 2 year olds but this is linked to deprivation.

##### *Perceptions of affordability*

As an indication of unmet demand for childcare in England, a survey of 4,000 parents in 2011 indicated that<sup>88</sup>:

- Eight out of ten parents living in severe poverty, defined as an income of less than £12,000, said that cost was a barrier to accessing childcare.
- A quarter of the parents in severe poverty who responded had given up work, a third had turned down a job, and a quarter had not been able to take up education or training, all because of difficulties in accessing childcare.
- The majority of parents in severe poverty, 58%, said they were no better off working and paying for childcare, compared with just 19% of those with incomes over £30,000.
- 41% of parents in severe poverty said they would consider giving up work and 25% said they would consider reducing their hours given a reduction in the childcare element of WTC.
- The majority of parents, 61%, in severe poverty said they had struggled to pay for childcare, compared to around a third of parents on higher incomes, 37%.
- 41% said that their childcare costs were similar to their mortgage or rent costs.

A further survey of 1,934 mothers with children under the age of 10 indicated that<sup>89</sup>:

- Childcare costs were regarded as the biggest single obstacle to more work by more than four out of every 10 mothers.
- 37% of stay-at-home mothers said they would like to work and would hope to do an average of 23 hours a week.
- And one in five of mothers who were already employment would like to work more; an extra 10 hours a week on average.

<sup>87</sup> Many considerations of childcare practice and policy in “the UK” are in practice considerations of what is happening in England. The three devolved administrations have responsibility for childcare policy in their own territories. That said, in so far a major part of public support to childcare continues to be through the tax system, e.g. WTC, employer vouchers or Tax Free Childcare, then there continues to be common practice across the UK.

<sup>88</sup> Daycare Trust and Save the Children 2014, *Making Work Pay—The Childcare Trap*, Edinburgh. Available at: [http://www.savethechildren.org.uk/sites/default/files/docs/Making\\_Work\\_Pay\\_Scotland\\_briefing\\_1.pdf](http://www.savethechildren.org.uk/sites/default/files/docs/Making_Work_Pay_Scotland_briefing_1.pdf)

<sup>89</sup> G. Cory and V. Alakeson 2014, *Careers and Carers: Childcare and Maternal Labour Supply*, Resolution Foundation, London. Available at: <http://www.scribd.com/doc/201656569/Careers-and-Carers-childcare-and-maternal-labour-supply>

## Key features of childcare provision

### *Supply side characteristics of childcare provision*

In 2011 78% of all paid ECEC staff were qualified to at least Level 3 and 15% were qualified to at least Level 6, i.e. degree level. Staff in early years provision in schools tend to have higher qualifications than childcare staff.

Pay in the sector is low. In 2011 the average hourly wage ranged from £7.80 for full daycare staff, including managers, to £11.30 for staff in children's centres. This was less than the national average hourly wage of £14.76<sup>90</sup>. The low pay undermines the attractiveness of the profession to potential applicants.

In terms of composition of providers; 59% of formal care, i.e. day care centres, children's centres, and sessional care/playgroups, is provided on a commercial basis, 30% by non-profit organisations and 12% publicly<sup>91</sup>.

Providers must not exceed the maximum ratios for numbers of children per staff member. In 2013 these ratios were: Nursery for under 1 year olds, three children per full-time adult; Nursery for 2 years old, four; Nursery for 3+ years old, eight, or 13 if led by a teacher. Childcarers can look after six children, no more than three of which can be under the age of 5 and only one of which can be under the age of 1. Child:staff ratios in England are lower than in many other European countries. Hence, the argument that a relatively high degree of regulation inflates costs compared to some other European countries<sup>92</sup>.

### *Maternity Leave policies*

Statutory Maternity Leave is for one year. Statutory Maternity Pay is for 39 weeks, the first six of these at 90% of the previous level of earnings.

### *Outcomes*

Despite high levels of public expenditure, the cost of care to parents is high, particularly for very young children. Since the introduction of free childcare for 3 and 4 year olds the attainment gap between disadvantaged 5 year olds and their more affluent counterparts narrowed from 37% in 2007 to 31% in 2011<sup>93</sup>.

### *Recent childcare support policies*

From 2015 there will be three different levels of subsidy available to parents who pay for childcare, assuming welfare reform continues:

- Parents in a family where all adults work and are not receiving UC, and are not 45p Income Tax rate payers, can receive support through the Tax Free Childcare scheme of 20% of each £ they spend on childcare, up to a maximum level of support of £2,000 per child per year.
- Parents in a family receiving UC and earning enough to pay Income Tax can receive support of up to 85% of each £ they spend on childcare, up to a maximum level of support.
- Parents in a family receiving UC and where at least one adult earns too little to pay Income Tax can receive support of up to 70% of each £ they spend on childcare, up to a maximum level of support.

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<sup>90</sup> R.Brind, O. Norden, S. McGinigal, D. Oseman and A. Simon 2012, *Childcare and Early Years Providers Survey 2011*, Department for Education, London..

<sup>91</sup> Do not add to 100% due to rounding. Brind et al. 2011, *Childcare and Early Years Providers Survey 2010*, Department for Education, London.

<sup>92</sup> For a critique of this argument, which has been advanced by some UK government Ministers, see IPPR 2012, *op.cit.*

<sup>93</sup> C.McCarthy 2 February 2012, "A window of opportunity on childcare", *Taken from website 4Children.Progressonline*. Available at: <http://www.progressonline.org.uk/2012/11/02/a-window-of-opportunity-on-childcare/>

## Key features of childcare provision

### **Scotland: Scottish government proposals for a universal publicly funded childcare**

#### *The proposals and their suggested impact*

In its 2013 White Paper on Scottish independence the Scottish government outlined a proposal to provide 100% publicly funded childcare for all 0 to 4 year olds over the lifetime of two Parliaments. This was to be fully achieved about a decade after Scottish independence in 2016<sup>94</sup>. As a neighbouring jurisdiction/region, and one with many economic and social similarities to Northern Ireland, it is clearly of some interest to policy makers and others in Northern Ireland that Scotland should be proposing to move beyond the current level of support in England in order to achieve something much more similar to Sweden and Denmark.

In briefings, the Scottish government suggested that adoption of such a universal system would be accompanied by a considerable increase in labour supply, a 6% gain in female employment, and a consequent growth in Scottish GDP of £2.2bn. There would be an increase in tax revenues of £700m<sup>95</sup>. Significantly, the implied public spending cost was also £700m, that is for the *early phase of implementation*, which might suggest the policy could “pay for itself” in public finance terms. It is important to stress that hitherto there has been a lack of clarity about the timescale over which the gains to employment would occur and how far they would be associated with partial or full implementation of universal childcare.

#### *Independent assessment of the likely impacts*

The suggested impacts have been scrutinised by Scottish Parliament’s Information Centre (SPICE)<sup>96</sup>. SPICE estimate the cost would be £500m higher, i.e. £1.2bn p.a, for the *full implementation* of a universal pre-school system. They also claimed that a £2.2bn increase in Scottish GDP would require a growth in the labour force of 104,000 which they implied was implausibly high given that a total of “only” 64,000 women were currently economically inactive.

#### *Response from the Scottish government*

The Scottish government’s response to SPICE was that any increase in female labour market participation would accumulate over time and, “We modelled the impact based on international examples. We’re looking at what we can achieve and we think we can match the best in Europe, that’s the pledge we’ve laid down, and looking around Europe I think that Sweden is the best or certainly one of the best and that’s what we’ve modelled”<sup>97</sup>.

## **Canada – Quebec**

### *Governance of the policy*

Each Province and Territory in Canada has autonomy regarding ECEC. Whilst the Quebec childcare system is mainly publicly funded, most of the providers remain private or not for profit. The not for profit childcare centres (CPEs) and childcare agencies which provided most provision before 1996 continue to exist. The CPEs each have their own charters.

### *Introduction of a highly subsidised system*

In 1997 the Province of Quebec introduced a universal ECEC policy. The policy pursued three objectives; to increase mothers’ participation in the labour market, balance the needs of workplace and home and enhanced child development and equality of opportunity for children.

Since 2000, heavily subsidised childcare for children aged from birth to 5 years old has been available. This initially limited the cost to parents to Canadian \$5 a day which was increased to Canadian \$7 in 2004, or about £3 to £4 per day. Before and after-school programmes for children aged 5 to 12 have also been made available at Canadian \$7 per day. Access to regulated childcare, and hence to the Canadian \$5 a day

<sup>94</sup> Scottish Government 2013, *Scotland’s Future Your Guide to An Independent Scotland*, Scottish Government, Edinburgh.

<sup>95</sup> The Courier.co.uk 4 April 2014, “Flaws found in Scottish government’s flagship childcare plans”, The Courier website. Available at: <http://www.thecourier.co.uk/news/politics/flaws-found-in-scottish-government-s-flagship-child-care-plans-1.302081>

<sup>96</sup> SPICE provides impartial research to Members of the Scottish Parliament. See, SPICE 2 April 2014, “Early learning and childcare”, Scottish Parliament, Edinburgh, *Briefing*, no. 14/26.

<sup>97</sup> STV website 3 April 2014, “Scottish Parliament experts question White Paper policy on childcare”, *STV website*. Available at: <http://news.stv.tv/politics/270420-scottish-parliament-experts-question-white-paper-policy-on-childcare/>

## Key features of childcare provision

subsidised spaces, is not restricted solely to parents in the paid workforce or enrolled in school; all families are eligible. At the same time, children from low income families may attend childcare for 23 hours a week at no charge.

While the fee per day has been fixed at Canadian \$7 per day since 1 January 2004, the subsidy per space has increased over time partly because of increased take-up of the free spaces and partly also because of inflation in childcare costs, the latter caused partly by increases in wages paid to childcarers. In the February 2014 Budget an increase in the parental charge was announced; to Canadian \$8 per day in September 2014, Canadian \$9 in 2015 and indexed to inflation thereafter<sup>98</sup>.

In the first year of the policy the average subsidy per space was Canadian \$3,888. For the 2011-12 financial year, the subsidy amounted to Canadian \$10,210 per space. Such averages masked important differences by setting and age of children: not-for-profit centres received the highest average subsidy per space, Canadian \$13,235, followed by for-profit centres, Canadian \$10,840, and family based spaces, Canadian \$8,514.

The level of charges to parents in Quebec at Canadian \$7 per day was equivalent to a monthly charge of Canadian \$154 or Canadian \$1,848 per year without adjusting for holidays. This compares to total public funding of Canadian \$2,240.4bn in 2012 relating to 210,803 subsidised places, ages 0 to 5<sup>99</sup>. This implied a level of public funding per place of \$10,628. Given the parental contribution of Canadian \$1,848, the implied level of public subsidy per place in 2012 was about 85%.

The bulk of public support for childcare in Quebec comes through these low cost places. Additionally, a smaller amount of funding is provided to assist through tax relief those parents who have to pay for places which are not within the \$7 per day programme.

### *Favourable outcomes*

The Quebec policy has made it easier for parents to balance work and family life. It has been associated with a decrease in poverty and welfare dependency. The number of lone parents receiving welfare benefits declined from 99,000 in 1996 to 45,000 in 2008. Alongside this, the poverty rate amongst lone parents declined from 36% to 22%<sup>100</sup>.

### *Unfavourable outcomes*

At the same time, the rapid expansion of childcare has been associated with various challenges or problems. Demand for subsidised spaces continues to exceed supply. The sector's staffing requirements, alongside consequent wage increases, prompted the Quebec government to launch a campaign promoting early childhood education as a career; numbers of childcare staff increased from 29,200 in 2001 to 62,200 in 2010.

The quality of provision has also sometimes been criticised; possible negative consequences in terms of impact on child development in behavioural or cognitive terms were considered in Chapter 3. Two major studies indicated that in the case of many of the providers standards were deemed to be low or unacceptable<sup>101</sup>.

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<sup>98</sup> Canadian Press February 2014, "Quebec reins in government spending as PQ seeks to end doubts over economic record", *Press Release, Canadian Press website*. Available from: <http://news.nationalpost.com/2014/02/20/quebec-budget-reins-in-government-spending-as-pq-seeks-to-end-doubts-over-economic-record/>

<sup>99</sup> M. Friendly, S. Halfon, J. Beach and B. Forer December 2013, *Early Childhood Education and Care in Canada 2012*, Childcare Resource and Research Unit, Toronto.

<sup>100</sup> Fortin, Godbout and St.-Cerny 2012, *op.cit.*

<sup>101</sup> ISQ-Institut de la statistique du Quebec 2004, *Quebec Survey on Quality of Educational Daycare*, Gouvernement du Quebec, Montreal. Available at [http://www.grandirequalitie.gouv.ca/grandir\\_qualitie\\_an.htm](http://www.grandirequalitie.gouv.ca/grandir_qualitie_an.htm).

Also, J. Christa, R. Tremblay and S. Cote 2005, "Quality counts!", *Institute for Research on Public Policy Choices*, vol. 12, no. 4. Available at <http://www.irpp.org>

## Key features of childcare provision

### Denmark

#### *Governance*

Denmark has a fully integrated ECEC system with a universal entitlement to a full-time place for children from 26 weeks to compulsory school age at 7 years old. It is the responsibility of the local authority to ensure these places are available. Informal care outside the family is illegal.

In 2011, responsibility for day care facilities transferred from Ministry of Social Affairs and Integration to the Ministry of Children and Education. The Denmark system is characterised by a high degree of decentralisation to local authorities/ municipalities.

#### *Funding arrangements*

All ECEC services, whether publicly or privately run, are heavily state subsidised. Parental fees are relatively low in percentage terms. The most common form of ECEC is the public daycare centre. For children under school age attending daycare services, the local authority is required to cover at least 75% of gross operating costs – payments by parents are not allowed to exceed 25% of the costs. For after-school care, payments by parents are not allowed to exceed 30%. Parent fees are set annually by the municipalities according to type of setting.

