Contents

Disclaimer and important message to readers who are not addressees

This report has been prepared for and only for NICVA/CEE in accordance with the terms of our engagement letter dated 18 March 2014 and for no other purpose. We do not accept or assume any liability or duty of care for any other purpose or to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by our prior consent in writing.

By reading this report, any person who is not an addressee of this report accepts and agrees to the following terms:

1. The reader of this report understands that the work performed by PricewaterhouseCoopers LLP was performed in accordance with instructions provided by our client and was performed exclusively for our addressee client's sole benefit and use.

2. The reader of this report acknowledges that this report was prepared at the direction of our addressee client and may not include all procedures deemed necessary for the purposes of the reader.

3. The reader agrees that PricewaterhouseCoopers LLP, its partners, principals, employees and agents neither owe nor accept any duty or responsibility to it, whether in contract or in tort (including without limitation, negligence and breach of statutory duty), and shall not be liable in respect of any loss, damage or expense of whatsoever nature which is caused by any use the reader may choose to make of this report, or which is otherwise consequent upon gaining access to the report by the reader.

Abbreviations

Abbreviation	Full name
CEE	Centre for Economic Empowerment
CPB	Central Planning Bureau
CPC	Child Parent Center
CPE	*Centre de la Petite Enfance*
CRSP	Centre for Research in Social Policy
CTC	Child Tax Credit
DARD	Department of Agriculture and Rural Development
DE	Department of Education (in Northern Ireland)
DEL	Department for Employment and Learning
DETI	Department of Enterprise, Trade and Investment
DFP	Department of Finance and Personnel
DHSSPS	Department of Health, Social Services and Public Safety
DKK	Danish Krone
DSD	Department for Social Development
DWP	Department for Work and Pensions
EC	European Commission
ECEC	Early Childhood Education and Care
EIU	Economist Intelligence Unit
EPPE	Effective provision of pre-school education
EU	European Union
EYE	Early Years Entitlement
FPG	Frank Porter Graham
FTE	Full-time equivalent
GB	Great Britain
GDP	Gross domestic product
GVA	Gross value added
HM	Her Majesty's
HMRC	Her Majesty's Revenue and Customs
HSC	Health and Social Care
HSCB	Health and Social Care Board
ICT	Information and communications technology
IFS	Institute for Fiscal Studies
IPPR	Institute for Public Policy Research
IRS	Internal Revenue Service
JRF	Joseph Rowntree Foundation
NCLB	No Child Left Behind
NI	Northern Ireland

Abbreviation	Full name
NIC	National Insurance Contribution
NICVA	Northern Ireland Council for Voluntary Action
NISRA	Northern Ireland Statistics and Research Agency
NOK	Norwegian Krone
NPV	Net present value
NVQ	National Vocational Qualification
OECD	Organisation for Economic Co-operation and Development
OFMDFM	Office of the First Minister and Deputy First Minister
PISA	Program for International Student Assessment
PPP	Purchasing power parity
PPVT	Peabody Picture and Vocabulary Test
SAC	School age childcare
SPA3	Social and Pedagogical Worker Level Three
SPICE	Scottish Parliament Information Centre
UC	Universal Credit
UK	United Kingdom
US	United States
WTC	Working Tax Credit

Acknowledgements

PwC would like to thank the many individuals and organisations who helped us in writing this report. Eoin Rooney, Co-ordinator of the Northern Ireland Council for Voluntary Action's Centre for Economic Empowerment (NICVA/CEE), provided many good suggestions.

Sarah McCarthy produced research assistance relating particularly to the international data and literature.

We would also like to acknowledge the advice provided by a number of officials; Bronagh Smyth and Sinead Crossan who consider social welfare policy in the Department for Social Development (DSD), and Dr Martin Tyrrell who considers childcare policy in the Office of the First Minister and Deputy First Minister (OFMDFM).

The Northern Ireland Statistics and Research Agency (NISRA) was unfailingly helpful in providing data relating to maternal employment. The Organisation for Economic Co-operation and Development (OECD) helpfully clarified a number of points relating to their data.

Employers for Childcare Charitable Group drew on their experience to provide many useful comments. They also provided one of the peer reviews of an early draft of this report.

We are also grateful to NICVA/CEE's second and anonymous referee, who provided many helpful comments.

Responsibility for the final report remains, however, with the authors.

Foreword

Despite the political emphasis placed on "making work pay", being employed does not guarantee an adequate standard of living. Reasons for this include flexible working – part-time, short-term, and even zero-hour contracts – and low wages, with a quarter of employees in Northern Ireland paid below the Living Wage.

Another factor is the high cost of childcare, which can mean that parents may be only marginally better off working, if at all, than they are staying home to look after their children. It is therefore worth considering whether the current piecemeal approach to funding childcare in Northern Ireland (a mixture of grants for childcare providers, tax credits for working parents, and tax reliefs for employers) could be replaced with a universal and more highly subsidised system, as exists in a number of countries.

This report considers the *economic* implications of three models for funding a universal system of childcare in Northern Ireland. Taking into account the potential benefits of higher employment and earnings, together with the cost of additional public spending, the authors conclude that for an 85% subsidised system, quantifiable economic costs would exceed quantifiable benefits by £9.9m. That would comprise less than 0.1% of Northern Ireland's Gross Value Added.

Whether this represents value for money depends on the weight given to various social benefits not quantified in this analysis. One is the prospect of greater gender equality - it is primarily mothers who assume responsibility for childcare and who carry the adverse consequences in terms of employment, career progression, and wages. Improved household finances may also help reduce child poverty.

If a universal system is accepted as desirable in principle, a number of practical obstacles remain. How would it be funded, particularly given that the service would have to be paid for up-front, while some of the benefits would be reaped over the longer term?

A further complication is that under the current fiscal arrangements, investment in childcare would come from the Northern Ireland Executive's budget, but it is primarily the UK Treasury which would gain from improved public finances. The implied fiscal deficit for the Executive - in the region of £260m to £397m - is considerable.

In setting out the financial implications and some of the practical issues involved, this report provides those interested in creating a more affordable and comprehensive system of childcare in Northern Ireland with a firmer evidence base and a focus for future work.

Seamus McAleavey
NICVA Chief Executive

Executive Summary

Introduction

PwC was commissioned to conduct a cost-benefit analysis of three models of public subsidy of childcare applied to Northern Ireland. This report along with its appendices represents the results of our investigations. Our working hypothesis was that improving childcare affordability by way of increased childcare subsidies would also increase maternal employment and hence generate quantifiable benefits in excess of quantifiable costs. Cost-benefit analysis was used to test that hypothesis.

Why the extent of public subsidy of childcare matters

The extent of public subsidy of childcare was of interest given its potential impact on the affordability of childcare. If the subsidy were increased this could increase affordability which in turn could increase employment, especially in terms of the labour supply of mothers with dependent children. Any such increase in maternal employment would be of particular interest in policy terms given the possible associated social and economic benefits:

- The social benefits include a reduction in child poverty; international comparisons suggest that countries with relatively high rates of maternal employment tend also to have relatively low rates of child poverty.

- The economic benefits include the increase in output which follows from the increased labour supply. In this cost-benefit study we focused mainly on the economic effects as these are the ones which are most readily quantified.

Admittedly, there are some caveats on the extent of such potential benefits. For example, the accessibility of childcare may be determined in part by non-price factors as well as affordability. Moreover, the extent of availability of childcare is not the only factor which determines maternal labour supply. The ability of the labour market to absorb the extra labour supply is unclear. Rates of child poverty are also determined by factors other than the maternal employment rate.

Nevertheless, a case for public subsidy for childcare could be made on the basis that a range of groups is likely to benefit and it is possible the sum of such benefits would exceed the cost in terms of increased public spending:

- Parents, especially mothers, could benefit in terms of the incentive to increase their labour supply, either in terms of entering employment or working for longer hours. There could also be a longer term benefit to mothers with dependent children in terms of a reduction in the extent to which they have to take sustained breaks from the labour market. Any reduction in such career breaks could lead to an increase in average earnings over a lifetime.

- Children could benefit in terms of a boost to early years education leading to accelerated cognitive and behavioural development.

- Government could benefit to the extent that there are improved social outcomes, especially over the long run, perhaps in terms of diverting children away from future social problems, e.g. poverty, educational underachievement, unemployment and crime.

- Employers could benefit through any increase in the supply of labour.

However, all these potential benefits are subject to caveats. For example, how far will labour demand be able to keep pace with increased labour supply? Or, how far, is the provision of childcare sufficiently integrated with early year's education and how far is it of sufficient quality to ensure the impact on the behavioural and cognitive development of children is positive rather than negative?

The likelihood that the benefits are spread across the four groups, parents, children, government and employers, is indicative that there is a case for some subsidy of childcare but not 100% subsidy. Given that parents (especially mothers) and employers are likely to gain, as well as government, there is a case for all these groups making some contribution to covering the costs.

Childcare: International comparisons

A review of the literature indicated the following important points relating to the context for considering the models of subsidised childcare:

- Those OECD countries with the highest maternal employment rates tended to have the lowest rates of child poverty.
- It is implied that the charge for childcare in Northern Ireland as a percentage of the average wage was higher than the UK or OECD average.
- The rate of child poverty in Northern Ireland was considerable in absolute terms and high relative to that in the Nordic countries. It was less clear whether it was higher than the UK average (this may depend on how poverty is defined).
- Northern Ireland's maternal employment rate in 2011 was higher than the OECD average. It was also indicated to be higher than the UK average. The Northern Ireland rate was also higher than both the OECD and UK average in 2009 but in that year the difference was marginal.
- Studies of childcare systems in various countries point to some of the desirable features for a system of childcare provision; low child:staff ratio, affordability including affordability from the point of view of middle income parents and the use of a curriculum to guide the educational content of the childcare.
- Childcare, especially high quality childcare, may have substantial, positive and long lasting impacts on individual children.
- Importantly, some of these benefits include possible diversion away from future social problems, e.g. poverty, welfare dependency and criminality.
- The optimistic view is that over the long run, public spending on childcare in effect pays for itself, given both longer term social benefits and also public spending avoided because certain social problems are reduced. This assumes government can borrow to pay for the spending in the present and is able to wait for such long term pay back.
- At the same time, in drawing lessons from such international studies, many of which relate to the US, it remains unclear how far it is legitimate to generalise the findings of studies which often relate to the application of childcare to narrowly defined groups, e.g. the socially deprived. The question remains, what would happen if childcare were provided on a universal or close to universal basis?
- Some of the other longitudinal studies, particularly those relating to Quebec imply there may be negative impacts on some children in terms of slowing down or even reversing behavioural or cognitive development. In this context it may be significant that the level of spending per childcare place in Quebec is much lower than that in the Nordic countries.

To sum up, the international data were suggestive of two relationships that may be of great interest to policy makers in Northern Ireland. First, as childcare becomes more affordable, maternal employment rates tend to be higher. Second, as maternal employment rates increase, rates of child poverty decrease. Such relationships are, however, general tendencies. It may be significant that in 2011 the rate of maternal employment in Northern Ireland was already above the OECD average, at the same time the rate of child poverty was probably about average within the OECD or just below that average.

Selecting childcare models

In order to reflect the terms of reference of this project, we considered a very highly subsidised publicly funded model of childcare and what impact that might have if applied in Northern Ireland. We used the system of childcare in the Canadian Province of Quebec to represent such a system.

We also considered the Danish approach to public subsidy of childcare and what impact that might have if applied to Northern Ireland. In Denmark roughly the first 75% of costs are paid for by the Danish local government authorities and remaining cost may be subsidised. That further subsidy is means tested. The Danish approach to childcare is associated with some very favourable outcomes, amongst the highest maternal employment rates and lowest child poverty rates across the OECD, and also some of the highest levels of public spending per childcare place in the world.

We selected a third model of childcare provision for consideration of the potential impact in Northern Ireland. The intention was to devise a model which was distinct not only from the UK but also from the Nordic countries and Quebec, especially in terms of having a rate of subsidy which was above that in the UK but below that in the Nordics. The detailed OECD data, and other sources, were used to consider 15 countries and then a shortlist of four was produced; Netherlands, Slovenia, France and Australia. Those four tended to be characterised by levels of public spending on childcare which were lower than those in the UK and also, in most cases, more favourable outcomes.

The Netherlands were selected as the third model. This choice was justified partly by the level of public spending per childcare place being less than that in the UK; especially once the impact of the levy on employers in reducing required public funding is allowed for. This choice was also partly based on the maternal employment rate being considerably higher than the UK, and partly on the unusual, and therefore interesting, feature of a childcare levy paid by businesses. It is useful to take the opportunity to evaluate what impact such a levy might have.

Attempts to apply such models based on other countries to Northern Ireland are subject to the caveat that the policies may not be readily transferrable in international terms. Danish childcare policies are just one part of a wider Nordic model in terms of social, welfare and labour market policies. The Denmark model relates to an economy which has a much higher level of productivity, wages and GDP per capita than Northern Ireland. There may be ways in which the Quebec and Netherlands models provide lessons for Northern Ireland as to policies to avoid, e.g. in terms of the possibly negative impact on child development of low quality childcare (Quebec) or the implied reduction in demand for labour which would result from a childcare levy on businesses (Netherlands).

The cost-benefit results for Northern Ireland

The principal benefit that could be quantified was the positive impact on the maternal employment rate. A further quantifiable benefit was the boost to lifetime earnings of mothers. The main quantifiable cost was the increase in public spending with allowance for the extent to which a policy of increased spending on childcare might have the indirect consequence of decreasing other areas of public spending, notably welfare spending.

Table 1: Summary of the quantifiable benefits and costs in Northern Ireland, in an annual snapshot or steady state comparison

	Benefits- higher employment and higher earnings, £m	Costs- public spending adjusted for welfare reductions, £m	Net cost (costs minus benefits), £m
Quebec model	535.4	545.3	9.9
Denmark model	487.6	513.5	25.9
Netherlands model	287.2	399.5	112.3

Source: See Chapter 5.

In the case of each of the three models of childcare - Quebec, Denmark and Netherlands - the annual quantifiable costs were indicated to exceed the quantifiable benefits for Northern Ireland, see Table 1**.** The margin was between £10m to £112m. This was in a steady state or snapshot comparison. By steady state or snapshot we mean the level of annual benefits and costs once the policies have been fully implemented and their full effects have been felt. The steady state or snapshot comparison does *not* involve discounting. We assumed this steady state would be reached 10 years after the policies began to be implemented in terms of benefits and 8 years in terms of costs.

In order to give a sense of orders of magnitude, a benefit of £535m would be equivalent to about 1.8% of the total gross value added (GVA) of the Northern Ireland economy. By implication, a net cost of £10m would be negligible percentage of total Northern Ireland GVA; much less than 0.1%.

Our working hypothesis had been that increased childcare subsidies through increasing affordability would also increase maternal employment and hence generate quantifiable benefits in excess of quantifiable costs. The results of the cost-benefit analysis did not support that hypothesis.

It is important to stress that each of the three models yields a stream of quantifiable benefits over future years alongside associated costs. Some of the benefits, notably the boost to lifetime earnings, will be felt over the long run. In order to compare the total value of such benefits and costs we discounted both streams into what would be the equivalent sum of money in 2014, i.e. the net present value (NPV).

Over the very long run, after discounting, quantifiable benefits still fell short of costs, see Table 2, below. In other words, the NPVs are substantial and negative; indicative of a net cost. None of this is surprising and follows from the results presented in Table 1; in the steady state quantifiable costs exceed quantifiable benefits so discounting over 60 years produces a substantial negative number.

Table 2: Discounted value of quantifiable benefits and costs in Northern Ireland (NPVs, discounting over 60 years)

	NPV of benefits - higher employment and higher earnings, £bn	NPV of costs - public spending adjusted for welfare reductions, £bn	NPV of the net cost, £bn
Quebec model	11.5	12.1	0.7
Denmark model	10.4	11.4	1.0
Netherlands model	6.1	8.9	2.7

Source: See Chapter 5.

For each of the three models a sizeable fiscal deficit was implied indicating that any increase in public spending would be substantially greater than any increase in tax receipts which might be generated. A substantial deficit in the range about £260m to £285m was indicated. Such a deficit would be even greater if attention was limited to the gap between *devolved* spending and taxation, i.e. most of the increased tax revenues related to tax streams which are not devolved. When the deficit was estimated relative to those tax revenues which are currently devolved then it was indicated to be in the range £389m to £526m.

Qualifications to the cost-benefit results

First, in addition to the quantifiable costs and benefits there are also some benefits and costs which could not be quantified and some of these could be important from a public policy point of view. On the benefit side, these included any reductions in child or adult poverty or income inequality which might be a consequence of a system of subsidised childcare. At the same time, if non-quantifiable aspects are to be considered it might also be necessary to make allowance for the non-quantifiable social costs such as any reduction in parental choice and any increase in personal taxation.

Second, there may be concerns about the quality of some of the underlying data for Northern Ireland, especially regarding the maternal employment rate. The use of a sample-based data set, the Labour Force Survey, implied that some figures fluctuated substantially on a year to year basis.

Third, we have abstracted from any differential impact relating to the method used to apply the subsidy to childcare costs, for example, whether this would be done in terms of a cash grant to parents, a cap on charges or through tax credits or reliefs.

Fourth, we assumed the growth in demand for labour would absorb any extra supply of labour produced as a result of the incentives provided by more affordable childcare. We did assume that extra demand for labour would be weighted towards part-time employment in the same proportion as existing maternal employment is divided between part-timers and full-timers.

Fifth, the sensitivity of the results to some of the assumptions made. Our general approach in making assumptions was that these should be more likely to *overestimate* rather than underestimate *benefits* compared to costs.

Sensitivity analysis

It was possible to test how far the measured net cost was to variation in some of the key assumptions. The sensitivity analysis confirms that many of the assumptions made tend to underestimate the extent of net costs.

At the same time, for both the Quebec and Denmark models if part-time childcare costs were 50% of full-time ones this would bring the results to a break-even point, i.e. benefits at least as high as costs. However, given that in 2013 part-time charges were indicated as 74% of full-time, we do not regard an assumption of part-time costs as 50% of full-time as realistic.

For the Denmark model the assumption that 60% of the gap in maternal employment rates between Northern Ireland and Denmark could be closed would be sufficient to imply a small net benefit. That assumption may be plausible.

Conclusions

When quantifiable costs and benefits were considered the results were unfavourable for each of the three models of subsidised childcare:

- Costs exceeded benefits albeit by a small margin; between £10m and £112m annually.
- Over the very long term, 60 years, the quantifiable costs exceeded the benefits; a negative NPV of about £0.7bn to £2.7bn, depending on which model is being considered.
- A sizeable fiscal deficit was implied for the UK government and especially for the Northern Ireland Executive. One consequence of the extra employment and output which results from subsidised childcare is an increase in tax receipts but that increase falls far short of the public expenditure cost of the childcare. In fact, for the Northern Ireland Executive the net impact on funding for public expenditure could be as high as £526m annually. Admittedly, the Executive could probably offset some of that deficit by reducing the spending on the existing programmes whereby it subsidises childcare; we estimate up to £129m could be contributed in that way.

Whilst this analysis suggests the *economic case* for subsidised childcare is not strong, there is a social value relating to some of the less readily quantifiable benefits such as any reductions in child or adult poverty. This implies policy makers will have to evaluate whether such social benefits are likely to be sufficiently large to compensate for the deficit in terms of quantifiable benefits relative to costs or of increased public spending compared to increased tax revenues.

1. Introduction

Why the extent of public subsidy is of interest

The public subsidy of childcare was of interest given its potential impact on the affordability of childcare. If the subsidy were increased this would be likely to increase affordability which in turn could increase employment, especially in terms of the labour supply of mothers with dependent children. Any such increase in maternal employment would be of particular interest in policy terms given the possible associated social and economic benefits. The social benefits include a reduction in child poverty; international comparisons suggest that countries with relatively high rates of maternal employment tend also to have relatively low rates of child poverty.

Not only could the subsidisation of childcare have particular and positive impacts on child poverty and general social disadvantage, but also a particular benefit for the so-called "squeezed middle" families[1]. The economic benefits include the increase in output which follows from the increased labour supply. In this cost-benefit study we focus mainly on the economic effects as these are the ones most readily quantified.

Admittedly, there are some caveats on the extent of such potential benefits. For example, the accessibility of childcare may be determined in part by non-price factors as well as affordability. The extent of availability of childcare is not the only factor which determines maternal labour supply. The ability of the labour market to absorb the extra labour supply is unclear. Rates of child poverty are also determined by factors other than the maternal employment rate.

Nevertheless, our working hypothesis to underpin the application of the three childcare models to Northern Ireland is as follows: that an increase in subsidy to the extent it increases the affordability of childcare would also increase maternal employment such that the increase in measurable economic benefits would exceed measurable costs. Cost-benefit analysis was used to test that hypothesis.

A further reason for interest in this subject of public subsidy of childcare is that the Northern Ireland Executive is developing a strategy for childcare. An interesting comparison can be made with the Executive's counterpart in Scotland. The Scottish Government has recently expressed strong interest in applying a Swedish or Danish model to childcare provision in Scotland. UK governments have also frequently cited support for more maternal employment as a central goal of early years' policy.

Terms of reference

These said that we were to use cost-benefit analysis to help determine the optimal level of public subsidy for childcare in Northern Ireland. Our analysis was therefore designed to help inform NICVA/CEE and others in this consideration but we have not determined what that optimal level of subsidy is.

The terms of reference also specified that as far as the data allowed, three models of childcare were to be analysed. One was to be a heavily subsidised publicly funded universal model of childcare. A second was to be the Denmark model in which parents pay up to 25% of costs, depending on their incomes. The third model was to be selected by PwC having heard the comments of NICVA/CEE.

This report was prepared for NICVA/CEE. The intention was to inform the debate around options relating to childcare policy, but not to endorse any particular outcome or proposal.

[1] See Resolution Foundation January 2014, *The State of Living Standards*, Resolution Foundation, London.

Methodology

Given that the extent of public subsidy had been identified as a key determinant of the extent of affordability of childcare we examined the implications of varying that extent of subsidisation. Three contrasting models of childcare were therefore considered. These were a very highly subsidised system of childcare, a heavily subsidised system though with a means tested element, similar to that in Denmark, and a third model selected by PwC. Following an extensive review of the international data and literature, we considered what the quantifiable costs and benefits would be if subsidised childcare models similar to those in Quebec, Denmark and the Netherlands in terms of the extent of public subsidy were applied in Northern Ireland.

It is important to stress that the three models differ from each other and from the existing childcare policy in Northern Ireland not only in terms of the extent of subsidy but in terms of other characteristics too. There may also be questions as to how far a childcare model developed in one country can readily be transferred to another.

The intention of this study was to inform the debate around options relating to childcare policy, but not to endorse any particular outcome or proposal.