Parents on low incomes receive an additional subsidy, the “aided place subsidy”, from the local authority. Parents with more than one child enrolled in pre-school age care get a discount – they pay the full means tested rate for the first place and 50% for subsequent places. Parents with children in after-school facilities and school-based free time facilities are also eligible for the siblings discount.

The income-related fees subsidy is linked to a nationally set and tapering scale: in 2012, parents with an annual household income of Danish Krone (DKK) 485,500 (equivalent to £52,270) or above paid the full contribution, parents with earnings between DKK 312,226 – 315,690 (£33,615 – £33,988) paid 50% of the contribution and parents with earning of DKK 156,301 (£16,828) or lower were exempt from ECEC contribution. There was an additional subsidy for lone parents.

#### *Comparison with the funding arrangements in the other Nordic countries*

Whilst there were many similarities between the heavily subsidised systems of childcare in each of the Nordics, there were some differences:

Finland- Local authorities charge daycare fees according to the size and income of families. The fees payable for a family’s subsequent children are smaller than those payable for the first child. Families on the lowest incomes are exempt from fees. Fees cover about 14% of the total costs of daycare provision. This implies a subsidy rate of about 86%. (Finland contrasts to the other Nordics by providing a home care allowance paid where one parent stays at home to care for a young child either full or part-time.)

Norway- Parents usually pay a monthly fee, which is capped by the government, for their child’s kindergarten place. In 2012, parent fees were set at Norwegian Krone (NOK )2,330, or £252, per month and NOK 25,630, or £2,769, per year.

In 2008, 17% of municipal kindergarten costs were covered by parental fees, 52% by central state funding and 31% by local municipal assets. All this implies a total publicly funded subsidy rate of 83%.

Sweden- Swedish ECEC is predominantly publicly funded; in 2011, 7% of the costs of a pre-school place and 17% of the costs of an after-school place were financed through parental fees; the remainder was paid by the municipalities. This implies the average total public subsidy rate was somewhere in the range 83% to 93%. Parent fees for pre-schools and after school care depend on income and the number of children in ECEC in the household. The maximum amount any parents pay is capped at a maximum fee of no more than 3% of household income. This cap is set annually and on a national level.

Iceland- Parental contributions cover approximately 30% of the operating costs of publicly run pre-schools care. The fees in privately run pre-schools are usually around 10% to 20% higher.

## Key features of childcare provision

### *Maternity Leave policy*

Total childbirth leave of 32 weeks per family with considerable flexibility as to how this is split between the parents. Rates of pay are often 100% of the previous level. This is especially so in the public sector.

### *Outcomes*

67% of all 1 to 3 year olds and 97% of 3 to 5 year olds attend day care centres<sup>102</sup>. Participation in after-school is also high; 84.4% of 6 to 9 year olds attend a school based facility after school hours<sup>103</sup>.

Whilst child:staff ratios are not regulated, in practice child:staff ratios tend to be low.

In terms of the range of services provided and their quality, the Denmark system of childcare is one of the most elaborate in the world. It is also associated with some of the highest levels of spending per child. Nevertheless, even in Denmark, there are perceptions of quality problems<sup>104</sup>; the Copenhagen Parents Organisation has stated;

***“There are not enough staff, and there is too little space for the children. There have been cuts in the last two years and the municipalities are being given more powers on how to spend the budget on childcare. We think standards have dropped”<sup>105</sup>.***

### *Context*

The Denmark system of childcare is just one feature of what is a high tax/high public spending economy. In 2007 government spending was 51% of GDP and by 2013 that percentage had risen to 58%<sup>106</sup>.

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## Netherlands

### *Governance*

In the Netherlands the ECEC system for children from birth to 5 is not integrated, except in the case of early education between the ages of 4 and 6 delivered in the primary school. The compulsory school age is 5. The early education and care system in the Netherlands is divided between early learning within and outside school, and care. All 4 year olds are entitled to one year of full-time early education.

The Dutch Childcare Act (2005) deregulated childcare except for a requirement to "provide responsible childcare". Apart from complying with health and safety rules, Dutch childcare providers were required to produce nothing more than a "pedagogical plan". Following this de-regulation in 2005 the quality of childcare provision overall may have dropped. Given this, the Dutch government decided to reverse the earlier deregulation policy. Childcare policy guidance is now being converted into a set of enforceable regulations, with a view to protecting children's well-being and promoting long term benefits.

### *The levy on employers*

Since the Childcare Act (2005) the government has given subsidies directly to parents to cover part of their childcare costs. Additionally, since 2007 all employers have to pay a percentage of all their employees' salaries, both those with children and those without, to the government to cover part of the costs of childcare. In 2011, that levy was 0.34% of the total wage or salary. Employees are reimbursed by their employer for a third of childcare costs for children under 12 years old. The employer childcare levy is shared in the case of two employed parents, so that each parent would then receive one sixth of the childcare costs from their respective employers.

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<sup>102</sup> Local Government Denmark 21 March 2011, Faktaark: Dagtilbud, Local Government Denmark, Copenhagen. Available at: <http://www.kl.dk/Born-og-unge/Fakta-om-dagtilbud/d83256/>, or <http://www.kldk.English>

<sup>103</sup> Statistics Denmark 2012, *op.cit.*

<sup>104</sup> Such problems could be real or perhaps such comments indicate that the Denmark system has encouraged very high expectations on the part of parents.

<sup>105</sup> *The Guardian* 12 February 2012, "What Britain could learn from Denmark's childcare model", *Article on The Guardian website*. Available at: <http://www.theguardian.com/society/2012/feb/18/britain-learn-denmark-childcare-model>

<sup>106</sup> *The Economist* 2 February 2013, "Survey of the Nordics: The Next Supermodel", Economist Publications, London.

## Key features of childcare provision

### *Government subsidies*

The government also pays an income related subsidy, which is lower for the first child than for the second and subsequent children. The amount of money the government spent on subsidies for childcare increased from €0.7 billion, i.e. £0.6 billion, in 2005 to €3.2 billion, i.e. £2.6 billion, in 2011. It is estimated that this increase was caused partly by an increase in the number of children using childcare, accounting for one-half of the increase, and by an increase in the fees charged by providers, accounting for another 15% of the increase.

Since 2005, there has been a 200% increase in the number of registered childminders. The expansion of childminders since the introduction of the Childcare Act (2005) was explained in part by grandparents registering to become formal carers for their own grandchildren, rather than by the registration of new “professional” childminders incentivised by deregulation to join the sector. The Dutch government therefore amended the Childcare Act (2005) to tighten up regulation. As a result, between 2009 and 2010 the number of parents receiving the subsidy for childminding declined by a quarter.

Local authorities funded playgroups and other early remedial education by €20 million, i.e. £16 million, during 2009 to 2012 in addition to funding provided by central government for this purpose.

Public subsidy of formal childcare and pre-primary education in the Netherlands tends to be concentrated on children aged 4 and above.

### *Maternity Leave policy*

Maternity leave for 16 weeks, of which six are before the birth and 10 afterwards. This is paid at 100% of previous earnings subject to a ceiling of the daily sickness benefit rate, i.e. €193 or £155 in 2012.

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# Appendix III: Shortlisting and selection of the third model

In order to identify a third model of childcare funding and provision to which cost-benefit analysis could be applied, a detailed international benchmarking review was undertaken to assess models of childcare and associated impacts across 15 countries. The results of that review were summarised in Chapter 3 and Appendix I.

Based on this review we shortlisted four countries, Netherlands, Slovenia, France and Australia. Table 22 indicates some of the data which were considered during the shortlisting. These four countries had some similarities with the UK or Northern Ireland but were also distinct from the Nordic countries in terms of their approach to childcare.

Levels of spend per childcare place tended to be lower than those in the UK but outcomes, especially in terms of the maternal employment rate, tended to be better. This characterisation is subject to the qualification, noted in Chapter 2 and associated with IPPR 2012, *op.cit.*, that the OECD data on relative levels of spending across the countries may exaggerate the UK's comparative position to the extent that the OECD standardises the figures to a common starting age of 6 for compulsory schooling. However, this, if anything, only reinforced the interest in these countries. These four other countries tend to spend less than the UK per childcare place and yet also tend to have more impact.

Whilst a case could be made for considering the childcare model represented by each of these four countries, interest in the French system was reduced given that the delivery system for childcare was complex and fragmented. Slovenia's very high maternal employment rate may owe much to the unusually low fertility rate<sup>107</sup>. Australia is characterised by one of the lowest maternal employment rates in the OECD.

The arguments for using the Netherlands model included:

- A relatively high maternal employment rate. Whilst the rate was less than in the Nordics, it was considerably higher than both the UK and OECD averages in 2009 and 2011.
- Total public spending per child was less than in the UK.
- The levy system provides an example of businesses making a contribution to funding childcare.
- There was some similarity to the system of support used in the UK given strong reliance on tax credits/reliefs.
- It is illustrative of some of the advantages of a demand-led system and also some of the disadvantages.

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<sup>107</sup> Slovenia's maternal employment rate was the second highest in the OECD in 2011. The fertility rate was 1.5 children per mother in 2007 compared to the 1.9 in the UK; see *The Economist* 2010, *Pocket World in Figures 2010 Edition*, Economist Publications, London.

**Table 22: Key characteristics of childcare in the shortlisted countries**

	GDP per capita PPP (UK= 100), 2014	Maternal employment rate % 2011	Subsidy rate %	Total spend on pre-school educ & childcare \$ PPP, 2008	Spend on child-care only \$ PPP, 2008	Total spend on pre-school % of GDP, 2009	Supply side features of childcare	Other comments
UK	100 NI 76 (2012)	64.3 NI 69.6	n.a.#	7,818	3,563	1.1		
France	98	72.5	<73*	7,537	2,858	1.1	Mixed- mainly private for ages 0 to 3, mainly public ages 0 to 6.	Fragmented, state funded age 3 to 6.
Slovenia	71	84.4	68**	n.a.	n.a.	0.5	Municipalities regulator role but mixed supply.	For ages < 3 some tax credits. Scale of parental contribution to payment reduced with number of children in family requiring childcare.
Netherlands	112	77.5	n.a.	6,973	1,092	0.9	Private ages 0 to 4, and increasingly for ages > 4 too.	<ul style="list-style-type: none"> <li>•Universal offer of publicly funded pre-compulsory school year in primary schools at age 4.</li> <li>•Levy system whereby all employers subsidise childcare costs.</li> <li>•Since 2005 switch to a more demand-led model.</li> </ul>
Australia	121	61.9	69%, for Long Day Care if family income c. £38,500.	7,434	1,726	0.6		Means tested childcare benefit and tax reliefs.

Note: #Though 20% rate of subsidy for those eligible for Tax Free Childcare and 85% subsidy for low income groups (through UC) and 70% subsidy rate for very low income groups (also through UC).

\* In France payments in the state run nursery centres are subsidised at a rate of 73%. This implies a lower rate of subsidy across the entire childcare system given other private providers.

\*\* : Average, for pre-school, i.e. ages 0 to 6.

Source: OECD 2014, *op.cit.* For GDP per capita, EIU estimates in *The Economist* December 2013, *op.cit.* Northern Ireland GDP per capita from ONS December 2013, "Regional Gross Value Added", *Statistical Bulletin*, Office for National Statistics, Newport.

The arguments against using the Netherlands model included:

- The system is fragmented and complicated.
- The levy on employers probably has a negative impact on demand for labour.

Given the balance of these considerations the Netherlands were selected to form the basis for the third model.

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# Appendix IV: Technical detail relating to the cost-benefit analysis

There are three parts to this Appendix:

- Part 1: Considerations relating to the four categories of benefits and costs.
- Part 2: Detail on the method used for the cost-benefit analysis.
- Part 3: Detail of the estimation of the costs and benefits.

## Part 1: Considerations relating to the four categories of benefits and costs

This part considers the four categories as summarised in Table 9.

### Quantifiable and measurable benefits and costs

#### Increased female employment

The international studies have concentrated on this. This is likely to be the largest of all the benefits in terms of its monetary value. The increase in female/mothers' employment could, in principle, be measured either by hours or full-time equivalents (FTEs) in employment and then multiplied by productivity to quantify the benefits. More specifically, two contrasting approaches to suggest the scale of increased female employment in Northern Ireland can be indicated:

- *Method 1*<sup>108</sup>: From the studies of Quebec<sup>109</sup>, where a highly subsidised system of childcare was introduced in the mid-1990s, apply directly to Northern Ireland the estimated percentage increase in maternal employment.
- *Method 2*: Northern Ireland's maternal employment rate is compared to some external comparator, e.g. Denmark or the Netherlands, to establish an upper bound as to the scale of increase which could be envisaged<sup>110</sup>.

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<sup>108</sup> A fuller method would consist of three stages. Stage 1: Estimate the reduction in the price of childcare to households. Stage 2: Select an appropriate measure of the responsiveness of female labour supply to the cost of childcare, i.e. the elasticity. This could be taken from previous, international studies; e.g. M. Baker, J. Gruber and K. Milligan 2005, "Universal childcare, maternal labour supply and family well-being", National Bureau for Economic Research, Cambridge MA, *Working Paper*, No. 11832; L.J.H. Bettendorf, E.L.W. Jongen and P. Muller 2012, "Childcare and labor supply: Evidence from a large Dutch reform", Tinbergen Institute, Rotterdam, *Discussion Paper*, TI 2012-093/1; and D. Blau and J. Currie 2006, *Handbook of Economics of Education*, Elsevier, Amsterdam, pp. 1163-78.

Stage 3: Apply the result of part 2 to part 1 to estimate the extent of increase in labour supply. Given uncertainty as to how big the reduction in the price of childcare would actually be, we decided to not use this method.