Childcare policy and provision in Northern Ireland

We used the definition of childcare adopted by the Northern Ireland Executive in its strategic framework document published in 2013, *Bright Start: The Northern Ireland Executive's Programme for Affordable and Integrated Childcare*;

"Childcare is the safe supervision of children aged 0-14 in an environment that assists and enriches their development, education and life opportunities."

Overall responsibility for childcare policy rests with OFMDFM but specific responsibilities are spread across many Departments and public agencies. For example: Department of Education (DE) –responsible for the *Early Years Strategy*, 0 to 6 years, and the Sure Start Programme; Department of Health, Social Services and Public Safety (DHSSPS) – responsible for inspection of childcare providers; Department for Employment and Learning (DEL) – responsible for providing financial support towards childcare costs through Steps to Work and the Training for Success programmes; DSD – responsible for the Women's Centres Childcare Fund and managing the relationship between childcare and the welfare system; and Department of Agriculture and Rural Development (DARD) – responsible for the Rural Childcare Programme.

The legislative basis for childcare provision continues to be The Children (Northern Ireland) Order 1995 and the policy basis is the now rather dated (1999) *Children First: The Northern Ireland Childcare Strategy: A Policy Statement*. The *Programme for Government, 2011-15* committed the Executive to develop a childcare strategy. That strategy is to be published during the 2014-15 financial year, and has been supported by a ring-fenced £12m fund, but as an indication of where policy is going, a strategic framework document has already been published.

The number of childcare places in Northern Ireland was measured as 55,500 in 2013[2]; representing one place for every 6.9 children aged between 0 and 15 years old[3]. Survey evidence indicated that childcare in Northern Ireland was expensive both in terms of fees being a high percentage of average wages and in terms of a high proportion of parents indicating they found it difficult to pay the charges[4]. Part-time childcare was indicated as

[2] DHSSPS 2013, "Children's Social Care Statistics for Northern Ireland 2012/13", Department of Health, Social Services and Public Safety, Belfast, *Statistical Press Release* . Available at: http://www.dhsspsni.gov.uk/microsoft_word_-_childrens_social_care_statistics_201213_press_release.pdf

[3] NISRA 2013, *Population and Migration Estimates Northern Ireland Statistical Report 2012,* Northern Ireland Statistics and Research Agency, Belfast. Available at: http://www.nisra.gov.uk/archive/demography/population/midyear/MYE_2012_Report.pdf

[4] R. Dennison and N. Smith 2012, *Northern Ireland Childcare Cost Survey 2012*, Employers for Childcare, Belfast. Available at:

http://vouchers.employersforchildcare.org/media/Northern%20Ireland%20Childcare%20Cost%20Survey%202012.pdf . See also, R. Dennison and N. Smith 2013, *Northern Ireland Childcare Cost Survey 2013*, Employers for Childcare, Belfast. Available at: http://vouchers.employersforchildcare.org/media/full-childcare-cost-survey-report-2013.pdf . Playboard Northern Ireland 2012, *State of the School Age Childcare Sector Report,* Playboard Northern Ireland, Belfast. Available at: http://www.playboard.org/pages/state-of-the-school-age-childcare-sector-report/

particularly expensive. There may also be issues around the accessibility of childcare, e.g. under-supply in certain locations such as Counties Fermanagh and Tyrone, or childcare costs becoming relatively expensive during school holidays[5].

The surveys indicate the average charge to parents for full-time childcare in Northern Ireland in 2012 was less than elsewhere in the UK in absolute terms; £156 per week compared to £183 in England, £178 in Scotland and £167 in Wales, see Dennison and Smith 2012, *op.cit*. However, charges were also 43% of the level of median gross weekly earnings for all employees in Northern Ireland, proportionally higher than in the rest of the UK. That is based on the average charge in 2013 of £158 compared to the median gross weekly earnings for both full-time and part-time employees in Northern Ireland in April 2013 of £367[6]. OECD data, see Chapter 2, imply that average childcare charges for the whole of the UK would be a lower percentage of average wages; about 25% in 2008.

In Northern Ireland, the government has already intervened to increase the affordability of childcare provision. This has partly been in terms of grant support to social economy providers with the intention to provide places which will have a relatively low charge. The Executive recently launched the Bright Start School Age Childcare Grant Scheme, a £15m investment over the next three and a half years which will provide support for up to 7,000 school age childcare places associated with about 750 new jobs in the social economy childcare sector. Private providers are not eligible for this support. These additional places will be available in rural areas, areas of disadvantage and within the schools' estate across Northern Ireland[7].

Northern Ireland shares in many of the fiscal and welfare interventions relating to childcare provision which occur in the rest of the UK. For example, childcare support through Working Tax Credits (WTCs), tax advantaged Employer Childcare Vouchers, the Budget 2014 proposals for Tax Free Childcare and support proposed under Universal Credit (UC) for lone parents and others[8]. A number of evaluations exist of the current or proposed system in the UK.

The Institute for Fiscal Studies (IFS) has, for example, pointed out a possible anomaly in the way that childcare costs are to be supported through UC and other tax schemes: the rate of support is not progressive. For the lowest income households the rate of support is 70% but this rises to 85% once enough income is earned to pay Income Tax. The rate of support then falls back to 20% through Tax Free Childcare[9].

Support for the costs of childcare within UC will be available to all lone parents and couples, where both adults are in work regardless of the number of hours they work. Removing the current very high rates of withdrawal of benefits for a small number of hours worked will provide an important financial incentive to those taking their first steps into paid employment, perhaps by taking on so-called "mini jobs", i.e. those with relatively low hours per week, especially less than 16 hours per week[10].

---

5 Playboard Northern Ireland 2012, *State of the School Age Childcare Sector Report*, Playboard Northern Ireland, Belfast. Available at: http://www.playboard.org/pages/state-of-the-school-age-childcare-sector-report/

6 That is comparing the average charge in 2013 of £158 to the median gross weekly earnings for both full-time and part-time employees in Northern Ireland in April 2013 of £367. See Dennison and Smith 2013, *op.cit*. See, also, NISRA 2013b, *Northern Ireland Annual Survey of Hours and Earnings,* Northern Ireland Statistics and Research Agency, Belfast. Available at: http://www.detini.gov.uk/northern_ireland_ashe_2013_bulletin.pdf

7 Northern Ireland Executive 27 March 2014, "Up to 7,000 affordable school age childcare places supported and 750 jobs to be created- McCann and Bell" *,* Northern Ireland Executive, Belfast, *News Release*. Available at: http://www.northernireland.gov.uk/index/media-centre/news-departments/news-ofmdfm/news-ofmdfm-270314-up-to-7000.htm

8 Her Majesty's Revenue and Customs (HMRC) 2013, *480(2014) Expenses and Benefits: A Tax Guide*, Her Majesty's Revenue and Customs, London. Available at: http://hmrc.gov.uk/guidance/480.pdf . HM Treasury 2014, *Budget 2014*, HM Treasury, London. Available at: https://www.gov.uk/government/publications/budget-2014-documents. HM Treasury 2014b, *Tax-free Childcare: Consultation on Design and Operation*, HM Treasury, London. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/226460/tax-free_childcare_consultation_on_design_and_operation.pdf.

9 See IFS February 2014, "State support for early childhood education and care", in, *The IFS Green Budget*, Institute for Fiscal Studies, London, pp. 172-197.

10 See Centre for Economic and Social Inclusion and Joseph Rowntree Foundation (JRF) October 2012, *Implementing Universal Credit Will the Reforms Improve the Service for Users?*, Centre for Economic and Social Inclusion and Joseph Rowntree Foundation, London.

Contents of the report

The remainder of this report contains the following Chapters:

- Review of the international data relevant to childcare.
- Review of research on the impact of childcare.
- Three models to illustrate options for childcare in Northern Ireland.
- Cost-benefit analysis.
- Conclusions.
- Bibliography.

Additionally, the following Appendices are available online (available at: http://www.nicva.org/resource/appendices-childcare-cost-benefit-analysis-report):

- Appendix I: Childcare related statistics for 15 OECD countries.
- Appendix II: Detailed analysis of childcare provision in four OECD countries.
- Appendix III: The shortlisting and selection of the third model.
- Appendix IV: Technical detail relating to the cost-benefit analysis.

2. Review of international data relevant to childcare

Introduction

An evaluation of various options or models relating to childcare policy and subsidisation should be put into the context of the international data relevant to childcare. Most of the statistics cited in this Chapter come from the OECD *Family Database*[11]. The OECD has 34 member states; Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Israel, Italy, Japan, South Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States. The OECD data sometimes include additional countries such as Bulgaria, Cyprus, Latvia, Lithuania, Malta and Romania.

The OECD does not disaggregate information at a Northern Ireland level or, indeed, at a regional level within Canada for Quebec. However, where comparable data could be found from other sources, statistics relating to Northern Ireland were also considered. In some cases it was necessary to infer Northern Ireland's relative position in international terms by, first, comparing to the UK average using UK data and, second, considering the UK's relative position within the OECD. We used the most up-to-date OECD data which were available; these related to years between 2008 and 2012.

This Chapter reviews the international data through considering:

- Labour market indicators.
- Indicators relating to child poverty and childcare policies.
- Conclusions, including lessons for Northern Ireland.

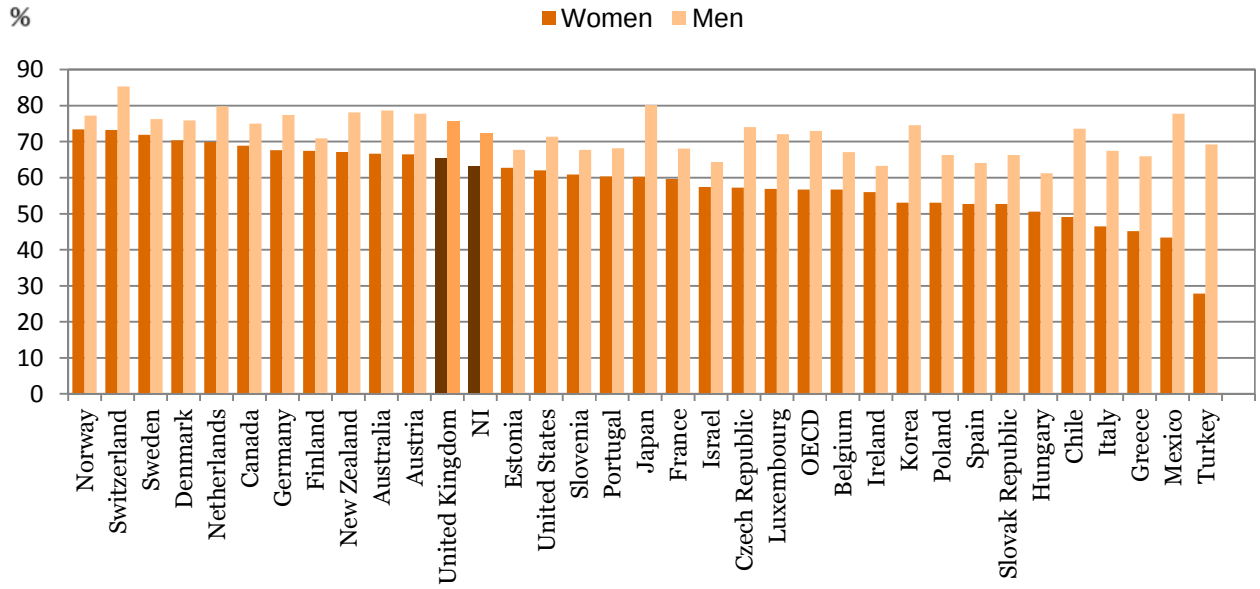
Labour market indicators[12]

Across the OECD countries employment rates for men exceeded those for women, see Figure 1. However, that gap was smallest in the Nordic or Scandinavian countries; Iceland, Norway, Sweden, Finland and Denmark. Employment rates for men in the UK and Northern Ireland were similar to the OECD average. However, the employment rates for women in the UK and Northern Ireland exceeded the OECD average.

[11] OECD 2014, *OECD Family Database*, Organisation for Economic Co-operation and Development, Paris. Available at: www.oecd.org/social/family/database

[12] The full data for 15 of the OECD countries is recorded in Appendix I. Whilst decisions about work and childcare will be influenced by issues such as the nature and extent of child welfare benefits and eligibility for parental leave and scope for work flexibility, we have not included data on these.

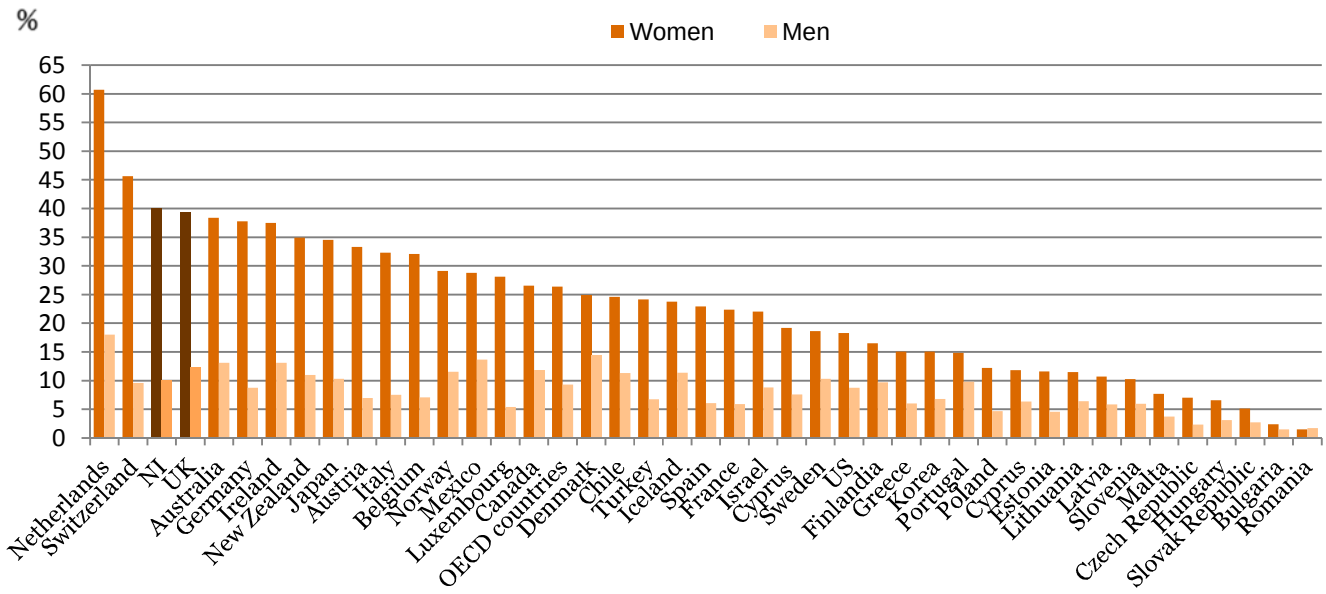
Figure 1: Employment rates by gender, 2011



Source: OECD.

In 2012, the average incidence of part-time employment, defined as working less than 30 hours per week, across the OECD countries was much higher for women than for men; 26.4% for women and 9.4% for men, see Figure 2. The Netherlands stood out as having the highest rate of female part-time working amongst the OECD countries, 60%. Both Northern Ireland and the UK were positioned above the OECD average.

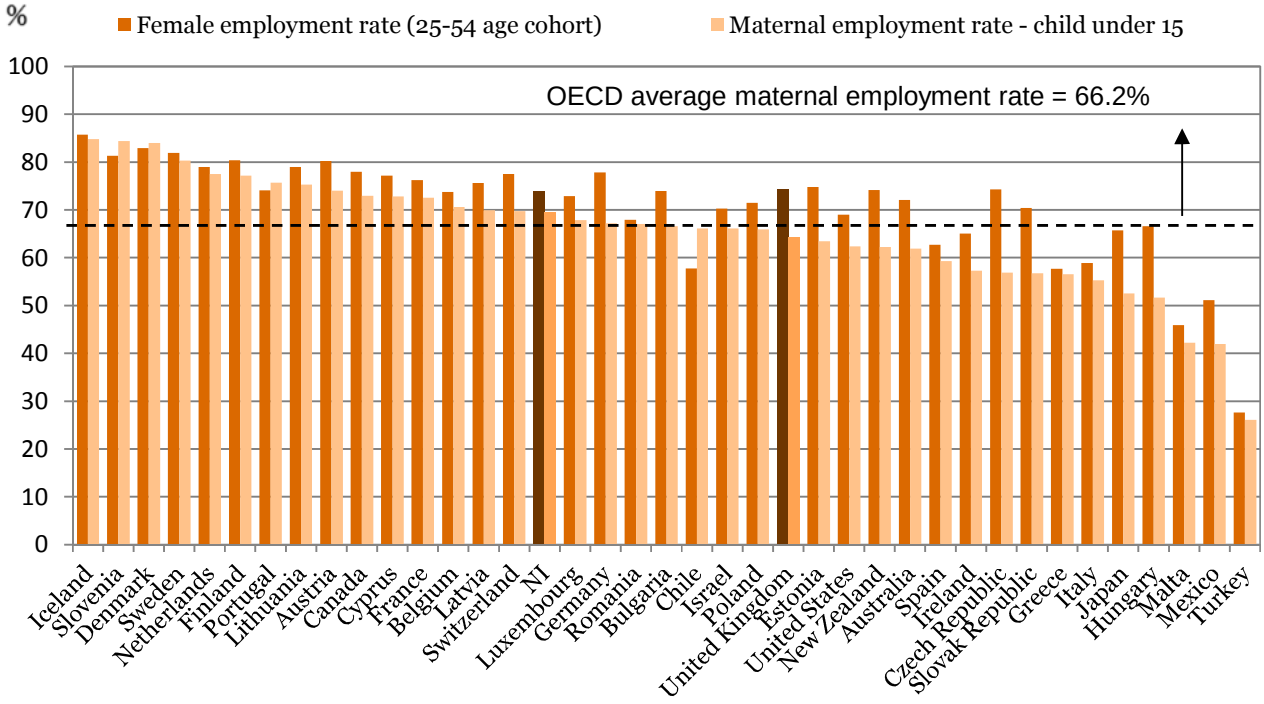
Figure 2: Rates of part-time employment, 2012



Source: OECD.

Across the OECD, employment rates for women in general tended to be higher than those for women with one or more dependent children, although this was not true in every case, see Figure 3. Dependency being defined as having a youngest child with an age of less than 15 years old.

Figure 3: Maternal employment rates compared to female employment rates, 2011*



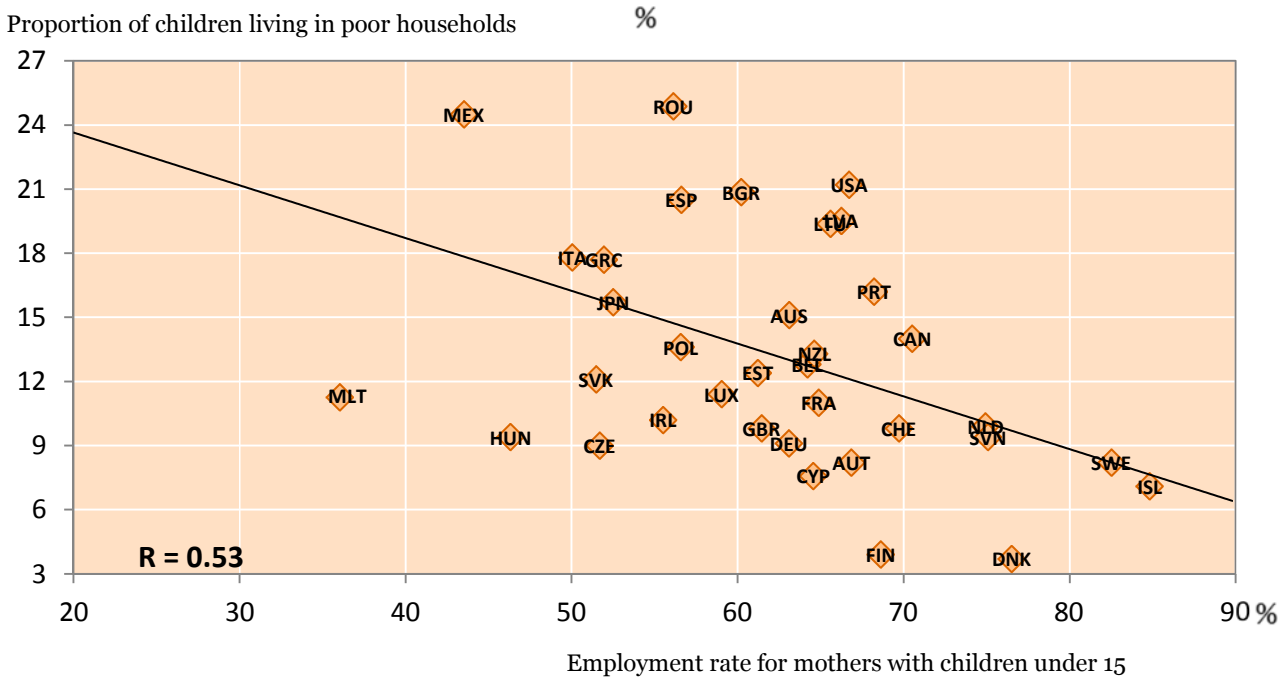
Note:*The data for 13 countries relate to a year earlier than 2011.
United: UK.
Source: OECD.

Iceland, Slovenia, Denmark, Sweden, Netherlands and Finland, in that order, had the highest maternal employment rates in 2011, but the UK was ranked twenty-third amongst the 38 countries considered. Northern Ireland's maternal employment rate was higher than both the UK and OECD average.

Indicators relating to child poverty and childcare policy

In general, within the OECD, countries with high maternal employment rates tended to have low rates of child poverty. For example, countries such as Denmark, Finland, Iceland and Slovenia (DNK, FIN, ISL and SVN, respectively) had some of the lowest rates of child poverty together with some of the highest maternal employment rates, see Appendix I for more data. Figure 4 uses data for 2010 and illustrates that there was a fairly strong negative correlation such that as the maternal employment rate raised the child poverty rate tended to be lower.