<sup>109</sup> P. Lefebvre, P. Merrigan and F. Roy-Desrosiers 2011, "Quebec's Childcare Universal Low Fees Policy 10 Years After: Effects, Costs and Benefits", Université du Québec à Montréal and Centre Interuniversitaire sur le Risque, les Politiques Économiques et l'Emploi (CIRPÉE), Montreal, *Working Paper*, no. 11-01. Available at: [http://www.cirpee.org/fileadmin/documents/Cahiers\\_2011/CIRPEE11-01.pdf](http://www.cirpee.org/fileadmin/documents/Cahiers_2011/CIRPEE11-01.pdf)

<sup>110</sup> Ideally, we would have used a full so-called "difference-in-difference" approach whereby the gap in employment rates would have been considered at two points in time; first, before the strongly subsidised childcare policy was adopted in the comparator, and second, the more up-to-date comparison, as we do here for, say, the year 2009 or 2011. Comparing the *difference in the gap* could give some indication of the impact of childcare alone as opposed to other factors. Unfortunately, we could not get data for the employment rate in the comparators for a relatively early year when childcare was not being strongly subsidised. In Denmark, for example, strong public subsidisation has been in place for several decades.

*Method 2* has the attraction of being somewhat related to Northern Ireland specific labour market data, in so far as such data exist, whereas *Method 1* relies more on international data. That said, a possible weakness of *Method 2* could be any assumption that *all* the shortfall in Northern Ireland's relative female participation is attributable to less readily available childcare. This may be a limitation in the approach used by the IPPR whereby they noted, first, that the UK's maternal employment rate lay about 10% points below OECD leaders and, second, that costs of childcare are relatively high. They implied that the second characteristic largely caused the first<sup>111</sup>.

Given such considerations, we used *Method 2* when we applied the Denmark and Netherlands models to Northern Ireland but assumed half of the gap between Northern Ireland and the comparator could be attributed to impact of lower cost of childcare. In applying these methods we also noted:

- Consideration of change in *total hours* worked would be better because the impact of cheaper childcare may be to encourage some mothers to work more hours and some to enter/re-enter work. Unfortunately, there were insufficient data to allow the impact on hours worked in Northern Ireland to be assessed.
- Allowance should be made for the differential effects on part-time and full-time employment which we attempted to do as far as the existing data allowed.
- The international evidence which pointed to a differential impact according to the skill level of the mothers. There is currently less discrepancy between the employment rate for highly educated mothers in the UK compared to some other European countries<sup>112</sup>. By implication, any increase in labour supply in Northern Ireland is likely to be weighted towards the lower skilled who also have lower productivity and relatively low wages.
- There was a fairly wide variation in estimates of the responsiveness of maternal employment in the literature. This was partly because of the difficulty in getting a truly exogenous estimate of cost of childcare, i.e. what the cost to households would have been in the absence of government intervention. Baker *et al* provided a careful study based on a longitudinal consideration of Quebec which implied an elasticity of about -0.236<sup>113</sup>. In contrast, Lundin *et al* 2008<sup>114</sup>, estimated an elasticity of close to zero for Sweden. That Swedish result may point to diminishing returns, once there is a highly subsidised system and low costs to households any further reduction has limited impact. Significantly, Baker *et al* report substantial deadweight effects, whereby mothers already in work use the subsidy to shift from informal care to formal<sup>115</sup>. Our assumption was that an increase in deadweight would not be significant in the case of Northern Ireland, this is an assumption which would tend to *underestimate* costs relative to benefits.
- The studies of Quebec provide some limited consideration of how the extent of response in terms of employment varied by age of child<sup>116</sup>. IPPR, similarly, posited for the UK that more affordable childcare would be likely to support mothers with young children, i.e. aged up to 2 years old, to enter or re-enter work, and to support mothers where the youngest child is between 3 and 5 to extend their hours of work<sup>117</sup>. The Northern Ireland data do suggest a pattern similar to the UK average, i.e. maternal employment rates increase as the age of the youngest dependent child gets bigger. However, the Northern Ireland data were insufficiently reliable to allow robust modelling of how the responsiveness of maternal employment might vary according to the age of the children.

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<sup>111</sup>IPPR do recognise that many factors will influence maternal labour supply but their focus is on affordable childcare. See two recent report by IPPR ; IPPR 2011, *Making the Case for Universal Childcare*, Institute for Public Policy Research, London, and IPPR 2014, *Childmind the Gap*, Institute for Public Policy Research.

<sup>112</sup> IPPR 2014, *op.cit.*

<sup>113</sup> Baker, Gruber and Milligan 2005, *op.cit.* That figure implies that a 10% reduction in childcare costs to households would be associated with a 2.36% increase in labour supply. It may be worth emphasising that such studies of the elasticity of response in Quebec indicate that, as might be expected, such elasticities have got larger over time.

<sup>114</sup> D. Lundlin, E. Mork and B. Ockert 2008, "How far can childcare push female labor supply?", *Labour Economics*, vol. 15, no. 4.

<sup>115</sup> Deadweight is an issue that the *Green Book* says should be considered.

<sup>116</sup> Fortin, Godbout and St.-Cerny 2012, *op.cit.*

<sup>117</sup> IPPR 2014, *op.cit.*

### Increased lifetime earnings of mothers

A previous study<sup>118</sup> suggested 1.5% should be added to full-time earnings and 0.5% to part-time ones. These uplifts were derived from the findings of human capital research. The justification for assuming such an effect is that greater childcare provision by reducing the lengths of career breaks increases the accumulation of human capital and hence earnings over the lifetime.

### Increased tax revenues

It is important to stress that this is not a “benefit” to be included in the cost-benefit analysis. If it were included that would double count some of the gains. The effect should however be measured if the intention is also to measure the scale of fiscal impacts.

In principle one would take the scale of employment, whether FTEs or hours worked, multiplied by the impact on earnings making some allowance for the extent to which employment *below* the income tax threshold was promoted. IPPR provided one such estimate of the scale of impact on tax receipts<sup>119</sup>. International studies have confirmed that the scale of tax revenues is very sensitive to the assumptions made about the scale of impact on female employment<sup>120</sup>.

We estimated at the Northern Ireland level the relationship between GVA and tax revenues, i.e. if Northern Ireland GVA grew by £100m by how much would total tax receipts grow? We also divided the change in tax revenues into that impacting on devolved taxes and that effecting non-devolved taxes. This was to distinguish the fiscal impact on Northern Ireland devolved government from that on the UK government.

### Increased government spending

The IFS and SPICE provided estimates of spending per childcare space in England and Scotland, both in the context of proposals for strong subsidisation of childcare provision. The Scottish estimates were applied to Northern Ireland. Similarly, OECD and other sources provided estimates for some countries.

We used the best and most appropriate proxy for what the costs might be in Northern Ireland but we noted that Northern Ireland costs per childcare place may differ from those elsewhere including those in the rest of the UK. Consideration of the public spending cost should strictly be *net* of any reductions in benefits and other aspects of welfare spending although the extent of such adjustments was constrained by the availability of data. We made such adjustments where possible.

## Measurable only benefits and costs

### Decreased child poverty

A number of contrasting approaches could be suggested to attempt to indicate the importance of this benefit:

- (1.) Make plausible assumptions about the scale of reduction informed by experience elsewhere and then assign a value to such changes. Neither of these exercises is likely to be uncontentious;
- (2.) Suggest an upper bound to possible improvement by comparing, say, Denmark’s child poverty rate to that of Northern Ireland and the UK though recognising that differences in childcare policies are not the only reason for any differences which are observed; and
- (3.) Note the likely benefit in terms of public spending avoided, as indicated in previous studies (see Chapter 3), in terms of each child diverted from various social problems such as educational drop out, crime, substance abuse though it will probably be impossible to estimate *how many* were so diverted.

We concluded that whilst it was safe to draw a conclusion as to the *direction* of impact on child poverty (it would be reduced) and *relative scale of impact* (it would be substantial) it would *not* be possible to directly assign a monetary value to that impact.

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<sup>118</sup> Used by PwC 2003, *op.cit.*, derived from J. Mincer and S. Polachek 1974, *op.cit.*

<sup>119</sup> IPPR 2011, *op.cit.*

<sup>120</sup> Baker, Gruber and Milligan 2005, *op.cit.*

### Decreased adult poverty

The possible approaches are likely to be very similar to those relating to decreased child poverty as described above.

In this case we also concluded that we could note the direction of impact but we would be unable to assign a monetary value to that impact.

### Reduced inequality

In principle, *if* one could estimate the impact on the distribution of income (say, by deciles - the top 10% through to the lowest 10%) this might then be assigned a value. In any case, isolating the impact of childcare on equality is likely to be impossible. Examination of the differences between the distribution of income in Northern Ireland/UK compared to, say, Denmark provides only an upper bound to the scale of effect.

Once again, we concluded that we could note the direction of impact but would be unable to assign a monetary value to this impact.

### Reduced choice in terms of childcare provision

Whether this cost applies in practice depends on *how* government intervenes in the provision of childcare. If, for example, a voucher system were used then the choice would be at least as good as at it is currently. In Denmark only about 5% of providers are private sector and such competition is relatively recent (first allowed in 2004). In Northern Ireland a significant question, both from the point of view of purchasers and providers, is what might happen to the extent of provision coming from the social economy sector?

As to how far households would actually place a value on any reduction in choice, one response might be that if there is universal publicly funded provision and *all* of this is of a high quality many people would not perceive a lack of choice to be a problem. However, it may be notable that a feature of the Danish approach to childcare is that use of informal care from outside the family is illegal. Some would judge that represents a rather drastic reduction in parental choice.

### Forced increase in labour supply to pay for higher tax burden

Assuming that the increase in government spending will require some increase in taxation to pay for it, this produces complex effects. For example, those who face higher tax rates could either work less because of disincentives hence implying a *reduction* in labour supply to net off against the increase in female employment noted above *or* work longer hours to maintain the same post-tax. The leisure time lost should then be counted as a “cost”.

We did not attempt to value this impact.

## *Neither quantifiable nor measurable benefits and costs*

### Positive impact on child development/education

A possible method would be to assume for children who experience childcare that their earnings as adults will be boosted by, say, 2%. The justification for choosing such a (modest) earnings premium is that previous US-based studies relating to impact on earnings of children coming from particularly disadvantaged groups suggested an impact of 10%<sup>121</sup>. Obviously universal or near universal systems of childcare will also impact on children from non-disadvantaged backgrounds too and so the average percentage impact will be smaller.

In practice, however, the possible impact on child development/education is complex. This is partly because there is the question of what is the impact on the mother’s sense of well-being and hence any knock on effect from that on to the child<sup>122</sup>.

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<sup>121</sup> P. Cameiro and J. Heckman 2003, “Human capital policy”, National Bureau of Economic Research, Cambridge, Massachusetts, *Working Paper*, No. 9495.

<sup>122</sup> IPPR 2014, *op.cit.*, take an optimistic view basing this on research by S. Harkness 2012, *The Influence of Employment on Depression: A Study of British Single and Partnered Mothers*, University of Bath, Bath. Contrasting, pessimistic views are also possible.

There has also been some controversy as to whether the net effect of childcare on child development/education is positive at all, see Chapter 3. In principle, we need to *net* any benefit against possible negative effects given that aspects of child development may be reduced by being in childcare.

*So, as a cautious assumption, we assumed that any positive effects on child development/education are exactly compensated for by negative effects, i.e. that the overall impact is zero.*

#### Higher birth rate and hence population growth and reduced age dependency rate

In principle, reduced childcare costs could have a positive impact on the birth rate and hence population growth<sup>123</sup>. In practice, the scale of any such positive effect is uncertain and if such an impact occurred it would, certainly, be a very long run effect so, it would have to be subject to discounting. In any case, although Northern Ireland, like most of the Western world faces the economic challenge of an ageing population, the Northern Ireland Executive has not adopted any policy on whether a higher or lower birth rate should be encouraged<sup>124</sup>. We, therefore, ignored this potential benefit.

#### Decreased time required from informal carers

In principle, this could be measured by estimating the reduced amount of informal care used, with this valued at an average or other appropriate wage level. However, several difficulties present themselves. For example, many of the informal carers are in retirement. How far should their time be valued at the average rate of earnings? If the informal carers enjoy providing such care and find they have to reduce their supply “involuntarily”, should this be considered as a cost rather than a benefit<sup>125</sup>? Given these difficulties and uncertainties we argue this impact can in practice be ignored.

#### Negative effect on child development/education

This is the reverse of the potential benefit noted earlier.

Baker *et al* (2008)<sup>126</sup> using a rich longitudinal data set from Quebec implied negative effects in terms of:

- Motor and social development, e.g. as measured by the Peabody Picture Vocabulary Test.
- Behavioural development.
- Child health.
- Impacts on the well-being of parents and the quality of their relationship with their children.

Kottenberg and Lehrer 2010<sup>127</sup>, reviewing similar data concluded, “Substantial heterogeneity complicates the childcare issue particularly for politicians”. Negative impacts in the UK on children’s education/learning were also suggested in a study by Ermisch and Francesconi<sup>128</sup>.

In other words, there is a wide range of results and some uncertainty as to outcomes for child development/education. We concluded therefore, as already indicated, that a suitably cautious assumption would be to assume that the overall impact on child development is zero.

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<sup>123</sup> Assuming that childcare is a substantial proportion of the “cost of having a child”.

<sup>124</sup> This contrasts to the Scottish Government which has had a commitment to reverse what was hitherto a trend decline in the population of Scotland, albeit more by selectively encouraging in-migration as opposed to by subsidising natural increase.

<sup>125</sup> Conversely, some grandparents, say, may be supplying informal care under a certain amount of “duress”!

<sup>126</sup> Baker, Gruber and Milligan 2008, *op.cit.*

<sup>127</sup> M. Kottelberg and S.F. Lehrer October 2010, “Reinvestigating who benefits and who loses from universal childcare in Canada”, Queen’s University Ontario, Canada and National Bureau of Economic Research, Cambridge, Massachusetts, *Paper. From website Queens Canada*. Available at <http://jdi.econ.queensu.ca/content/reinvestigating-who-benefits-and-who-loses-universal-childcare-canada>

<sup>128</sup> Ermisch and Francesconi 2002, *op.cit.*

## Immaterial benefits and costs

### Increased paternal labour force participation

In principle, the consideration could be the same as for employment of mothers. This benefit tends to be neglected in the literature. Where this impact has been noted, and a *decrease* in employment by fathers is also possible, it has been judged to be a small effect. We therefore ignored this potential impact.