Figure 4: Maternal employment rates compared to child poverty rates, 2010



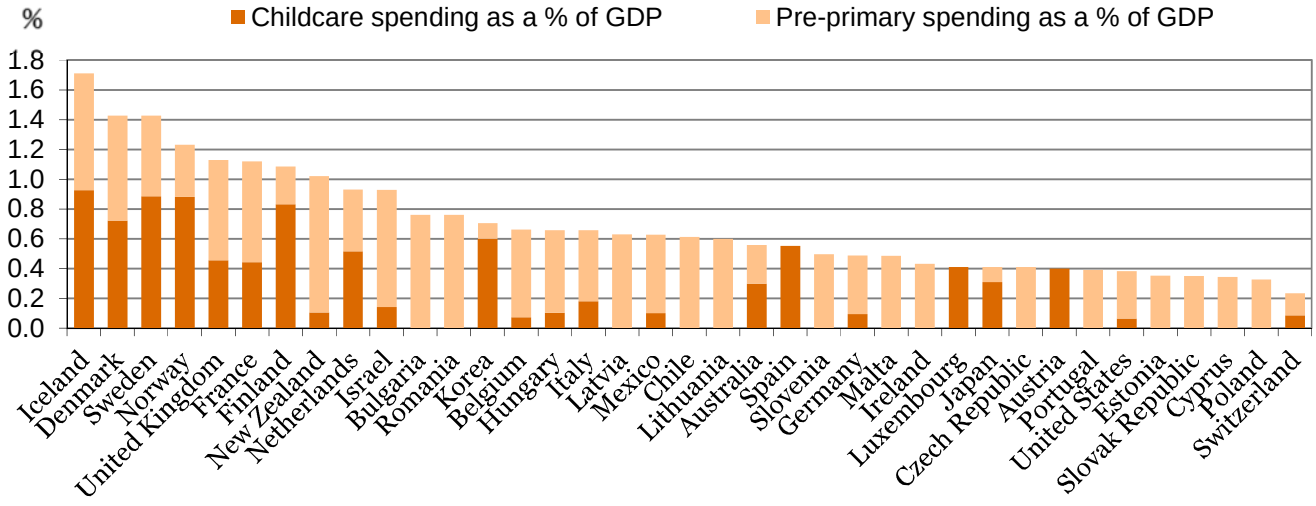
Note: Poverty defined as 50% or less of median income. The black sloping line and the R^2 statistic are indicative of the negative relationship between the two rates. Child poverty rate data on this basis not available for Northern Ireland but other sources suggest the Northern Ireland rate would be broadly similar to that for the UK (shown as GBR in the above)[13], so, by implication that rate could be less than the OECD average.
Source: OECD.

The amount of public spending on pre-school childcare and education varied across the OECD ranging from more than 1% of GDP in the Nordic countries down to rates of spending of 0.2% of GDP in Switzerland and Canada, see Figure 5. In the UK such spending was about 1% of GDP[14] and therefore above the OECD average.

[13] Save the Children and ARK October 2008, "Persistent child poverty in Northern Ireland", Queen's University and University of Ulster, Belfast, *Report by Save the Children and ARK*. For the 2009-10 comparison, Joseph Rowntree Foundation (JRF) 2012, *Monitoring Poverty and Social Exclusion in Northern Ireland in 2012*, Joseph Rowntree Foundation, York. Centre for Economic and Social Research February 2013, *End Child Poverty: Child Poverty Map of the UK*, Loughborough University, Loughborough.

[14] Although some commentators have argued that the method used by the OECD to ensure comparison is "like for like" gives an inflated impression of the relative spend in the UK. OECD standardised spend across the member states based on the assumption that compulsory schooling started at age 6. By implication, the spending figure quoted by the OECD included an upward adjustment to reflect a hypothetical spend on 5 year olds in the UK who were actually in school rather than childcare. See Institute for Public Policy Research (IPPR) 2012, *Double Dutch The Case Against Deregulation and Demand-led Funding in Childcare*, Institute for Public Policy Research, London.

Figure 5: Public expenditure on pre-school childcare and pre-primary education services, 2009

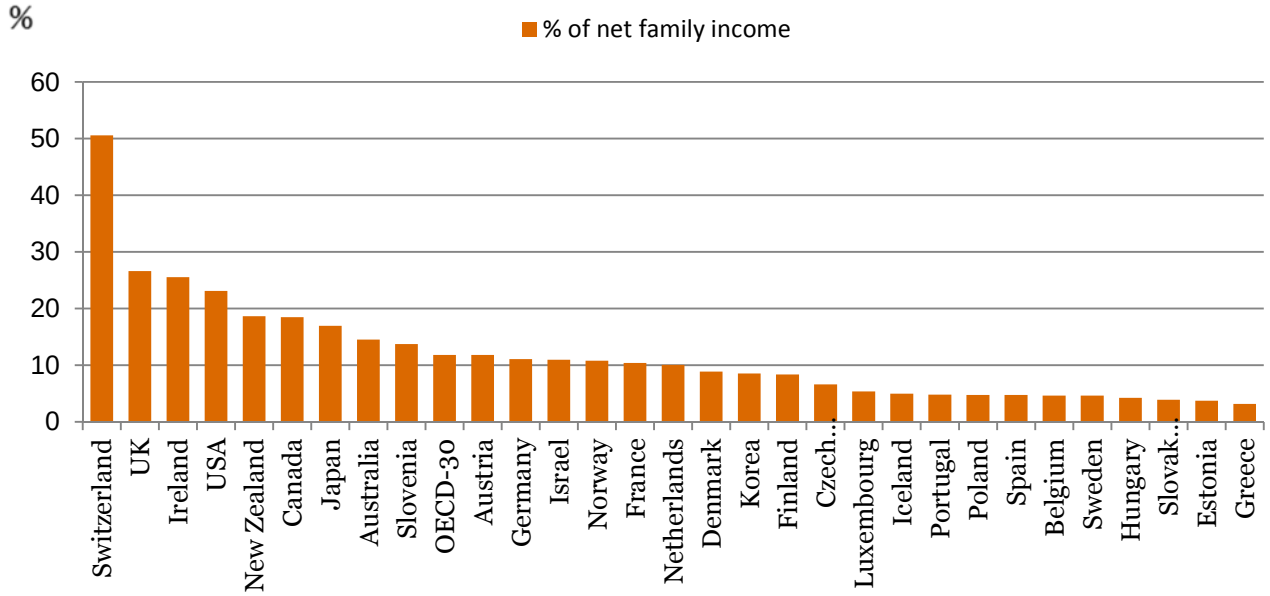


Note: Canada same as Switzerland.
Source: OECD.

When the composition of total public spending on supporting families is considered across the OECD there were some notable contrasts. Some countries such as the UK concentrated such spending on benefits. The Nordics relied much more on spending on services. It was also notable that the Nordic countries, unlike the UK, made little or no use of tax credits or reliefs.

Childcare charges, full-time for two 2 year olds in 2008 net of all forms of government support, for a couple with total household earnings 167% of the average wage[15] were indicated to be a relatively high percentage of disposable income in countries such as Switzerland, at 51%, the UK, at 27%, and the Republic of Ireland, at 26%, compared to an average across the OECD of 12%, see Figure 6.

Figure 6: Net childcare charges* compared to household disposable income, 2008

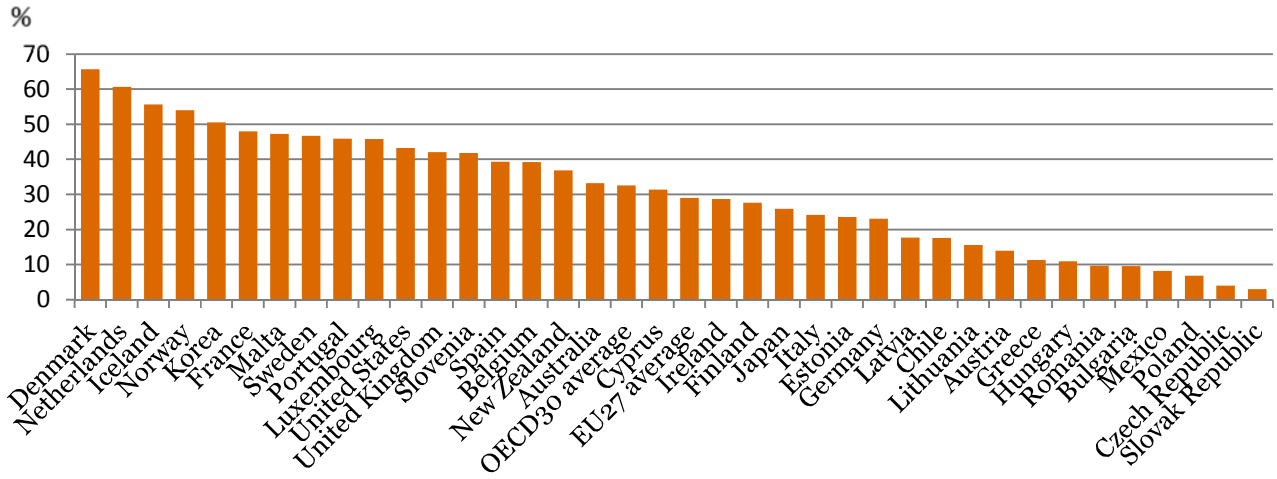


Note:*Full-time for two 2 year olds. Two earners in household, one 100% of average wage and the other 67%.
New: New Zealand.
Source: OECD

[15] i.e. two earners, one at 100% of the average wage and the other at 67%.

Participation rates in formal childcare, that is the percentage of all children using the care, were highest in the Nordic countries, Figure 7.

Figure 7: Average enrolment rate in formal childcare by children less than 3 years old, 2010



Source: OECD.

Conclusions

There are a number of key conclusions and lessons for Northern Ireland:

- Those OECD countries with the highest maternal employment rates tended also to have the lowest rates of child poverty[16].
- It is likely that the cost of childcare in Northern Ireland as a percentage of the average wage was higher than the UK or OECD average.
- If comparison is restricted to early years' services and pre-school education, per capita spending on children is less than in England[17].
- In the late 2000s about 43% of Northern Ireland children aged 0 to 4 used formal childcare and 56% used informal care[18]. This implies that if formal childcare became more affordable there would be considerable scope for a switch from informal to formal. This would represent deadweight and a worsening of the relationship between costs and benefits.
- The rate of child poverty in Northern Ireland was considerable in absolute terms and high relative to that in the Nordic countries. It is less clear whether it was higher than the UK average (this may depend on the definition of poverty).
- Whilst inter-regional and international comparisons of poverty rates are difficult to make because of variations in the definitions used, Northern Ireland's rate of child poverty was indicated to be at least as high

[16] G. Whitham 2012, *Ending Child Poverty: Ensuring Universal Credit supports Working Mums*, Save the Children, London. Available at: http://www.savethechildren.org.uk/sites/default/files/docs/Ending-Child-Poverty.pdf

[17] This was indicated by Save the Children October 2009, "A child's portion: An analysis of public expenditure on children in the UK", Save the Children, Belfast, *Save the Children Briefing*. Available at: http://www.savethe children.org.uk/sities/default/files/doc/A_childs_Portion_NI_Briefing.pdf

[18] These data were taken from the Family Resources Survey. The same child would be counted twice if they used both formal and informal childcare.

as the UK average, e.g. 28% in 2009-10[19]. According to some definitions of poverty, for example persistent poverty, the rate in Northern Ireland may be higher than the UK average[20].

- Northern Ireland's current maternal employment rate was higher than the OECD average. It is also indicated to be higher than the UK average. The extent of the margin depends on which year the comparison is made in.

- If one of the aims of a policy of subsidising childcare is to raise maternal employment it is worth noting that Northern Ireland stood above the UK average and above the OECD average using data for 2011.

[19] The definition being, less than 60% of the household median income, after allowing for housing costs.

[20] Save the Children and ARK October 2008, *op.cit.,* JRF 2012, *op.cit.,* and Centre for Economic and Social Research February 2013, *op.cit.*

3. *Review of research on the impact of childcare*

Introduction

An evaluation of the various options for childcare policy and subsidisation should be put into the context of the research on the impact of childcare. This Chapter provides such a context by reviewing:

- Research that considered the impact of childcare across countries.
- Research that considered the impact of childcare on individual children.
- Childcare policies in a sample of OECD countries.
- Conclusions.

Research that considered the impact of childcare across countries

We reviewed the following studies:

- **Economist Intelligence Unit (EIU)**: *Starting Well – Benchmarking Early Education across the World* (2012) – A review of 45 countries.
- Study for **Department of Education**: *A Comparison of International Childcare Systems* (July 2013) – A review of 15 countries.
- **OECD**: *Starting Strong II: Early Childhood Education and Care* (2006) – A review of 20 countries.
- **OECD**: *Starting Strong III: A Quality Toolbox for Early Childhood Education and Care* (2012) – A review of 31 countries.
- Study for **The Scottish Government**: *Early Childhood Education and Care Provision: International Review of Policy, Delivery and Funding* (March 2013) – A review of eight countries.

We summarise the findings of the first and last of these publications only. This is because the Department of Education and OECD publications came to broadly the same conclusions as those contained in the EIU and the study for the Scottish Government.

EIU: Starting Well – *Benchmarking Early Education across the World*

The *Starting Well* report ranked the pre-school environment for children aged 3 to 6 years in 45 countries, across a combination of OECD and major emerging economies. Each country was ranked according to relative availability, affordability and quality of such early childhood education and care (ECEC) – measured by the 'Starting Well Index'.

- The 10 highest ranking countries were, in order from the highest first; Finland, Sweden, Norway, UK, Belgium, Denmark, France, Netherlands, New Zealand and South Korea.
- According to this report, these countries tended to have the following characteristics:
    - A comprehensive early childhood development and promotion strategy, backed up with a legal right to such education.
    - Universal enrolment of children into a year or more of pre-school at ages 5 or 6, with nearly universal enrolment between the ages of 3 and 5.

- Subsidies to ensure access for underprivileged families.
- Where provision is privately provided, the cost of such care remains affordable relative to average wages.
- A high standard set for pre-school staff, with specific qualification requirements. This was often associated with relatively high wages, as well as low student:teacher ratios.
- A well-defined pre-school curriculum, along with clear health and safety standards.
- Strong efforts to encourage parental involvement.
- A socio-economic environment that ensures that children are healthy and well-nourished when they enter pre-school.

The Scottish Government: *Early Childhood Education and Care Provision: International Review of Policy, Delivery and Funding*[21]

This report provided a comprehensive overview of the ECEC in Scotland, England, Sweden, Denmark, Norway, Slovenia, France and the Netherlands. For each of these nations the review provides a country report with detailed information on the national frameworks of ECEC, guiding principles and objectives, governance, types of services, types of providers, funding and costs, systems of quality assurance and access levels.

The authors assessed how far the ECEC systems in 8 nations met various EU targets or best practice standards:

- Access [Where the EU target was - *To provide by 2010 a full-time place in formal childcare for at least 90% of children aged between 3 and mandatory school age, and for at least 33% of children under 3 years*]:
  - All the countries realised the second half of this target, i.e. participation rates of over 33% for children under the age of 3, provided that part-time childcare was also counted in. However, only the Netherlands, Sweden, France and Slovenia met the target for 90% of the age 3 to school age group to be in full-time care.
  - Only Denmark, Sweden, Slovenia and Norway had 33% or more of all children aged 3 and under using full-time ECEC; full-time defined as more than 30 hours per week. In the Netherlands and the UK use of childcare by those aged 3 and under was weighted towards part-time. In France, in contrast, the weighting was towards full-time, but even there the 33% target was not achieved.
- Costs to parents [Where the EU target was - *charges to parents for ECEC services should be less than 15% of net monthly household income*]:
  - Net childcare costs relative to disposable income were highest in Switzerland at 51% and also relatively high in the UK at 27%[22].
  - In England and Scotland, public expenditure on ECEC was high, but parental contributions were also relatively high. Many parents of 3 to 4 year old children benefitted from some free part-time education for their children, but still faced relatively high childcare costs.
- Quality in terms of integration of childcare and pre-school education, such integration was significant in terms of maximising the positive impacts of childcare:
  - In Denmark, Slovenia, Sweden and Norway, there was an integrated system of ECEC services which catered for children from around 1 year to school age.
  - In France, the Netherlands, Scotland and England, ECEC services differed as between pre-school age children and younger children. Pre-school age children were offered education-based formal services,

[21] I. Naumann, C. McLean, A. Koslowski, K. Tisdall and E. Lloyd 2013, *Early Childhood Education and Care Provision: International Review of Policy, Delivery and Funding,* Scottish Government Social Research, Centre for Research on Families and Relationships, the University of Edinburgh, Edinburgh. Available at: http://www.scotland.gov.uk/Publications/2013/03/4564/0

[22] Full-time care for two 2 year olds. Working couple with household income 167% of the wage average, i.e. one earner 100% of average wage and the other 67%. Net childcare costs as percentage of disposable income in 2008. See OECD 2014, *op.cit.*

often publicly provided or funded, while younger children were offered a wider variety of services, some of which may be centre-based and some of which may be residence-based (e.g. childminding). Public funding and support was often lower for this age group.

- Quality in terms of curricular development:

  - Those countries which offered an integrated system of ECEC services tended to have a national curriculum, whereas those which offered separate systems tended not to have a national curriculum for care services.
  - Denmark, Slovenia and Sweden offered a national curriculum for all age groups.
  - Norway had a Framework Plan for the Content and Tasks of Kindergartens for all age groups.
  - France had a national curriculum for early education but none for care services. Crèches set educational goals for children.
  - In the Netherlands there was no prescribed curriculum for care services, but providers had to work to a "pedagogical plan". Early "compensatory" education was provided for children with particular needs.
  - Scotland had a Curriculum for Excellence but this covered ages 3 to 18 and there was no curriculum for younger children.
  - England offered an Early Years Foundation Stage, for children from birth to 5 years.

Research that considered the impact of childcare on individual children

The previous section focused on cross-sectional research, i.e. studies which compared the impact of childcare by contrasting the differing systems of childcare in various countries. This section considers studies which were longitudinal. This section concentrates on studies which considered the impact on children. Appendix IV, Part 2 reviews those studies which considered the impact of childcare provision on levels of maternal employment.

Some of the longitudinal studies also included control groups. We reviewed the following studies with an important distinction being between those which indicated positive impacts and those which indicated negative ones:

Studies indicating positive impacts

- The large scale Effective Provision of Pre-School Education study (EPPE), 1997–2004, in England[23] found that children who had high quality early years provision achieved better results in language, reading and numeracy. High quality childcare was defined by, for example, use of trained teachers. Children from deprived backgrounds benefitted most from this type of provision.

- Analysis in the UK undertaken for the JRF estimated that affordable, high quality early years provision could shift between one-sixth and one-half of children out of poverty[24].

- In a study of schools in England, attending a high or medium quality pre-school was found to have a lasting effect on social and behavioural outcomes[25].

- Pre-school provision was also found to be a significant predictor of performance in Key Stage 2 English and mathematics[26]. More highly qualified staff could offer higher quality support for children age 30 months to five years in developing communication, language, literacy, reasoning, thinking and mathematical skills[27].

---

[23] The EPPE project surveyed 3,000 children recruited at age 3 and studied longitudinally through to the end of Key Stage 1. Data were collected on children's developmental profiles, background characteristics, home learning environment and pre-school settings. See, K. Sylva, E. Melhuish, P. Sammons, I. Siraj-Blatchford and B. Taggart 2004, "The Effective Provision of Pre-School Education (EPPE) Project: Findings from the pre-school period", Department for Education and Skills, London, *Research Brief,* RBX15-03. K. Sylva, E. Melhuish, P. Sammons, I. Siraj-Polatchford and B. Taggart 2008, "Effective Pre-school and primary education 3-11 project (EPPE3-11)-Final Report from the Primary Phase: Pre-school, School and Family Influences on Children's Development during Key Stage 2 (Age 7-11)", Department for Education and Skills, London, *Research Report,* DCSF-RR061.

[24] J. Waldfogel and A. Garnham 2008, *Eradicating Child Poverty: The Role of Key Policy Areas*, Joseph Rowntree Foundation, York.

[25] I. Siraj-Blatchford, A. Mayo, E. Melhuish, B. Taggart, P. Sammons and K. Sylva 2011, "Performing against the odds: developmental trajectories of children in the EPPSE 3-16 study", Department for Education, London, *Research Report,* DFE-RR128.

- An affiliate of the US Chamber of Commerce, in a 2010 study of spending on ECEC in the US suggested that:

  "..for every dollar invested today, savings range from $2.50 to as much as $17 in the years ahead[28]."

  Arguably, the optimal investment to build human capital and one of the best ways to break the cycles of poverty and deprivation, is investment in children. This is because the opportunity costs of investing in children are lower and the benefits are maximised given that there is the longest possible period for the payback to be realised[29]. Nobel Laureate, Professor James Heckman argued that the rates of return to investment in human capital development were highest in early years, and drop steadily thereafter[30]. These returns accrue in part to the children themselves—largely in the form of increased lifetime earnings—but also to the wider society in the form of reduced costs of education, increased labour productivity, lower welfare payments, and a reduction in crime[31].

- The High Scope Perry Pre-school Project[32] was a longitudinal study in the US which followed children at ages 3 or 4 through to age 27. Compared to the control group, programme participants had superior outcomes in terms of earnings, rate of home ownership, school or college qualifications and avoidance of welfare dependency or criminality. In fact, the Project has been estimated to produce a social benefit of $7.16 for every $1 invested. The benefit was made up of savings in education and welfare expenditures as well as gains in productivity[33].

- The Chicago Child Parent Center (CPC) was a comprehensive centre-based early intervention programme that provided educational and family support services for children aged 3 to 9. The Chicago Longitudinal Study investigated 1,539 children, and of these 989 were CPC participants. Evaluations suggested that CPC participants recorded higher reading and math scores, higher teacher ratings of school adjustment, were less likely to repeat a grade, and more likely to complete more years of schooling and graduating from high school. CPC pre-school investments demonstrated the greatest social benefits, $7.14 to $10.15 returned for each dollar invested[34].

- The Carolina Abecedarian Project[35] was a carefully controlled study, albeit with a small sample. 57 infants from low income families were randomly assigned to receive early intervention in a high quality child care setting compared to 54 in a control group receiving no intervention. The treated children received full-time educational intervention in a high quality childcare setting from infancy through to age 5. Each child had an individualised prescription of educational activities. The findings showed that there were substantial measured educational improvements over the long run. Additionally, mothers whose children participated in the programme achieved higher educational and employment status than mothers whose children were not in the programme. These results were especially pronounced for teenage mothers.

---

[26] *Ibid.* and K. Sylva *et al.* 2008, *op.cit.*

[27] S. Mathers et al 2011, "Evaluation of the graduate leader fund final report", Department for Education, London, *Research Report,* DFE-RR144.

[28] US Chamber of Commerce 2010, *Why Business Should Support Early Childhood Education,* Institute for a Competitive Workforce, Washington DC.

[29] L. McGinnis, V. Mangiaterra and J.F. Sanchez 2005, *Children and Youth: A Framework for Action,* The International Bank for Reconstruction and Development/The World Bank, Washington DC.

[30] J. Heckman 2008, *Return on Investment: Cost versus Benefits*, University of Chicago Economics, Chicago. Available at: http://childandfamilypolicy.duke.edu/pdfs/10yranniversary_Heckmanhandout.pdf

[31] J. Heckman 2014 *Why Early Investment Matters*. University of Chicago Economics, Chicago. Available at: http://www.heckmanequation.org/content/resource/why-early-investment-matters

[32] L.J. Schweinhart, J. Montie, Z. Xiang, W.S. Barnett, C.R. Belfield and M. Nores 2005, "Lifetime effects: The HighScope Perry Preschool study through age 40", High Scope Press, Ypsilanti Michigan, *Monographs of the High Scope Educational Research Foundation,* No. 14.