## Part 2: Detail on the method used for the cost-benefit analysis

This Part provides a step-by-step account of our method. Part 3 illustrates the actual calculations.

### 1. The Quebec model

#### BENEFIT: Increased female employment

##### The method used

The steps in the method were (more details are provided in Part 3, Box 1):

- (1.) Used the 2009 data from the Labour Force Survey as a measure of the baseline employment of mothers with dependent children<sup>129</sup>.
- (2.) An estimate of the responsiveness of maternal employment to the Quebec subsidised childcare model<sup>130</sup>, i.e. 13.78%, was applied to that baseline.
- (3.) The estimated increase in employment was broken down into full-timers and part-timers using the proportional shares of full-timers and part-timers in existing maternal employment in 2009.
- (4.) The levels of GVA per full-time female worker and part-time female worker were estimated; the average relationship between GVA per worker and average earnings for all workers in Northern Ireland was applied to each of the average wage level for full-time female workers and part-time female workers.
- (5.) The estimated increase in the number of full-time female workers was multiplied by the estimated GVA per full-time female worker and likewise for part-timers, and the total increase in GVA was implied.

##### The result

The increase in GVA associated with the increased female employment was estimated as £520.1m, a 1.8% increase relative to total Northern Ireland GVA in 2011. This increase in GVA was the steady state value, i.e. at the point when the policy has been implemented for a sufficiently long period of time- we assumed 10 year after the policy first began to be implemented- for the full effects to be felt.

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<sup>129</sup> Maternal employment in 2011 as measured by the Labour Force Survey was substantially higher compared to 2009. We judged that use of data from that year would be very likely to overestimate the scale of increase in employment (see Part 3, Box 2). The data from the Labour Force Survey as to the total number of mothers with dependent children who were in employment showed quite large fluctuations between years- e.g. 129,000 in 2009, 146,000 in 2011 and 141,000 in 2012. Similarly, the figures for the total number of mothers with dependent children were 192,000 in 2009, 210,000 in 2010 and 204,000 in 2011 with the confidence interval +/- 18,000 (95% in 2011).

<sup>130</sup> Fortin, Godhout and St.-Cerny 2012, *op.cit.*

## BENEFIT: Increased lifetime earnings of mothers

### The method used

The steps in the method used were (more details are provided in Part 3, Box 3<sup>131</sup>):

- (1.) Used the 2009 data from the Labour Force Survey as a measure of the baseline employment of mothers with dependent children.
- (2.) An estimate of the responsiveness of maternal employment to the Quebec subsidised childcare model, i.e. 13.78%, was applied to that baseline to estimate what the level of maternal employment would be if the Quebec model were applied.
- (3.) It was assumed that one-half of mothers in employment would avoid a significant career break if subsidised childcare were available<sup>132</sup>.
- (4.) The average levels of lifetime earnings for female full-timers and part-timers in Northern Ireland were estimated. Data on wages by age band existed for the UK and were applied to Northern Ireland using the relationship between average female wages in Northern Ireland and the UK.
- (5.) An uplift of 1.5% was applied to the full-time wage and 0.5% to the part-time one<sup>133</sup>.
- (6.) It was assumed that the impact of the increase in earnings would take 10 years from the beginnings of implementation of the policy to be fully felt. In practice, realisation of the uplift to *lifetime* earnings might take longer than 10 years but it is worth noting that the age profile of average female earnings indicates an increase during the 20s with peak levels reached in the 30s (see Part 3, Box 3). This would be consistent with any uplift in lifetime earnings being achieved relatively quickly.
- (7.) The stream of annual benefits, i.e. the extent to which earnings were higher, was discounted to indicate the NPV. Given that the benefit would be felt over the entire working life of a mother a long discounting period, i.e. 60 years, was used<sup>134</sup>.

### The result

The increase in GVA associated with the increased lifetime earnings was estimated as £15.3m, a 0.05% increase relative to total Northern Ireland GVA in 2011. This increase in GVA was the steady state value, i.e. at the point when the policy has been implemented for a sufficiently long period of time- we assumed 10 years after the policy first began to be implemented- for the full effects to be felt. We assumed it would take 10 years for the full increase in maternal employment and uplift in earnings to be felt and that those variables would remain constant at their new higher level thereafter.

## COST: Increased government spending

### The method used

The steps in the method used were (more details are provided in Part 3, Box 5):

*Using cost data taken from Quebec:*

- (1.) Calculated the cost per subsidised pre-school childcare place in Quebec in 2012.
- (2.) Converted that cost from a value in Canadian \$ to one in £ using the PPP rate of exchange.

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<sup>131</sup> As for estimating the increase in maternal employment, we judged that a more realistic result would be produced by using data for 2009 rather than 2011. Box 4 describes the use of 2011 data.

<sup>132</sup> There was little empirical evidence to suggest what this proportion would actually be. One-half was felt to be a suitably cautious assumption, PwC 2003, *op.cit.*, assumed the same. It is also broadly consistent with our assumption that about 44% of the children aged 1 to 14 would use formal childcare.

<sup>133</sup> These percentage uplifts derived from Mincer and Polachek 1974, *op.cit.*

<sup>134</sup> We followed the practice recommended by Treasury by using a discount rate of 3.5% for the first 30 years of the policy and then a lower discount rate of 3% for year 31 and thereafter. See HM Treasury 2011, *op.cit.*

- (3.) For children aged 1 to 4, i.e. pre-school, estimated the total cost in Northern Ireland by multiplying that cost per place by the number of children in Northern Ireland aged 1 to 4. Given the one year of statutory Maternity Leave it was assumed childcare would not be used for children aged under 1<sup>135</sup>.
- (4.) For children aged 5 to 14, i.e. school age, where a part-time childcare place estimated the total cost in Northern Ireland by multiplying the number of children in Northern Ireland aged 5 to 14 by 60% of the unit cost of a place for a child aged 1 to 4<sup>136</sup>.
- (5.) Allowed for the fact that for some children aged 1 to 4 a full-time place would be required and for others a part-time depending on whether the mother was in full or part-time work (a split of 50%:50% was used reflecting the composition of employed mothers in 2009 and 2011). For the children aged 5 to 14 it was similarly assumed that for 50% part-time childcare would be required; this reflected the fact that half of the mothers were assumed to be working full-time and childcare would be required for the working hours outside school hours. Also for the children aged 5 to 14, and for the remaining half of this group, i.e. where the mothers were assumed to work part-time, this group was sub-divided into two equally sized sub-groups- i.e. each 25% of the age 5 to 14 group<sup>137</sup>. The rationale for this was that in some cases no childcare at all would be required, where mothers were able to find employment with working hours coinciding with school hours, and in the remaining cases part-time childcare would be required, where the mother works part-time hours but some or all of those hours fell outside of school hours.
- (6.) Estimated total cost by making an estimate of the total number of childcare places which would be required. A baseline estimate of the percentage of children aged 1 to 14 using formal childcare was increased by the same proportion as the estimated increase in female employment<sup>138</sup>.

*Using cost data taken from Scotland:*

- (1.) Calculated the cost per pre-school childcare place implied by the SPICE data.
- (2.) Doubled that cost per place given that the SPICE data was based on a 25 hour week whereas full-time care in Northern Ireland was assumed to be a 50 hours per week.
- (3.) The Scottish estimates related to a 100% subsidised system, so took 85% of that implied cost per place given our estimate that the rate of subsidy in Quebec was actually 85% (see Chapter 3).
- (4.) For children aged 1 to 4, i.e. pre-school, estimated the total cost in Northern Ireland by multiplying that cost per place by the number of children in Northern Ireland aged 1 to 4. Given the one year of statutory Maternity Leave it was assumed childcare would not be used for children aged under 1.
- (5.) For children aged 5 to 14, i.e. school age, where a part-time childcare place was required estimated the total cost in Northern Ireland by multiplying the number of children in Northern Ireland aged 5 to 14 by 60% of the unit cost of a place for a child aged 1 to 4.
- (6.) Allowed for the fact that for some children aged 1 to 4 a full-time place would be required and for others a part-time depending on whether the mother was in full or part-time work (a split of 50%:50% was used reflecting the composition of employed mothers in 2009 and 2011). For the children aged 5 to 14 it was similarly assumed that for 50% part-time childcare would be required; this reflected the fact that half of the mothers were assumed to be working full-time. Also for the children aged 5 to 14, and for the

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<sup>135</sup> The available survey evidence suggests that many mothers return to employment at 39 weeks, i.e. when statutory Maternity Pay ends, rather than 52 weeks. Nevertheless, one survey in Northern Ireland indicated that 58% took 39 or more weeks leave and only 20% took 26 weeks or less. See, R. Dennison 2013, *Managing Expectations: A Survey of New Mums and Dads*, Employers for Childcare Charitable Group, Lisburn. In the absence of any more precise data, we have used the assumption that no formal childcare will be required until the child is aged 1. To the extent that some childcare is used this assumption implies that *costs* have been *underestimated*.

<sup>136</sup> Intuitively, a rate of closer to 50% might be suggested but in 2013 the actual charges paid by parents for part-time childcare were indicated as 74% of the level of full-time. See, Dennison and Smith 2013, *op.cit*.

<sup>137</sup> In the absence of any specific data, the sub-division into two equally sized sub-groups was felt to be a reasonable compromise assumption.

<sup>138</sup> i.e. 38.4% increased by 13.78% which gave 43.69%. See, Part 3, Box 5 for details.

remaining half of this group, i.e. where the mothers were assumed to work part-time, this group was subdivided into two equally sized sub-groups- i.e. each 25% each of this age group. The rationale for this was that in some cases no childcare at all would be required, in cases where mothers were able to find employment with working hours coinciding with school hours, and in the remaining cases part-time childcare would be required, where the mother works part-time hours but some or all of those hours fell outside of school hours.

- (7.) Estimated total cost by making an estimate of the total number of childcare places which would be required. A baseline estimate of the percentage of children aged 1 to 14 using formal childcare was increased by the same proportion as the estimated increase in female employment.

### The result

We used the cautious approach- i.e. one that would tend to *underestimate* costs- of taking the average of the lower estimate based on Quebec figures and the higher based on Scotland, i.e. £475.9m and £703.7m, respectively. This implies a total cost of £589.8m and a cost per childcare place, assuming 43.7% take up, of (£589.8m divided by 43.7% of 330,800=)£4,080. We believe that figure is plausible. It is lower than the existing level of charges<sup>139</sup> to parents in Northern Ireland and the public spending per place in Quebec and considerably lower than the estimated public spending cost per place in Scotland<sup>140</sup>. See, also, Table 23:

The estimated cost per childcare place aged 1-4 in Scotland at just over £8,748<sup>141</sup> might seem a high figure to apply to Northern Ireland given that the spend per childcare place in Quebec in 2012 was about Canadian \$ 10,600, or £5,916. As noted above, the Quebec figure may actually *underestimate* the cost of providing a full-time or 50 hour week of care. Moreover, both these levels of spend are much lower than the level of funding per place in Denmark, see Chapter 3 and below. In fact, the hourly cost and hence cost per place in Scotland might *rise* if an attempt was made to double provision from the proposed 25 hours per week to 50 hours<sup>142</sup>.

Another benchmark relevant to the potential cost per place of a highly subsidised system in Northern Ireland is the existing level of charges to families in Northern Ireland; £158 per week for full-time care in 2013 and £117 for part-time<sup>143</sup> which are equivalent - assuming a 46 week year- to £7,268 and £5,382 per place respectively, or an average of £6,325<sup>144</sup>.

It might be objected that the £117 per week figure would be an overestimate if used to represent the cost of after-school/school age childcare (SAC). However, the available indications are that the charges for SAC are considerable. For example, the average weekly charge for after school afternoon sessions was £51.50 in 2012 and the weekly charge for privately provided breakfast clubs was £34, i.e. taken together, a total weekly charge of £85.50 which would be equivalent to £3,933 annually (assuming 46 weeks, and not adjusting for possibly higher charges during school holiday periods)<sup>145</sup>.

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<sup>139</sup> Though, to the extent that private providers of childcare are making profits then charges will exceed costs.

<sup>140</sup> Our figure is also lower than the cost per childcare place used in the earlier study of UK-wide childcare; PwC 2003, *op.cit.* In fact, that cost figure of about £6,000 per place used in the earlier study should be upgraded to allow for inflation of costs during 2002-14.

<sup>141</sup> i.e. the “100% subsidy rate” figure of £5,146 reduced to the “85% subsidy rate” figure, but then doubled to reflect a 50 rather than 25 hour week.

<sup>142</sup> This is because there could be additional capital costs as capacity is increased. This point was noted by SPICE 2014, *op.cit.*

<sup>143</sup> Dennison and Smith 2013, *op.cit.*

<sup>144</sup> These are annual charges or fees and so *overestimate costs* to the extent that childcare providers are making profits.

<sup>145</sup> See Chapter 2 and Playboard NI 2012, *op.cit.* and Dennison and Smith 2013, *op.cit.* This almost certainly *underestimates* the annual charge given the evidence that all day care during school holidays is relatively expensive.

**Table 23: Alternative estimates of the public spending cost per childcare place**

**Our estimate, age 1 to 14, average of full-time and part-time: £4,080**

Alternative estimates:

- Quebec, age 0 to 5 “full-time”: £5,900
- Scotland, age 1 to 4 full-time: £8,700
- Northern Ireland charge, age 1 to 4 full-time: £7,300
- Northern Ireland charge, age 5 to 14 part-time: £5,400
- Northern Ireland charge, age 5 to 14 breakfast club and after school: £3,900

Source: See the references referred to in the text above this Table.

It is important to stress that the cost estimate relates to a steady state or snapshot level of costs after the policy has been fully implemented, i.e. the costs in year 8 and thereafter given that we make the assumption that it would take 8 years to fully implement the policy and put all the childcare infrastructure in place<sup>146</sup>.

### SUMMARY- Cost-benefit results for the Quebec model

Table 24 provides a summary:

**Table 24: Summary of the cost-benefit results for the Quebec model in a snapshot of steady state comparison**

<b>Benefits</b>	<b>£535.4m</b>
GVA generated through extra maternal employment	£520.1m
GVA generated through higher lifetime earnings of mothers	£15.3m
<b>Costs</b>	<b>£545.3m</b>
Increase in public spending	£589.8m
but minus reduction in other welfare spending	£44.5m
<b>Net cost (i.e. costs minus benefits)</b>	<b>£9.9m</b>

Note: 2009 data were used. For the reduction in other welfare spending, see Table 14, above.

## 2. The Denmark model

### BENEFIT: Increased female employment

#### The method used

The steps in the method were (more details are provided in Part 3, Boxes 6 and 7):

- (1.) Used the 2009 data from the Labour Force Survey as a measure of the baseline employment of mothers with dependent children.
- (2.) Assumed that application of the Denmark model would result in half of the gap between Northern Ireland and Denmark maternal employment rates closing, i.e. Northern Ireland’s maternal employment rate would increase to  $(67.2 \text{ plus } 8.4 =) 75.6\%$ .
- (3.) The estimated increase in employment was broken down into full-timers and part-timers using the proportional shares of full-timers and part-timers in existing maternal employment in 2009.

<sup>146</sup> We have no precise evidence to justify this choice of 8 years. However, the Scottish Government set themselves 10 years to fully implement a universal age 1 to 4 childcare provision. Also, the Quebec studies are suggestive in that it took 8 to 10 years to achieve reasonably full benefit of policy changes that began in 1997. Compare Baker, Gruber and Milligan 2005, *op.cit.*, Fortin, Godhout and St.-Cerny 2011 and C. Haeck, P. Lefebvre and P. Merrigan 2013, *Canadian Evidence on Ten Years of Pre-School Policies: The Good and the Bad*, Centre Interuniversitaire Sur Le Risque, less Politiques Economique et L’Emploi, Quebec. Available at; <http://ideas.repec.org/p/lvl/lacicr/1334.html> We assume that it will take longer for the benefits to reach the steady state as compared to the costs, i.e. eight and 10 years respectively.

- (4.) The levels of GVA per full-time female worker and part-time female worker were estimated; the average relationship between GVA per worker and average earnings for all workers in Northern Ireland was applied to each of the average wage level for full-time female workers and part-time female workers.
- (5.) The estimated increase in the number of full-time female workers was multiplied by the estimated GVA per full-time female worker and likewise for part-timers, and the total increase in GVA was implied.

#### The result

The increase in GVA associated with the increased female employment was estimated as £472.5m, a 1.6% increase relative to total Northern Ireland GVA in 2011. This increase in GVA was the steady state value, i.e. at the point when the policy has been implemented for a sufficiently long period of time- we assumed 10 years after the policy first began to be implemented- for the full effects to be felt.

#### BENEFIT: Increased lifetime earnings of mothers

##### The method used

The steps in the method were:

- (1.) Used the 2009 data from the Labour Force Survey as a measure of the baseline employment of mothers with dependent children.
- (2.) The increase in maternal employment was calculated assuming that the maternal employment rate in Northern Ireland becomes 75.6%, i.e. half of the gap between the employment rate in Northern Ireland and Denmark is closed.
- (3.) It was assumed that one-half of mothers in employment would avoid a significant career break if subsidised childcare was available.
- (4.) The average level of lifetime earnings for female full-timers and part-timers in Northern Ireland were estimated. Data on wages by age band existed for the UK and were applied to Northern Ireland using the relationship between average female wages in Northern Ireland and the UK.
- (5.) An uplift of 1.5% was applied to the full-time wage and 0.5% to the part-time one.
- (6.) It was assumed that the impact of increase in earnings would take 10 years from the beginnings of implementation of the policy to be fully felt.
- (7.) The stream of annual benefits, i.e. the extent to which earnings were higher, was discounted to indicate the NPV. Given that the benefit would be felt over the entire working life of a mother a long discounting period, i.e. 60 years was used.

#### The result

The increase in GVA associated with the increased lifetime earnings was estimated as £15.1m, a 0.05% increase relative to total Northern Ireland GVA in 2011. This increase in GVA was the steady state value, i.e. at the point when the policy has been implemented for a sufficiently long period of time- we assumed 10 years after the policy first began to be implemented- for the full effects to be felt.

#### COST: Increased government spending

##### The method used

The steps in the method were:

- (1.) It was assumed that the cost per childcare place would be similar to but slightly less than that estimated in the case of the Quebec model. The public spending cost would be lower to the extent that higher income households made a means tested contribution to childcare fees.

- (2.) It was assumed that the government spending cost per place would be 95%<sup>147</sup> of that in the case of application of the Quebec model.
- (3.) Estimated total cost by making an estimate of the total number of childcare places which would be required. A baseline estimate of the percentage of children aged 1 to 14 using formal childcare was increased by the same proportion as the estimated increase in female employment.

### The result

The estimated cost was £554.0m<sup>148</sup>. It is important to stress that the cost estimate relates to a steady state or snapshot level of costs after the policy has been fully implemented, i.e. the costs in year 8 and thereafter given that we make the assumption that it would take 8 years to fully implement the policy and put all the childcare infrastructure in place.

It might be argued that the obvious indicator for the cost of applying the Denmark model in Northern Ireland would be the *actual level of spend per place in Denmark*. Such figures were, in practice, very high. Given that one estimate of the parental payment for a pre-school childcare place in Denmark in 2012 was equivalent to £2,809<sup>149</sup> and assuming an 80% subsidy rate, public spending per place would be £11,200. That would be much higher than the estimated cost per place we implied for either Quebec (£5,916) or Scotland (£8,748). However, we judged that it would be inappropriate to apply the very high figure from Denmark to Northern Ireland. This is because the relatively high figures for Denmark may partly reflect a combination of a higher cost of living in Denmark<sup>150</sup> plus the very high quality of childcare provision<sup>151</sup>.

### SUMMARY – Cost-benefit results for Denmark model

Table 25 provides a summary:

**Table 25: Summary of the cost-benefit results for the Denmark model in a snapshot or steady state comparison**

<b>Benefits</b>	<b>£487.6m</b>
GVA generated through extra maternal employment	£472.5m
GVA generated through higher lifetime earnings of mothers	£15.1m
<b>Costs</b>	<b>£513.5m</b>
Increase in public spending	£554.0m
but minus reduction in other welfare spending	£40.5m
<b>Net cost (i.e. costs minus benefits)</b>	<b>£25.9m</b>

Note: 2009 data were used. For the reduction in other welfare spending, see Table 14, above.

<sup>147</sup> This would be the case if the rate of subsidy in Denmark was about 80% compared to about 85% in Quebec. Whilst we were unable to estimate the subsidy rate in Denmark directly, one source, IPPR 2012, *op.cit.*, suggests a rate of 80%. It may also be significant that in the other Nordic countries, with broadly similar childcare policies, the implied subsidy rates were 83% for Norway, 86% for Finland and a range of 83% to 93% for Sweden, lower figure for after-school, higher for pre-school; see Appendix II. Such subsidy rates for the other Nordic countries might imply we have *underestimated* the rate in Denmark which in turn would imply we have *underestimated* costs.

<sup>148</sup> i.e. took the unit cost already estimated for Quebec, i.e. £4,080, and reduced this to 95% i.e. £3,876. Estimated the take up, i.e. the percentage use of formal childcare in 2011- 38.4%- increased by the same proportion as the estimated increase in maternal employment in the Denmark model, i.e. 145,152 divided by 129,000 or 12.52%. So, an estimated take up of 38.4 times 1.1252= 43.21%. This implies the total costs would be £3,876 times 330,800 times 0.4321=£554.0m.

<sup>149</sup> Naumann, McClean, Koslowski, Tisdall and Lloyd 2013, *op.cit.* IPPR 2012, *op.cit.* indicate £12,000 for each place for children of ages 0 to 2 and £8,000 for those of ages 3 to 5.

<sup>150</sup> In other words, possibly, a childcare place of similar quality costs more in Denmark even when comparison is made in terms of the exchange rate or PPPs.

<sup>151</sup> That is, it might be judged that the cost of childcare in Denmark in part reflects add ons to basic provision which might not be necessary in Northern Ireland, e.g. hot meals, arts and crafts, parties for the children as well as out of hours care. See, *The Guardian* January 2013, *op.cit.*

### 3. *The Netherlands model*

#### **BENEFIT: Increased female employment**

##### **The method used**

The steps in the method used were (more details are provided in Part 3, Boxes 8 and 9):

- (1.) Used the 2009 data from the Labour Force Survey as a measure of the baseline employment of mothers with dependent children.
- (2.) Assumed that application of the Netherlands model would result in half of the gap between the Northern Ireland and Netherlands maternal employment rates closing, i.e. Northern Ireland's maternal employment rate would increase to  $(67.2 \text{ plus } 5.65 =) 72.85\%$ .
- (3.) The estimated increase in employment was broken down into that part which would be full-time and that part which would be part-time using the proportional shares of full-timers and part-timers in existing maternal employment in 2009.
- (4.) The levels of GVA per full-time female worker and part-time female worker were estimated; the average relationship between GVA per worker and average earnings for all workers in Northern Ireland was applied to each of the average wage level for full-time female workers and part-time female workers.
- (5.) The estimated increase in the number of full-time female workers was multiplied by the estimated GVA per full-time female worker and likewise for part-timers and the total increase in GVA was implied.

##### **The result**

The increase in GVA associated with the increased female employment was estimated as £272.7m, a 0.9% increase relative to total Northern Ireland GVA in 2011. This increase in GVA was the steady state value, i.e. at the point when the policy has been implemented for a sufficiently long period of time- we assumed 10 years after the policy first began to be implemented- for the full effects to be felt.

#### **BENEFIT: Increased lifetime earnings of mothers**

##### **The method used**

The steps in the method used were:

- (1.) Used the 2009 data from the Labour Force Survey as a measure of the baseline employment of mothers with dependent children.
- (2.) The increase in maternal employment was calculated assuming that the maternal employment rate in Northern Ireland becomes 72.85%, i.e. half of the gap between the employment rate in Northern Ireland and Netherlands is closed.
- (3.) It was assumed that one-half of mothers in employment would avoid a significant career break if subsidised childcare were available.
- (4.) The average level of lifetime earnings for female full-timers and part-timers in Northern Ireland were estimated. Data on wages by age band existed for the UK and were applied to Northern Ireland using the relationship between average female wages in Northern Ireland and the UK.
- (5.) An uplift of 1.5% was applied to the full-time wage and 0.5% to the part-time one.
- (6.) It was assumed that the impact of increase in earnings would take 10 years from the beginnings of implementation of the policy to be fully felt.
- (7.) The stream of annual benefits, i.e. the extent to which earnings were higher, was discounted to indicate the NPV. Given that the benefit would be felt over the entire working life of a mother a long discounting period, i.e. 60 years was used.

### The result

The increase in GVA associated with the increased lifetime earnings was estimated as £14.5m, a 0.05% increase relative to total Northern Ireland GVA in 2011. This increase in GVA was the steady state value, i.e. at the point when the policy has been implemented for a sufficiently long period of time- we assumed 10 year after the policy first began to be implemented- for the full effects to be felt.

### COST: Increased government spending

#### The method used

The steps in the method used were (further details are provided in Part 3, Box 10):

- (1.) Took the OECD data for 2008 for spending on childcare per pre-school child.
- (2.) Adjusted this data from \$ to £ using a PPP.
- (3.) Adjusted this to a per childcare place basis using OECD data on the participation on childcare in the Netherlands.
- (4.) Reduced this by one-third to allow for the contribution made to childcare costs through the levy on businesses.
- (5.) Upgraded this estimate of cost for 2008 to 2012 using the UK GDP deflator<sup>152</sup>.
- (6.) For children aged 1 to 4, i.e. pre-school, estimated the total cost in Northern Ireland by multiplying that cost per place by the number of children in Northern Ireland aged 1 to 4. Given the one year of statutory Maternity Leave it was assumed childcare would not be used for children aged under 1.
- (7.) For children aged 5 to 14, i.e. school age, where a part-time childcare place estimated the total cost in Northern Ireland by multiplying the number of children in Northern Ireland aged 5 to 14 by 60% of the unit cost of a place for a child aged 1 to 4.
- (8.) Allowed for the fact that for some children aged 1 to 4 a full-time place would be required and for others a part-time place depending on whether the mother was in full or part-time work (a split of 50%:50% was used reflecting the composition of employed mothers in 2009). For the children aged 5 to 14 it was similarly assumed that for 50% part-time childcare would be required; this reflected the fact that about half of the mothers were assumed to be working full-time. Also for the children aged 5 to 14, and for the remaining half of this group, i.e. where the mothers were assumed to work part-time, this group was subdivided into two equally sized sub-groups- i.e. each 25% each of this age group. The rationale for this was that in some cases no childcare at all would be required, in cases where mothers were able to find employment with working hours coinciding with school hours, and in the remaining cases part-time childcare would be required, where the mother works part-time hours but some or all of those hours fell outside of school hours.
- (9.) Estimated total cost by making an estimate of the total number of childcare places which would be required. A baseline estimate of the percentage of children aged 1 to 14 using formal childcare was increased by the same proportion as the estimated increase in female employment.

### The result

The estimated cost was £423.5m<sup>153</sup>. It is important to stress that the cost estimate relates to a steady state or snapshot level of costs after the policy has been fully implemented, i.e. the costs in year 8 and thereafter given

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<sup>152</sup> i.e. 1.0967. Our cost estimates for both the Quebec and Denmark models were reasonably up-to-date, e.g. based on estimated costs for Scotland for 2013-14 and calculated costs for Quebec in 2012. The OECD data for the Netherlands is, however, rather more out of data since it related to 2008. We “brought forward” the costs to 2012 using the measure of general cost inflation for the UK economy, the GDP deflator. See ONS 2013. Available at: [http://GDP\\_Deflators\\_Qtrly\\_National\\_Accounts\\_December\\_2013\\_update.xls](http://GDP_Deflators_Qtrly_National_Accounts_December_2013_update.xls)

that we make the assumption that it would take 8 years to fully implement the policy and put all the childcare infrastructure in place.