[33] A. Rolnick and R. Grunewald 2003, "Early childhood development: Economic development with a high public return", Federal Reserve Bank of Minneapolis, Minnesota, *Research Paper*.

[34] A.J. Reynolds, J.A. Temple, D.L. Robertson and E.A. Mann, 2002, "Age 21 cost-benefit analysis of the Title I Chicago Child-Parent centers", *Educational Evaluation and Policy Analysis,* vol. 24, no. 4, pp. 267–303.

[35] F. Porter, *The Carolina Abecedarian Programme*, Graham Child Development Institute, The University of North Carolina, Chapel Hill, North Carolina. Available at http://abc.fpg.unc.edu/

Studies indicating negative impacts

- Such longitudinal studies are suggestive of the positive impact of quality childcare especially when applied to relatively small samples of children including those coming from a disadvantaged background. It is less clear how far the same results might hold if childcare was applied to the general population of children. In fact, some research has pointed to the possibility that maternal employment and/or the associated use of childcare has negative impacts particularly on children's cognitive development.

- Analysis of the UK by Ermisch and Francesconi (2002) suggested negative effects of full-time maternal employment for children aged 0 to 5. Esping-Andersen (2003) was unable to identify for the Nordic countries any clear effect from maternal employment, whether part-time or full-time, on children's cognitive development scores. For other countries his results were more mixed with full-time employment having a negative impact in some cases, e.g. the US, Netherlands and Spain, although not for the UK. Part-time maternal employment tends to be associated with more positive effects on cognitive development[36].

- Nevertheless, there is a growing body of empirical results indicating that maternal employment and time spent in childcare during the earliest years of life can have adverse effects on a child's developmental outcomes, such as verbal, reading and math scores and may be associated with behavioural problems[37].

- Some of this evidence as to possible negative impacts relates to the experience of childcare programmes in Quebec. Baker, Gruber and Milligan (2008)[38] produced evidence that there had been negative impacts on diverse measures of the well-being and health of both children, 0 to 4 year olds, and parents. They considered the Peabody Picture and Vocabulary Test (PPVT) evidence. The PPVT is a vocabulary test of early literacy skills and is sometimes used to measure cognitive development. For 4 year olds the childcare intervention was associated with decreased standardised PPVT scores but the effects were not statistically significant. For 5 year olds the decreases were significant, on average. Furthermore, the results for two sub-samples of children based on the mother's education, high school education or less, and those with a university degree, suggested that the policy intervention did *not* reduce gaps in school readiness.

Childcare policies in a sample of OECD countries

A total of 15 countries were selected from the 34 OECD member states for the purposes of this review; UK, Denmark, Norway, Sweden, Finland, Iceland, Slovenia, Canada, France, the Netherlands, Republic of Ireland, Switzerland, Australia, New Zealand, USA. This sample was selected so as to include countries demonstrating either a high, medium or low level of spending on ECEC services.

Appendix I presents the key characteristics for these countries including; population, male and female employment rates, maternal employment rates, full-time and part-time employment, characteristics of households with children, poverty rates, rates of spending on social protection, rates of public spending on childcare, childcare participation rates and childcare costs.

A summary of the key features of ECEC services in the four countries most relevant to this study, UK (i.e. England and Scotland), Canada (i.e. Quebec), Denmark and the Netherlands, is presented in Table 3. The focus is on two characteristics; first, how government intervenes in the provision of childcare and, second, the characteristics of childcare provision and the outcomes. A more detailed version of this Table is provided in Appendix II.

---

[36] For UK see, J. Ermisch and M. Francesconi 2002, "Intergenerational mobility in Britain: new evidence from the BHPS", Centre for Household Income, Labour and Demographic Economics/ChilD, University of Essex, Colchester, *Working Paper,* no. 06/2002. Available at http://www.child-centre.it/papers/. Also, G. Esping-Andersen July 2003, "Towards a new welfare equilibrium", *Report to the Progressive Governance Conference,* London. For US, see G. Duncan and J. Brooks-Gunn 1998, *Consequences of Growing Up Poor*, Russell Sage Foundation, New York. R. Haveman and B. Wolfe 1995, *Succeeding Generations on the Effects of Investment in Children*, Russell Sage Foundation, New York. PwC 2003, "Universal childcare provision- towards a cost-benefit analysis", PricewaterhouseCoopers LLP, London, *Discussion Paper*, highlighted that disentangling correlation and causality in such studies is not straightforward.

[37] C. Ruhm 2004, "Parental employment and child cognitive development", *Journal of Human Resources,* vol. 39, no. 1, pp. 155-92. J. Waldfogel, W. Han and J. Brooks-Gunn 2002, "The effects of early maternal employment on child cognitive development", *Demography,* vol. 39, no. 2, pp. 369- 92. J. Hill, J. Waldfogel, J. Brooks-Gunn and W. Han 2005, "Maternal employment and child development: A fresh look using newer methods", *Developmental Psychology,* vol. 41, pp. 833-50.

[38] M. Baker, J. Gruber, and K. Milligan 2008, "Universal childcare, maternal labor supply, and family well-being", National Bureau of Economic Research, *Journal of Political Economy*, vol. 116, no. 4, pp. 709-45.

Table 3: Summary of early childhood education and care in those countries most relevant to this study

UK: Key features

England[39]

How government intervenes

The Department for Education has overall responsibility but ECEC is administered by local authorities. All 3 and 4 year olds are entitled to 15 hours of free early education each week for 38 weeks of the year; Early Years Entitlement (EYE). There is some provision for 2 year olds but this is linked to deprivation.

Characteristics of childcare provision and outcomes

In 2011 15% of staff were qualified to at least degree level. Pay in the sector is relatively low. Child:staff ratios in England are lower than those in many other European countries. Despite high levels of public expenditure, the cost of care to parents remains high, particularly for very young children. There are strong indications that demand for affordable childcare still exceeds supply.

Scotland

How government intervenes

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, i.e. by 2026[40].

Characteristics of childcare provision and outcomes

In briefings, the Scottish government suggested that adoption of the proposed 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[41], the same as the increase in public spending. Such claims have been scrutinised by Scottish Parliament's Information Centre (SPICE)[42]. SPICE estimated 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 only 64,000 women were currently economically inactive. In response, a Scottish government spokesperson commented: *"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"*[43].

Quebec: Key features

How government intervenes

Each Canadian Province and Territory decides its ECEC policy. In 1997 the Province of Quebec introduced a universal pre-school ECEC policy. This initially limited the cost to parents to Canadian $5 a day which was increased to Canadian $7 in 2004, equivalent to about £3 to £4 per day.

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)[44]. This implied a

[39] 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 as 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.

[40] Scottish Government 2013, *Scotland's Future Your Guide to An Independent Scotland*, Scottish Government, Edinburgh.

[41] 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

[42] 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.

[43] 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/

[44] 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.

level of public funding per place of $10,628, equivalent to £5,916 at a Purchasing Power Parity (PPP) rate of exchange. Given the parental contribution of Canadian $1,848, the implied level of public subsidy per place in 2012 was about 85%.

Characteristics of childcare provision and outcomes

Whilst the Quebec childcare system is now mainly publicly funded, most of the providers remain private or not for profit. The Quebec policy has helped parents to achieve a better balance of work and family life. It has been associated with a reduction 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%[45]. 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 quality of provision has sometimes been criticised.

Denmark: Key features

How government intervenes

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. For children under school age attending day-care 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 – for the second and subsequent places they get a 50% discount. Parents with children in after-school facilities and school-based free time facilities are also eligible for the siblings discount. Average public spending per childcare place for an under 2 has been estimated as about £12,000 in 2011, and £8,000 for children aged 3 to 5[46]. In 2011 total public spending on day-care was about £3.4bn and associated parental contributions £0.9bn, this would indicate a rate of public subsidy in Denmark of about 80%[47].

Characteristics of childcare provision and outcomes

The Denmark system of childcare is one of the most elaborate in the world.[48] It is also associated with some of the highest levels of spending per child.

Netherlands: Key features

How government intervenes

ECEC in the Netherlands is divided between early learning, both within and outside school, and care. All 4 year olds are entitled to one year of full-time early education (the compulsory school age is 5). 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 and those without children, to the government to cover part of the costs of childcare. In 2011, this 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.

Characteristics of childcare provision and outcomes

Since the mid-2000s the approach in the Netherlands has swung first towards a very de-regulated system and then back towards partial re-regulation. Some commentators have claimed a tendency for the subsidy support provided to parents to have the ultimate consequence, through pushing up demand, of pushing up the prices charged by the private providers[49].

---

[45] P. Fortin, L. Godbout and S. St.-Cerny May 2012, "Impact of Quebec's universal low fee childcare program on female labour force participation, domestic income and government budgets", Universite de Sherbrooke, Quebec, *Working Paper*, no. 2012/2.

[46] IPPR 2012, *op.cit.*

[47] IPPR 2012, *ibid.*

[48] *The Guardian* January 2013, "Childcare changes: Why the Danish model won't work in the UK", *Blog on Guardian Women's website*. Available at: http://www.theguardian.com/money/the_womens_blog_with_jane_martinson/2013/jan/30/childcare_changes_danish_model_uk

[49] IPPR 2012, *op.cit.*

Conclusions

There are the following conclusions regarding the international evidence on the impact of childcare:

- Cross-sectional international studies suggest good quality childcare is usually associated with characteristics such as a relatively low child:staff ratio, relatively high qualifications amongst the childcarers and a curriculum for childcare activities.

- In some of these cross-sectional comparisons the UK was comparatively highly placed. This result may, however, reflect the way in which such indices are constructed. If emphasis was placed on educational outcomes, the affordability of childcare, especially for families with middle incomes, and detailed comparisons of the qualifications of childcarers, then that relative position would appear less favourable.

- A number of longitudinal studies, some of which included control groups, indicate that childcare provision, especially when targeted towards groups which might otherwise be characterised by various social problems, has the potential to produce favourable social outcomes over the long term.

- Importantly, some of these studies indicated that favourable outcomes were dependent on the childcare being of high quality which, in turn, is probably associated with relatively high levels of public spending. It is also unclear how far the results of *small scale studies* can be applied to *universal* provision.

- Other detailed studies point to the possibility that use of childcare may be associated with negative outcomes in terms of child behaviour and development. Where levels of public spending are relatively low there may be variability in the quality of the childcare and hence unfavourable impacts are more likely.

- One high level conclusion which might be drawn from the data presented in this Chapter, together with the data in Chapter 2, is that diminishing returns may apply to the impact from public spending on childcare. Countries such as Denmark and the other Nordics which have very high rates of spending do not have a much higher rate of maternal employment than, say, the Netherlands or Quebec which have a lower level of spending. In other words, a maternal employment rate of 80-85% in practical terms may represent something of a ceiling. IPPR 2011, *op.cit.* , make this point that beyond a certain point diminishing returns impact on policies designed to increase maternal employment through increasing the affordability of childcare.

The lessons that can be indicated for Northern Ireland from the childcare systems in other countries are summarised in Table 4.

Table 4: Lessons for Northern Ireland from the childcare systems in other countries

- England: Northern Ireland shares some of the features of the English approach. Northern Ireland should recognise both the strengths and weaknesses of a patchwork approach, e.g. local government administration, some universal entitlement but limited in its nature, affordability low for middle income families and a complex system of support through the tax and benefit system (assuming here that it is unlikely that the extent of future fiscal devolution will be sufficient to allow Northern Ireland to depart from the HMRC approach).