**SUMMARY: Cost-benefit results for the Netherlands model**

Table 26 provides a summary:

**Table 26: Summary of the cost-benefit results for the Netherlands model in a snapshot or steady state comparison**

<b>Benefits</b>	<b>£287.2m</b>
GVA generated through extra maternal employment	£272.7m
GVA generated through higher lifetime earnings of mothers	£14.5m
<b>Costs</b>	<b>£399.5m</b>
Increase in public spending	£423.5m
but minus reduction in other welfare spending	£24m
<b>Net cost (i.e. costs minus benefits)</b>	<b>£112.3m</b>

Note: 2009 data were used. For the reduction in other welfare spending, see Table 14, above.

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<sup>153</sup> i.e. Took an estimated cost per place of £3,079.35 (for details of calculation see Part 3, Box 10). Estimated the take up, i.e. the percentage use of formal childcare in 2011- 38.4%- increased by the same proportion as the estimated increase in maternal employment in the Netherlands model, i.e. 139,640 divided by 129,000 or 8.25%. So, an estimated take up of 38.4 times 1.0825= 41.57%. This implies the total costs would be £3079.35 times 330,800 times 0.4157=£423.5m.

## Part 3: Detail of the estimation of the costs and benefits

### Box 1: Estimation of the employment impact of applying the Quebec model to Northern Ireland - Using 2009 data<sup>154</sup>

In 2008, the total number of mothers with dependent children ages 0 to 14 in Quebec was 747,300<sup>155</sup>. Econometric estimation of the impact of various factors on labour supply implied that the introduction of highly subsidised childcare in Quebec after 1996 led to an increase in maternal employment of 69,700. In 2008, the total number of mothers with dependent children in employment was 575,579, which implied a maternal employment rate of 77.0%. By implication, in the absence of the subsidised childcare maternal employment would have been (575,579 minus 69,700=) 505,879, which implied a maternal employment rate of 67.7%. Another way of expressing the impact of the subsidised childcare is to say that a (575,579 minus 505,879, divided by 505,879, multiplied by 100=) 13.78% increase in maternal employment is indicated.

If we assume that the impact in the case of Northern Ireland would also be a 13.78% increase in maternal employment if a highly subsidised Quebec model were applied, then maternal employment would increase from 129,000 to 146,780, i.e. an increase of 17,780 or 2.4% of total Northern Ireland employment.

We should not assume that all of the extra jobs will be full-time ones. It is likely that a large share of the extra maternal employment would be part-time. We assumed that the extra 17,780 of maternal employment was divided into 50.3% full-timers and 49.7% part-timers, based on the existing breakdown of maternal employment in Northern Ireland<sup>156</sup>. That implied 8,943.3 full-time jobs and 8,836.7 part-time jobs. To measure the economic benefit of this employment gain, we estimated the GVA uplift for each type of job (full-time and part-time) based on applying to the average wage for full-time women and the average wage for part-time women the overall relationship between GVA per job and the average wage level in the Northern Ireland economy (for the most recent year, 2012-2013, for which data were available)<sup>157</sup>. The calculations were as follows, implying a total gain to GVA of £520.1m:

Job type	Number of jobs created	Estimated GVA per job (£)	Estimated GVA uplift (£)
Full-time	8,943.3	41,454	370.7m
Part-time	8,836.7	16,907	149.4m

With the GVA per job figures estimated using the following data:

GVA, 2012, £m (Office for National Statistics)	29,410
Total employment, 2012 (Labour Force Survey)	800,200
Average GVA per person in employment, 2012,£	36,753
Average wage, 2013, £ (Annual Survey of Hourly Earnings)	22,463
Ratio of GVA per person in employment to average wage**	1.64

Note:\*\*This is, of necessity, an average across men and women and, whilst using the most up-to-date available data, compares a 2013 value to one for 2012. The relationship thus established between wage levels and GVA per person in employment levels is therefore an approximation.

	Average wage, £	Estimated GVA per job, £ (using the 1.64 ratio)
Female full-time workers	25,336	41,454
Female part-time workers	10,333	16,907

Source: NISRA 2013b, *op.cit.*

<sup>154</sup> The measured Northern Ireland maternal employment grew substantially between 2009 and 2011, so use of the latter year may substantially *overestimate* the scale of employment impact in Northern Ireland.

<sup>155</sup> The data for Quebec derive from Fortin, Godbout and St.Cerny 2012, *op.cit.*

<sup>156</sup> In 2009. A similar approach was used in PwC 2003, *op.cit.*

<sup>157</sup> This approximation was necessary because no data on GVA per full-time and part-time female worker were available.

**Box 2: Estimation the impact of applying the Quebec model to Northern Ireland - Using 2011 data**

Whilst the method was the same as that outlined in Box 1, above, the following data relating to 2011 were used:

146,000 (employment level in 2011) times 1.1378= 166,118.8 i.e. additional employment of 20,118.8.

50.8%, that is using the existing split in employment in 2011, of these assumed to be full-time, i.e. 10,220. And 49.2% of these assumed to be part-time, i.e. 9,898.

On this basis, the increase in GVA was estimated as follows:

Job type	Number of jobs created	Estimated GVA per job (£)	Estimated GVA uplift (£)
Full-time	10,220	41,454	423.7m
Part-time	9,898	16,907	167.3m

A total gain to GVA of £591m.

### Box 3: Estimation of the impact of increased lifetime earnings, Quebec model - Using 2009 data

We assumed that for 50% of all the mothers with a dependent child who are in work a significant career break which would otherwise have happened does not happen because of the childcare subsidy. Uplifts in earnings were applied to that proportion of working mothers. That is; 50% of 146,780 (i.e. the 2009 base of mothers in employment which was 129,000, times the increase implied by the Quebec study, i.e. 1.1378). We again used a split of 50.3% and 49.7% between full-time and part-time workers, based on NISRA data for 2009 for those mothers in work under the current childcare system. As there were no data for the lifetime earnings in Northern Ireland, nor were there any data on the different wage levels by age band for Northern Ireland, we estimated the lifetime average annual earnings for women in Northern Ireland as follows:

- We calculated the ratio between the mean UK wage for females and the mean Northern Ireland wage for females.
- We assumed that this difference in earnings between Northern Ireland and the UK is identical across all age bands, and we applied this ratio to the mean annual pay for females in the UK by age band data in ASHE (Annual Survey of Hours and Earnings) 2013 to imply mean annual pay levels in Northern Ireland, for females, by age band. See the tables below:

#### Mean annual gross pay for female full-time workers by age band, 2013

Age bands:	UK mean wage (£)	Estimated NI mean wage (£)
18-21	13,322	12,217
22-29	22,251	20,405
30-39	29,908	27,426
40-49	30,180	27,676
50-59	28,611	26,237
60+	25,297	23,199

#### Mean annual gross pay for female part-time workers by age band, 2013

Age bands:	UK mean wage (£)	Estimated NI mean wage (£)
18-21	5,186	4,756
22-29	9,260	8,492
30-39	12,759	11,700
40-49	12,105	11,101
50-59	11,705	10,734
60+	9,478	8,692

Source: Office for National Statistics and ASHE.

- Based on these wage levels for the different age bands, we derived the lifetime earnings, assuming the wages will remain constant over time, i.e. multiplying up all the wages in each age band by the number of years in that band but then dividing by the number of years in the working life.
- We used this procedure for both full-timers and part-timers and obtained the following results:  
Estimated lifetime annual average earnings for full-time females in Northern Ireland= £24,287.  
Estimated lifetime annual average earnings for part-time females in Northern Ireland= £9,910.
- We applied a 1.5% uplift to full-time earnings and 0.5% to part-time ones.
- We then calculated the discounted benefits in terms of 60 years.

#### Box 4: Estimation of the impact of increased lifetime earnings, Quebec model - Using 2011 data

We assumed that for 50% of all the mothers with a dependent child who are in work a significant career break which would otherwise have happened does not happen because of the childcare subsidy and so the uplifts in earnings were applied to that proportion of working mothers. That is; 50% of 166,118 (i.e. the 2011 base of mothers in employment which was 146,000, times the increase implied by the Quebec study, i.e. 1.1378).

Here we used a split of 50.8% and 49.2% between full-time and part-time workers, based on NISRA data for 2011 for those mothers in work under the current childcare system.

As there were no data for the lifetime earnings in Northern Ireland, nor were there any data on the different wage levels by age band for NI, we estimated the lifetime average annual earnings for women in NI as follows:

- We calculated the ratio between the mean UK wage for females and the mean Northern Ireland wage for females.
  - We assumed that this difference in earnings between Northern Ireland and the UK is identical across all age bands, and we applied this ratio to the mean annual pay for females in the UK, by age band data in ASHE 2013 to estimate mean annual pay levels in NI, for females, by age band.
  - Based on these wage levels for the different age bands, we derived the lifetime earnings, assuming the wages will remain constant over time, i.e. multiplying up all the wages by age band by the number of years in that age band but then dividing by the number of years in a working life.
  - We used this procedure for both full-timers and part-timers and obtained the following results:
  - Estimated lifetime annual average earnings for full-time females in Northern Ireland= £24,287.
  - Estimated lifetime annual average earnings for part-time females in Northern Ireland= £9,910.
  - We applied a 1.5% uplift to full-time earnings and 0.5% to part-time ones.
  - We then calculated the discounted benefits in terms of 60 years.
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## Box 5: Estimation of the increase in government spending for the Quebec model

We used two approaches to estimate what would be the cost of a very highly subsidised publicly funded system in Northern Ireland<sup>158</sup>; the first, using the figures for Quebec itself and, the second, using estimates for Scotland<sup>159</sup>.

### (1.) Using figures for Quebec

*Key assumptions and the data which were used:*

1. In 2012 the cost per childcare place in Quebec, ages 0 to 5, has been indicated to have been Canadian \$10,628<sup>160</sup> which is equivalent to £5,916 at a purchasing power parity (PPP) rate of exchange<sup>161</sup>.
2. We assumed this Quebec-based figure could be applied to full-time care for children aged 1 to 4 in Northern Ireland<sup>162</sup>, we assumed this could be converted to a rate for either part-time care for children aged 1 to 4 or children aged 5 to 14 by multiplying it be 60%, i.e. giving a figure of £3549.6<sup>163</sup><sup>164</sup>.
3. In 2011 Northern Ireland's population of 1-14 year olds<sup>165</sup> was 330, 800. This was made up of 100,700, for ages 1 to 4, plus 111,800, for ages 5 to 9, and 118,300, for ages 10 to 14.
4. Based on the data for 2011 on the percentage of children in Northern Ireland using formal childcare, about 38.4%<sup>166</sup>, which was increased in line with the estimated responsiveness of maternal employment in the Quebec model (see Box 1, above), we assumed 43.69% of children aged 1 to 14 would use a formal childcare place<sup>167</sup>.
5. Given the data for 2009 and 2011 indicate that about 50% of working mothers work full-time and about 50% part-time, we assumed that for children aged 1 to 4 half of the childcare places would be full-time and half part-time.
6. For children aged 5 to 14 we assumed that half of the children would use childcare places which were part-time (relating to mothers working full-time, the part-time childcare arising because of the working hours beyond school hours). For the remaining half of children in this age group, we assumed half of this group (i.e. 25% of all those aged 5 to 14) would require no childcare (i.e. mothers found part-time work which

<sup>158</sup> As argued in Chapter 3, we estimated that the rate of subsidy in Quebec was 85%.

<sup>159</sup> If costs per child per place of provision in Northern Ireland are higher, whether for reasons of inefficiency, fewer economies of scale or because of some other explanation, then use of the Scottish data will tend to *underestimate the public spending cost*. Chapter 2, however, outlines the survey evidence which suggests that childcare fees in Northern Ireland tend to be lower than elsewhere in the UK.

<sup>160</sup> i.e. Canadian \$2,240.4m and 210,803 funded places. See M. Friendly, S. Halfon, J. Beach and B. Forer December 2013, *op. cit.*

<sup>161</sup> Using the OECD PPP for GDP for 2012. Available at [http://stats.oecd.org/index.aspx?DataSetCode=SNA\\_TABLE4](http://stats.oecd.org/index.aspx?DataSetCode=SNA_TABLE4). The PPP attempts to allow for the extent to which prices of goods or services are more costly in one country relative to another. None of this is to deny the possibility that the price of childcare services in Quebec relative to the UK could be out of line with the general PPP or exchange rate relationship being either relatively expensive or relatively cheap.

<sup>162</sup> The provision of the low fee childcare places in Quebec is described in the literature as "full-time", e.g. in Friendly, Halfon, Beach and Forer December 2013, *op.cit.* We have assumed that full-time in Quebec means the same as full-time for Northern Ireland, i.e. 50 hours per week. To the extent that the subsidised provision in Quebec relates to a lower number of weekly hours then the *implied cost* of applying such a system to Northern Ireland has probably been *underestimated*.

<sup>163</sup> A lower relative cost for the 5-14 year old places compared to the 1 to 4 might seem plausible. After all, no care should be necessary during school hours. That said the existing relative cost as expressed in terms of the fees paid appears to be much *higher* than 60%, in 2013 part-time childcare fees were estimated at 74% of the weekly rate of full-time; Dennison and Smith 2013, *op.cit.* 60% was therefore used as a reasonable compromise.

<sup>164</sup> Friendly, Halfon, Beach and Forer December 2013, *op. cit.*, do provide some limited data on public spending through the Quebec Ministry of Education on after-school care- though the data is limited to 2008 . They note there was Canadian \$ 152.3m of spending on 162,955 places. That implies a very low and perhaps implausible level of spending per place; \$ 934.4 or the equivalent of £520.

<sup>165</sup> We use 1-4 year olds because we assume childcare would not be used before the age of one, given the one year of Maternity Leave.

<sup>166</sup> According to the Family Resources Survey in 2011-12 131,987 children used formal childcare and in 2010-11 117,230. To convert these figures to the calendar year 2011 we used weights of 0.67 and 0.33 respectively, implying 127,120 used childcare in 2011. If it is assumed that *all* of these children were in the 1 to 14 age range then the rate of use of childcare was 127,120 divided by 330,800 or 38.4%.

<sup>167</sup> This figure of 43.69% seems plausible though perhaps an *underestimate* given that OECD data indicate that in 2008 the UK average rate of usage of formal care by children aged less than 3 was 40%; OECD 2014, *op.cit.* One estimate is that the rate of take up in Quebec was about 50%; Fortin, Godhout and St.-Cerny 2012, *op.cit.*

coincided with school hours) and for the other half of this group (i.e. 25% of all those aged 5 to 14) part-time childcare places were required (i.e. mothers found part-time work but this did not coincide with school hours). The equal split of that particular sub-group was an arbitrary but we thought cautious assumption—we thought it realistic to assume some degree of inflexibility in the labour market, i.e. provision of working hours would not necessarily be aligned with school hours.

*Estimating the weighted average cost per childcare place based on the Quebec data*

Children aged 1 to 4 with full-time working mother	5,916 times (100,700/330,800) times 0.5	900.455
Children aged 1 to 4 with part-time working mother	3,549.6 times (100,700/330,800) times 0.5	540.27
Children aged 5 to 14 with full-time working mother	3,549.6 times (230,100/330,800) times 0.5	1,234.53
Children aged 5 to 14 with part-time working mother requiring childcare	3,549.6 times (230,100/330,800) times 0.5 times 0.5	617.263
Children aged 5 to 14 with part-time working mother where no childcare required	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		3,292.518

**A total cost of (£3,292.518 times 330,800 times 0.4369=) £475.86m is implied.**

**(2.) Using estimates for Scotland**

*Key assumptions and the data which were used*

n 2013 the Scottish government outlined proposals to introduce 100% publicly funded childcare, for 1,140 hours per year, for all 1-4 year olds, this measure to be fully implemented within 10 years of Scottish independence.

We used the cost estimate produced by the Scottish Parliament Information Centre (SPICE) of £1.2bn<sup>168</sup>.

Scotland's 1-4 year olds population in 2011 was 233,200<sup>169</sup>, which implies a cost per childcare place of £5,146, that is assuming a 100% rate of take up of the subsidised places. It is important to stress that the Scottish proposals relates to 1140 hours per year, or 25 hours per week, if it is assumed that the childcare is required for about 46 weeks in each year. Dennison and Smith (2013)<sup>170</sup> in their consideration of childcare charges in Northern Ireland assume a full-time childcare place involves double that length of time, i.e. 50 hours per week. Given this, for the purposes of estimating the cost of applying a very highly subsidised system in Northern Ireland we assume full-time childcare means 50 hours week and we therefore assume that the Scottish cost per place should be doubled to £10,292.

We reduced this figures to reflect our estimate that the subsidy rate in Quebec was actually 85% rather than 100%, i.e. the cost of a full-time childcare place in NI based on the Scottish data would be £,8748.2

The other assumptions used were the same as for the use of the Quebec data (see above).

<sup>168</sup> SPICE provides impartial research services to Members of the Scottish Parliament (similar to the House of Commons Library). The SPICE 2014, *op.cit.*, estimate of the cost of 100% publicly funded childcare for 1-4 year olds in Scotland was £500m higher than that suggested by the Scottish government itself, although the lower figure seems to relate to a first stage of implementation only. See, Chapter 3. Available at: [http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB\\_14-26.pdf](http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_14-26.pdf)

<sup>169</sup> ONS. Available at: <http://www.ons.gov.uk/publications/re-reference-tables.html?edition=tcm%3A77-319259>

<sup>170</sup> Dennison and Smith 2013, *op.cit.*

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*Estimating the weighted average cost per childcare place based on the Scottish data*

Children aged 1 to 4 with full-time working mother	8,748.2 times (100,700/330,800) times 0.5	1,331.54
Children aged 1 to 4 with part-time working mother	5,248.92 times (100,700/330,800) times 0.5	798.92
Children aged 5 to 14 with full-time working mother	5,248.92 times (230,100/330,800) times 0.5	1,825.54
Children aged 5 to 14 with part-time working mother requiring childcare	5,248.92 times (230,100/330,800) times 0.5 times 0.5	912.77
Children aged 5 to 14 with part-time working mother where no childcare required	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		4,868.77

**A total cost of (£4,868.77 times 330,800 times 0.4369=) £703.67m is implied.**

To summarise, these two methods, imply a total cost for Northern Ireland of between £475.86m and £703.67m.

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### **Box 6: Estimation of the employment impact of applying the Denmark model to Northern Ireland - Using 2009 data**

In 2009 the maternal employment rate, for mothers with a youngest child 0 to 14, in Northern Ireland was 67.2%, not dissimilar to the UK average, 67.1%. This contrasts to the rate in Denmark which was 84.0%.

In other words, the “gap” between Northern Ireland and Denmark was 16.8% points.

We assumed that if the Denmark model of part subsidised childcare were applied to Northern Ireland half of that gap would be closed. In other words, the Northern Ireland maternal employment rate would increase from 67.2 to (67.2 plus 8.4=) 75.6%.

In 2009 the total number of mothers in Northern Ireland with a youngest dependent child ages 0 to 14 was 192,000 so, at the new maternal employment rate, employment would be 145,152 compared to the actual employment level of 129,000.

By implication, adoption of the Denmark model was implied to increase employment by 16,152 which would be equivalent to a 2.1% gain in total employment across the entire Northern Ireland economy.

However, as in application of the Quebec model, we adjusted this increase in employment for the breakdown into full-timers and part-timers, based on the 2009 split of 50.3% and 49.7% respectively. Therefore, the impact is as follows:

<b>Job type</b>	<b>Number of jobs created</b>	<b>Estimated GVA per job (£)*</b>	<b>Estimated GVA uplift (£)</b>
Full-time	8,124.4	41,454	336.79m
Part-time	8,027.5	16,907	135.72m

### Box 7: Estimation of the employment impact of applying the Denmark model to Northern Ireland - Using 2011 data

In 2011 the maternal employment rate, for mothers with a youngest child 0 to 14, in Northern Ireland was 69.6%. This contrasts to the rate in Denmark which was 84.0%.

In other words, the “gap” between Northern Ireland and Denmark was 14.4% points.

We assume that if the Denmark model of part subsidised childcare was applied to Northern Ireland half of that gap would be closed. In other words, the Northern Ireland maternal employment rate would increase from 69.6 to (69.6 plus 7.2=) 76.8%.

In 2011 the total number of mothers in Northern Ireland with a youngest dependent child aged 0-14 was 210,000 so, at the new maternal employment rate, employment would be 161,280 compared to the actual employment level of 146,000.

By implication, adoption of the Denmark model was implied to increase employment by 15,280 which would be equivalent to a 1.9% gain in total employment across the entire Northern Ireland economy.

However, as in application of the Quebec model, we adjust this increase in employment for the breakdown into full-timers and part-timers, based on the 2011 split of 50.8% and 49.2% respectively. Therefore, the impact was as follows:

Job type	Number of jobs created	Estimated GVA per job (£)*	Estimated GVA uplift (£)
Full-time	7,762.2	41,454	321.77m
Part-time	7,517.8	16,907	127.1m

### Box 8: Estimation of the employment impact of applying the Netherlands model to Northern Ireland - Using 2009 data

In 2009 the maternal employment rate for mothers with a youngest child ages 0 to 14 in Northern Ireland was 67.2%, not dissimilar to the UK average of 67.1%. This contrasts to the rate in the Netherlands which was 78.5%. In other words, the “gap” between Northern Ireland and the Netherlands was 11.3% points. We assumed that if the Netherlands model of part subsidised childcare were applied to Northern Ireland half of that gap would be closed. In other words, the Northern Ireland maternal employment rate would increase from 67.2 to (67.2 plus 5.65 equals) 72.85%.

In 2009, the total number of mothers in Northern Ireland with a youngest dependent child aged 0 to 14 was 192,000 so, at the new maternal rate, employment would be 139,870 compared to the actual employment level of 129,000. By implication, adoption of the Netherlands model is implied to increase employment 10,870 which would be equivalent to a 1.5% gain in total employment across the entire Northern Ireland economy.

However, and in contrast to the Quebec and Denmark models, a further and negative consideration should be applied to considering the overall impact on employment. A major part of the Netherlands system is a levy on all employment paid by employers.

We assumed the same rate of levy, 0.34% of total salary and wage costs, would be paid by all businesses in Northern Ireland. It would not be unreasonable to assume that an increase in labour costs would result in some reduction in labour demand. We assumed a response, or elasticity of demand for labour, of -0.5, i.e. for each 1% increase in the labour costs paid by businesses there is a -0.5% decrease in demand and hence employment<sup>171</sup>. In the case of a 0.34% levy the reduction in employment implied by the elasticity would be -0.17%.

Given total Northern Ireland employment of 755,250 in 2009 this would represent a decrease in employment of 1,280.

We divided that reduction in employment into two groups; first, reduced employment of mothers, and, second, reduced employment of everyone else.

Given our estimate that maternal employment would rise to about 139,870, this would imply that employed mothers would represent (139,870/755,250) or about 18% of all employment (in 2009). That would imply that the loss of employment amongst employed mothers could be 1,280 times 0.18, or 230. By implication, the *net* increase in employment of mothers which is the consequence of subsidised childcare is 10,870 minus 230, or 10,640 (composed of 5,351.9 full-time jobs and 5,288.1 part-time jobs, based on the previous assumptions about the split between full and part-time, i.e. 50.3% and 49.7% respectively). The overall economic benefit was estimated as follows:

Job type	Number of jobs created	Estimated GVA per job (£)	Estimated GVA uplift (£)
Full time	5,351.9	41,454	221.86m
Part time	5,288.1	16,907	89.41m

This implies a total GVA gain from the additional maternal employment of £311.27m.

However, allowance, must also be made for the negative impact on GVA arising from the reduction in employment which impacts on all employment other than mothers in employment, i.e. 1,280 minus 230 or 1,050 jobs. For these we assume the level of GVA per person in employment was the same as the average level of productivity of the entire Northern Ireland economy, i.e. £36,753 (see Box 1). This implies a reduction in GVA of 1,050 times £36,753= £38.59m.

Therefore, the net gain to GVA of 311.27 minus 38.59= £272.68m

<sup>171</sup> For the elasticity, see A. Hijzen and P. Swaim 2010, “Offshoring, labour market institutions and the elasticity of labour demand”, *European Economic Review*, 54 (8), pp. 1016-34.

### Box 9: Estimation of the employment impact of applying the Netherlands model to Northern Ireland - Using 2011 data

In 2011 the maternal employment rate for mothers with a youngest child ages 0 to 14 in Northern Ireland was 69.6%. This contrasted to the rate in the Netherlands which was 77.5%.

In other words, the “gap” between Northern Ireland and the Netherlands was 7.9% points.

We assumed that if the Netherlands model of part subsidised childcare were applied to Northern Ireland half of that gap would be closed. In other words, the Northern Ireland maternal employment rate would increase from 69.6 to (69.6 plus 3.95 equals) 73.55%.

In 2011 the total number of mothers in Northern Ireland with a youngest dependent child aged 0 to 14 was 210,000 so, at the new maternal rate, employment would be 154,455 compared to the actual employment level of 146,000.

By implication, adoption of the Netherlands model is implied to increase employment 8,455 which would be equivalent to a 1.9% gain in total employment across the entire Northern Ireland economy.

However, and in contrast to the Quebec and Denmark models, a further and negative consideration should be applied to considering the overall impact on employment. A major part of the Netherlands system is a levy on all employment paid by employers.

We assumed the same rate of levy, 0.34% of total salary and wage costs, would be paid by all businesses in Northern Ireland. It would not be unreasonable to assume that an increase in labour costs would result in some reduction in labour demand. We assumed a response, or elasticity of demand for labour, of -0.5, i.e. for each 1% increase in the labour costs paid by businesses there is a -0.5% decrease in demand and hence employment<sup>172</sup>. In the case of a 0.34% levy the reduction in employment implied by the elasticity would be -0.17%.

As shown in Box 8, the negative impact of the levy on maternal employment was estimated to be 230. This implies the net gain to maternal employment would be 8,455 minus 230, or 8,225. This contrasts to the larger gain in maternal employment implied by use of the 2009 data, i.e. 10,640 (see Box 8, above).

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<sup>172</sup> Hijzen and Swaim 2010, *op.cit.*

## Box 10: Estimation of the cost of Netherlands model direct from OECD data for the Netherlands

Stages in the estimation:

1. According to OECD (2014)<sup>173</sup>, the Netherlands government spend per pre-school child in the population in terms of pre-school childcare and education was \$6,973 in PPP terms<sup>174</sup> in 2008.
2. Using the PPP relationship between the \$ and the £ in 2008, which was 0.650843<sup>175</sup>, that implied a cost per child of £4,538.33.
3. OECD estimate was that the rate of take up of childcare places in the Netherlands was 60%. Applying that would indicate a cost *per place* of £7,563.88<sup>176</sup>.
4. When that figure was reduced by one-third to allow for the contribution to funding made through the levy on employers this indicated a cost per place of £5,045.11.
5. When this estimated cost was upgraded from 2008 to 2012 using the GDP deflator for that period, i.e. 1.0967, the indicated cost was £5,532.97.
6. We assume that cost, relating to children aged 1 to 4, could be converted to a part-time cost at a rate of 60%, i.e. indicating a cost per part-time place of £3,319.78.
7. Estimating the weighted average cost per childcare place using the Netherlands data (*assuming part-time childcare costs 60% of full-time*):

Children aged 1 to 4 with full-time working mother	5,532.97 times (100,700/330,800) times 0.5	842.16
Children aged 1 to 4 with part-time working mother	3,319.78 times (100,700/330,800) times 0.5	505.29
Children aged 5 to 14 with full-time working mother	3,319.78 times (230,100/330,800) times 0.5	1,154.6
Children aged 5 to 14 with part-time working mother requiring childcare	3,319.78 times (230,100/330,800) times 0.5 times 0.5	577.3
Children aged 5 to 14 with part-time working mother where no childcare required	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		3,079.35

<sup>173</sup> OECD 2014, *op.cit.*

<sup>174</sup> PPP comparisons attempt to allow for differences in the price levels of goods and services of *similar types and qualities* in different countries.

<sup>175</sup> i.e. one \$ equalled £0.650843 when the comparative costs of all goods and services in GDP in the two economies were compared. OECD 2008 data on PPPs available at [http://stats.oecd.org/index.aspx?DataSetCode=SNA\\_TABLE4..](http://stats.oecd.org/index.aspx?DataSetCode=SNA_TABLE4..)

<sup>176</sup> See Chapter 2 and OECD 2014, *op.cit.* This figure applied only those children aged up to 3. We assumed that the rate of use by children aged 3-14 years old would be similar.

*Table A1: Estimating the weighted average cost per childcare place using the Netherlands data (assuming part-time childcare costs 50% of full-time):*

Children aged 1 to 4 with full-time working mother	5,532.97 times (100,700/330,800) times 0.5	842.16
Children aged 1 to 4 with part-time working mother	2,766.49 times (100,700/330,800) times 0.5	421.08
Children aged 5 to 14 with full-time working mother	2,766.49 times (230,100/330,800) times 0.5	962.17
Children aged 5 to 14 with part-time working mother requiring childcare	2,766.49 times (230,100/330,800) times 0.5 times 0.5	481.08
Children aged 5 to 14 with part-time working mother where no childcare required	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		2,706.49

*Table B1: Estimating the weighted average cost per childcare place using the Netherlands data (assuming part-time childcare costs 74% of full-time):*

Children aged 1 to 4 with full-time working mother	5,532.97 times (100,700/330,800) times 0.5	842.16
Children aged 1 to 4 with part-time working mother	4,094.4 times (100,700/330,800) times 0.5	623.2
Children aged 5 to 14 with full-time working mother	4,094.4 times (230,100/330,800) times 0.5	1,424.0
Children aged 5 to 14 with part-time working mother requiring childcare	4,094.4 times (230,100/330,800) times 0.5 times 0.5	712.0
Children aged 5 to 14 with part-time working mother where no childcare required	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		3,610.36

## Box 11: Detail of the sensitivity analysis

### 1. Using Denmark's cost per childcare place (rather than an average of costs in Quebec and Scotland)

Childcare model	Our estimate of average cost per place, £	Average cost per place in Denmark <sup>177</sup> , £	Implied revised total cost*, £m	Benefits, £m	Original net costs, £m	Revised net costs (costs minus benefits), £m
Quebec	4,080	6,665	589.77 times 6,665 divided by 4,080=963.44 Minus 44.5 (welfare reduction)=918.9	535.4	9.9	383.5
Denmark	3,876	6,665	554.0 times 6,665 divided by 3,876=952.63 Minus 40.5 (welfare reduction)=912.1	487.6	25.9	424.5
Netherlands	3079.35	6,665	423.5 times 6,665 divided by 3079.35=916.6 Minus 24 (welfare reduction)=892.6	287.2	112.3	605.4

Note:\*In each case our original estimate of total cost is multiplied up by the ratio between £6,665 (our estimate of average cost per place in Denmark) and our original estimate of average cost per place.

### 2. Using a full-time: part-time split in the additional maternal employment of 25%:75% (rather than approximately 50%:50%)

Childcare model	Original benefits, £m	Revised benefits, £m	Costs, £m	Original net cost, £m	Revised net cost, £m
Quebec	535.4	(184.26+225.45 +9.41=*)419.12	545.27	9.9	126.2
Denmark	487.6	(167.89+205.42 +9.31=)382.62	513.5	25.9	130.9
Netherlands	287.2	(110.27+134.92 +9- 38.59**=)215.6	399.5	112.3	183.9

Note:\*In each calculation, the first figure relates to the additional GVA from full-timers, the second figure to the additional GVA from part-timers and the third to the increase in lifetime earnings.

\*\*The negative adjustment to GVA given the reduction to employment which was a result of the childcare levy on employers.

<sup>177</sup> According to IPPR 2012, *op.cit.*, the cost per place in Denmark for an under 2 year old was £12,000 and for a 3 to 5 year old it was £8,000. We took the average of those, i.e. £10,000, to represent the average for ages 1 to 4. We then assumed that the average for ages 5 to 14 would be 50% of that, i.e. £5,000. We then applied weights approximating to the population shares of one-third and two-thirds respectively to these two age related unit costs giving a weighted average of £6,665.

3. Using a level of deadweight, for every two additional places required because of additional maternal employment, a further one child would be displaced from informal into formal childcare

Childcare model	Original costs, £m	Revised costs, £m	Benefits, £m	Original net cost, £m	Revised net cost, £m
Quebec	545.3	£4,080 times 330,800 times 0.4634 <sup>178</sup> =625.43 Minus 44.5 (welfare reduction)=580.9	535.4	9.9	45.5
Denmark	513.5	£3,876 times 330,800 times 0.4561 <sup>179</sup> =584.8 Minus 40.5 (welfare reduction)=554.3	487.6	25.9	66.7
Netherlands	399.5	£3079.35 times 330,800 times 0.4315 <sup>180</sup> = 439.55 Minus 24 (welfare reduction)=415.55	287.2	112.3	128.3

4. (a.) Using part-time childcare costing 50% of full-time (rather than 60%)

Childcare model	Original costs, £m	Revised costs, £m	Benefits	Original net cost, £m	Revised net cost, £m
Quebec	545.3	518.35* Minus 44.5 (welfare reduction)= 473.9 * For calculation, see the following two Tables A2 and B2, below	535.4	9.9	-61.5, i.e. a net benefit
Denmark	513.5	Estimate unit cost for Quebec i.e. 518.35 divided by 144.527 <sup>*</sup> =3,586.5 Reduced that unit cost to 95% i.e. 3,407.2 Total cost= 3,407.2 times 330.8 times 0.4321= 487.0 Minus 40.5 (welfare reduction)=446.5 *i.e. 330,800 times 0.4369	487.6	25.9	-41.1, i.e. a net benefit
Netherlands	399.5	Estimated unit cost=2,706.49* Total cost= 2,706.49 times 330,800 times 0.4157=372.2 Minus 24 (welfare reductions)=348.2 *See Table A1 in Box 10, above	287.2	112.3	61.0

<sup>178</sup> It was assumed that the total percentage increase in take up from the base in 2011 of 38.4% would be the estimated percentage increase in maternal employment, i.e. 13.78%, plus a further percentage increase equivalent to half the percentage increase in maternal employment, i.e. 6.89%. So, the total increase in take up would be 20.67%. As a result the new percentage use of childcare would be 38.4% times 1.2067, i.e. 46.34%.

<sup>179</sup> i.e. 12.52% plus 6.26%. So, the total increase in take up would be 18.78%. As a result the new percentage use of childcare would be 38.4% times 1.1884, i.e. 45.61%.

<sup>180</sup> i.e. 8.25% plus 4.13%. So, the total increase in take up would be 12.38%. As a result the new percentage use of childcare would be 38.4% times 1.1238, i.e. 43.15%.

**Table A2: Estimating unit cost and total cost for Quebec with cost part-time childcare 50% of full-time**

Children aged 1 to 4 with full-time working mother	5,916 times (100,700/330,800) times 0.5	900.455
Children aged 1 to 4 with part-time working mother	2,958 times (100,700/330,800) times 0.5	450.23
Children aged 5 to 14 with full-time working mother	2,958 times (230,100/330,800) times 0.5	1,028.77
Children aged 5 to 14 with part-time working mother requiring childcare	2,958 times (230,100/330,800) times 0.5 times 0.5	514.39
Children aged 5 to 14 with part-time working mother where no childcare required	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		2893.85

Implied total cost £2,893.85 times 330,800 times 0.4369= £418.24m

**Table B2: Estimating unit cost and total cost for Scotland with part-time childcare 50% of full-time**

Children aged 1 to 4 with full-time working mother	8,748.2 times (100,700/330,800) times 0.5	1,331.54
Children aged 1 to 4 with part-time working mother	4,374.1 times (100,700/330,800) times 0.5	665.77
Children aged 5 to 14 with full-time working mother	4,374.1 times (230,100/330,800) times 0.5	1,521.28
Children aged 5 to 14 with part-time working mother requiring childcare	4,374.1 times (230,100/330,800) times 0.5 times 0.5	760.64
Children aged 5 to 14 with part-time working mother where no childcare required	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		4,279.23

Implied total cost £4,279.23 times 330,800 times 0.4369= £618.46m

4. (b.) Using part-time childcare costing 74% of full-time (rather than 60%)

Childcare model	Original costs, £m	Revised costs, £m	Benefits	Original net cost, £m	Revised net cost, £m
Quebec	545.3	689.74* Minus 44.5 (welfare reduction)= 645.2 * For calculation see the following two Tables A3 and B3, below	535.4	9.9	109.8
Denmark	513.5	Estimate unit cost for Quebec i.e. 689.74 divided 144,527*=4,772.4 Reduced that unit cost to 95% i.e. 4,533.8  Total cost= 4,533.8 times 330.8 times 0.4321= 648.06 Minus 40.5 (welfare reduction)=607.56 *i.e. 330,800 times 0.4369	487.6	25.9	120.0
Netherlands	399.5	Estimated unit cost=3,601.36* Total cost= 3601.36 times 330,800 times 0.4157=495.24 Minus 24 (welfare reductions)=471.2 See Table B1 in Box 10, above	287.2	112.3	184.0

**Table A3: Estimating unit cost and total cost for Quebec with cost part-time childcare 74% of full-time**

Children aged 1 to 4 with full-time working mother	5,916 times (100,700/330,800) times 0.5	900.455
Children aged 1 to 4 with part-time working mother	4,377.8 times (100,700/330,800) times 0.5	666.34
Children aged 5 to 14 with full-time working mother	4,377.8 times (230,100/330,800) times 0.5	1,522.58
Children aged 5 to 14 with part-time working mother requiring childcare	4,377.8 times (230,100/330,800) times 0.5 times 0.5	761.29
Children aged 5 to 14 with part-time working mother where not requiring childcare	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		3,850.67

Implied total cost £3,850.67 times 330,800 times 0.4369= £556.52

**Table B3: Estimating unit cost and total cost for Scotland with cost of part-time childcare 74% of full-time**

Children aged 1 to 4 with full-time working mother	8,748.2 times (100,700/330,800) times 0.5	1,331.54
Children aged 1 to 4 with part-time working mother	6,473.67 times (100,700/330,800) times 0.5	985.34
Children aged 5 to 14 with full-time working mother	6,473.67 times (230,100/330,800) times 0.5	2,251.5
Children aged 5 to 14 with part-time working mother requiring childcare	6,473.67 times (230,100/330,800) times 0.5 times 0.5	1,125.75
Children aged 5 to 14 with part-time working mother where not requiring childcare	zero times (230,100/330,800) times 0.5 times 0.5	Zero
Weighted cost per childcare place, £		5,694.13

Implied total cost £5,694.13 times 330,800 times 0.4369= £822.95m

5. Using assumption of 60% of gap in maternal employment rates being closed (rather than 50% of the gap)

(a.) *Denmark (using 2009 data)*

Denmark's maternal employment rate minus Northern Ireland's= 16.8% points (see Box 6, above).

So, if 60% of that gap is removed that is equivalent to a gain in Northern Ireland's maternal employment rate of 10.08% points.

So, Northern Ireland's maternal employment rate would then become 67.2 plus 10.08= 77.28%.

Therefore, maternal employment in Northern Ireland would become 192,000 times 77.28%, i.e. 148,377.6.

And therefore the increase in maternal employment would equal 148,377.6 minus 129,000= 19,377.6.

As before, we assume, a 50.3%:49.7% split of full-time and part-time (based on the baseline data for 2009).

So, estimated increase in full-time female employment 9,746.9 and increase in part-time 9,630.7.

Applying the levels of estimated GVA per full-time and part-time female employee as estimated before implies gains to GVA of 404.05m plus 162.83m= 566.88m.

(b.) *Netherlands (using 2009 data)*

Netherlands's maternal employment rate minus Northern Ireland's= 11.3% points.

So, if 60% of that gap is removed that is equivalent to a gain in Northern Ireland's maternal employment rate of 6.78% points.

So, Northern Ireland's maternal employment rate would then become 67.2 plus 6.78= 73.98%.

Therefore, maternal employment in Northern Ireland would become 192,000 times 73.98%, i.e. 142,041.6.

Hence, a gain to employment of 142,041.6 minus 129,000= 13,041.6.

But, as previously estimated, is also negative impact on maternal employment given the increase in labour costs which is produced by the levy on employers. That impact was estimated as 230 jobs; see Box 8, above. Therefore, the net gain to employment is  $13,041.6 - 230 = 12,811.6$ .

As before, we assume, a 50.3%:49.7% split of full-time and part-time (based on the baseline data for 2009).

So, estimated increase in full-time female employment 6444.2 and increase in part-time 6,367.4.

Applying the levels of estimated GVA per full-time and part-time female employee as estimated before implies gains to GVA of 267.1m plus 107.7m = 374.8m. However, a further, negative, adjustment in GVA is necessary given reduction in employment (given the levy) amongst all employees other than mothers, i.e. £38.59m (see above).

So, net gain to GVA = 374.8 minus £38.59 = £336.2m

Summary of impact of adjustment:

Childcare model	Original benefit, £m	Revised benefit, £m	Net cost original, £m	Net cost revised, £m
Denmark	487.6	566.8 plus 15.42* = 582.2 * i.e. the steady state increase in female earnings	25.9	-68.7 i.e. a net benefit
Netherlands	287.2	336.2 plus 14.76* = 351.0 * i.e. the steady state increase in female earnings	112.3	48.5

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