- Scotland: Northern Ireland should follow the debate about the Scottish proposals with interest. The Scottish government was proposing a universal, Nordic style system. However, this was to be implemented over 10 years and relates only to pre-school. It has been claimed that such an approach would bring large economic benefits and would pay for itself in fiscal terms, but such assertions have been questioned.

- Quebec: Demonstrates that it is possible to cap childcare charges whilst committing a level of public spending which is lower than that in the Nordics. A downside is variability in childcare quality and outcomes. The system is not universal, i.e. demand for places continues to out-run supply. Whilst the system has proven popular, there has been criticism of the quality of the service provided.

- Denmark: This model may appear attractive but it is unclear how far the approach to childcare can be extracted from the rest of the Nordic model. In any case the cost in public spending terms is extremely high. The Danish system has been in place for decades. This, together with the fact that it is part and parcel of an overall Nordic approach to welfare and labour market policies, makes it very difficult to evaluate the particular costs and benefits of the model.

- Netherlands: Has the attraction of being associated with a lower level of public spending, compared to the Nordics, but there are a number of downsides; quality of provision, complexity of the system and impact on businesses of the levy. The Netherlands operates a demand-led approach, i.e. a combination of grants and tax credits to parents to support their purchase of care from private providers (part of the subsidy to parents also derives, unusually, from levy on employers). The Netherlands approach moved towards substantial de-regulation in 2005, although some regulation has since been re-introduced.

- Other OECD countries: These can be sub-divided into three groups:

    - *High spenders*, i.e. principally the other Nordics, although there are some variations in the way in which public subsidy support is delivered. The same lessons as for the Denmark model also apply.

    - *Middle spenders*, e.g. France, Australia and the New Zealand. These show some similarities to the UK/England approach, e.g. in terms of use of means testing and tax credits. The same types of strengths and weaknesses may apply.

    - *Low spenders*, e.g. the US (although with a growing level of state support for low income families) and Switzerland. In these countries families have to pay their own way in terms of childcare. Such an approach is not likely to win much favour in Northern Ireland. Perhaps, significantly, the Republic of Ireland, hitherto a "low spender" with a relatively low maternal employment rate, is trying to increase state support for childcare provision.

4. Three models to illustrate options for childcare in Northern Ireland

Introduction

This Chapter considers the selection of the three models of childcare which were the subject of the cost-benefit analysis:

- Why each of the three models was of interest.
- The economic context for each of the three models.
- Conclusions.

Why each of the three models was of interest

The Canadian Province of Quebec has been indicated as having a high rate of subsidy, see Chapter 3, above. In recent years the level of public spending per pre-school childcare place, equivalent to about £5,900, has been indicated to have been equal to 85% or more of total costs. Quebec should not be regarded as some sort of ideal of "childcare-max". It is possible that Northern Ireland could learn from *both* the positive and negative features of the Quebec model of childcare as outlined in Table 5.

As noted in the previous Chapter, Denmark has a fully integrated ECEC system with a universal entitlement to a full-time place for children from age 6 months through to the compulsory school age at 7 years old. The overall rate of subsidy of childcare is substantial, probably about 80%, albeit at a lower rate than in Quebec.

To identify a third model of childcare funding/provision to which cost-benefit analysis could be applied, a detailed international benchmarking review was undertaken to assess other childcare models and associated impacts across 15 countries. The results of that review were summarised in the previous Chapter. Based on this review, four countries were shortlisted; Netherlands, Slovenia, France and Australia. These had some similarities with the UK or Northern Ireland but were also distinct from the Nordic countries in terms of 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[50]. The shortlisting and selection process is summarised in Appendix III. Given the balance of the arguments, the Netherlands were selected to form the basis for the third model.

[50] 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, if anything, this only reinforces the interest in these comparisons. These four other countries tend to spend less than the UK per childcare place and yet also tend to have more impact.

Table 5: Summary of the reasons why each of the models was of interest

Childcare model	Reasons why this model was of interest to Northern Ireland	Caveats or qualifications relating to using this model as an exemplar for Northern Ireland
Quebec	• High rate of subsidy; 85%.	• Variations in quality of care. • Even the relatively low level of spending in Quebec is no longer regarded as sustainable. • Childcare and education not integrated.
Denmark	• Lowest child poverty rate of the OECD countries and was ranked third for high levels of maternal employment. • Integrated and universal system. • Highly qualified childcare workforce, about 60% of staff have a university degree.	• One of the highest public spending costs in the world. • Childcare provision just one part of an overall Nordic model relating to social and labour market policy. • A high income per head and high productivity economy.
Netherlands	• A relatively high maternal employment rate. Whilst the rate was less than in the Nordics it was considerably higher than the UK and OECD average. • Total spend per child less than that in the UK. • The levy system represents an attempt to include a business contribution to funding childcare[51]. • Some similarity to the system of support used in the UK given strong reliance on tax credits/reliefs. • It is illustrative of the advantages and disadvantages of a demand-led system.	• Fragmented and complicated delivery system. • The levy on employers as a charge on employment probably has some negative impact on employment. Administratively complex. • Much of the increase in maternal employment has been part-time (and probably relatively low wage). • A high income per head and high productivity economy.

The economic context for each of the models

Table 6 gives context for the application of the Quebec model to Northern Ireland by illustrating key data for both regions:

Table 6: Population and GDP per capita in Quebec and Northern Ireland, c. 2012

GDP per capita (UK= 100, based on PPP comparisons)		Population	
Quebec 2014	NI 2012	Quebec 2013	NI 2013
96.7	76.0	8.16m	1.8m

Sources and notes: Data were taken from *The Economist* December 2013, *The World in 2014*, Economist Publications, London and national statistical agencies. The Quebec estimate of comparative GDP per capita is based on a combination of the estimate of comparative GDP per capita of Quebec compared to the Canadian average in 2012 (national statistics) combined to the EIU forecast for Canada/UK in 2014.

Table 6 illustrates that Quebec's size is about four and half times that of Northern Ireland in population terms. Quebec is also considerably more prosperous in per capita terms.

Table 7 illustrates that are some significant differences between Denmark and Northern Ireland, over and above the fact that the former is a state and the latter a region.

[51] OECD appear to treat the levy on employers as a form of taxation which funds government expenditure on childcare. We viewed the levy as an alternative way of funding childcare which reduced the required commitment from government, see Chapter 5, below.

Table 7: Population, GDP per capita, competitiveness and equality indicators in Denmark and Northern Ireland, 2012-2014

GDP per capita (UK= 100, based on PPP comparisons)		Population		Competitiveness, ranking in World Economic Forum index (1= best), 2013		Equality measure, Gini coefficient, 0=absolute equality, 1= absolute inequality, c. 2010	
Denmark 2014	NI 2012	Denmark 2012	NI 2013	Denmark	NI	Denmark	NI
110.2	76.0	5.6m	1.8m	15	42	0.25	c.0.29

Sources and notes: As in Table 6, but competitiveness and equality data for Denmark from Scottish Government November 2013b, *Building Security and Creating Opportunity: Economic Policy Choices in an Independent Scotland*, Scottish Government, Edinburgh. For Northern Ireland- competitiveness measure, SQW, Economic Advisory Group, Cambridge Econometrics June 2013, *Competitiveness Index for Northern Ireland,* Cambridge Econometrics, Cambridge, and equality measure- estimate produced by OFMDFM[52].

Denmark's population is about three times that of Northern Ireland. Denmark is indicated to have a considerably higher level of GDP per capita; about one and a half times higher. Indeed, the total size of the Danish economy is indicated to be about four and a half times that of Northern Ireland's.

International comparisons always beg the question as to how far particular policies can be transferred. There is in an additional note of caution regarding any attempt to apply the very distinctive Denmark childcare model to Northern Ireland[53]. Arguably the Denmark childcare model is just one part of a much wider approach to social and economic policy. So, how far can we take one element of that approach and transfer it to another country?

There is some evidence that people in Scandinavia generally have different values and attitudes from their counterparts in Northern Ireland; notably, in the way they see a strong state as an ally in promoting individual freedom as opposed to a threat. In the context of childcare provision it is notable that informal care outside of the family has actually been made illegal in Denmark[54]. For sure, the Nordics' *public* sectors have been subjected to radical reform and modernization with strong emphasis on performance and sometimes also including delivery of publicly funded services by private providers. At the same time, the productivity and competitiveness of the Scandinavian *private* sectors have been ruthlessly promoted, as indicated by the competitiveness index measure quoted in Table 7, and part of this has been a strong emphasis on labour mobility and re-training, albeit within a so-called "flexicurity approach".

Table 8 compares some of the key contextual data for the Netherlands relative to Northern Ireland:

Table 8: Population and GDP per capita in the Netherlands and Northern Ireland, 2012-2014

GDP per capita (UK= 100, based on PPP comparisons)		Population	
Netherlands 2014	NI 2012	Netherlands 2013	NI 2013
112.0	76.0	16.73m	1.8m

Sources and notes: Most of the data taken from *The Economist* December 2013, *op. cit.* and national statistical agencies. The Netherlands estimate of comparative GDP per capita is based on the EIU forecast for 2014.

Table 8 illustrates that the Netherlands economy is considerably larger than that of Northern Ireland; population more than nine times larger and total GDP about 14 times larger. The Netherlands are also considerably more prosperous in GDP per capita terms; as in the case of Denmark, about one and a half times the level in Northern Ireland.

---

[52] Northern Ireland Executive March 2012, "Economic Strategy- Rebuilding and rebalancing the economy: An evidence base", *Slide deck on the Northern Ireland Executive website,* Slide 132. Available at http://www.northernireland.gov.uk/nies-evidence-base-slides-march-2012.pdf

[53] For some of the issues see, for example, S. Hamilton, Minister Department of Finance and Personnel (DFP) 1 August 2013, *Speech to CBI lunch*, Belfast. Also, E. Birnie April 2014, "Is Northern Ireland ready to embrace the Nordics", *AgendaNI*, Belfast. Also available on the AgendaNI website at http://www.agendani.com/15-northern-ireland-ready-to-embrace-the-nordics/

[54] For some of the evidence on differences in values between Northern Ireland and the Nordic countries, see C. Welzel 2005, *Modernization, Cultural Change and Democracy: The Human Development Sequence*, Cambridge University Press, Cambridge.

Conclusions

There are the following conclusions:

- We considered a very highly subsidised publicly funded model of childcare and what impact that might have in Northern Ireland. We used the subsidised system of childcare in the Canadian Province of Quebec as the best exemplar of such a system. Although Quebec would have one of the highest rates of subsidy of childcare cost within the OECD, that rate would probably be 85% in recent years and not 100%.

- We considered the Danish approach to public subsidy; the overall subsidy rate is about 80%. The Danish approach to childcare is associated with some very favourable outcomes, amongst the highest maternal employment rates and lowest child poverty rates across the OECD, and also some of the highest levels of public spending per childcare place in the world.

- We selected a third model of childcare provision for consideration of the impact in Northern Ireland. The intention was to devise a model which was distinct in some respects not only from the UK but also from the Nordic countries and Quebec. The detailed OECD data, and other sources, were used to consider 15 countries and then a shortlist of four was produced; Netherlands, Slovenia, France and Australia. These four tended to characterised by levels of public spending on childcare which were lower than those in the UK and also, in most cases, more favourable outcomes.

From that shortlist, the Netherlands were selected. This choice was based partly on the level of public spend per childcare place being less than in the UK. The choice was also based partly on the maternal employment rate being considerably higher than the UK and partly on the unusual, and therefore interesting, feature of a childcare levy on businesses

5. Cost-benefit analysis

Introduction

This Chapter outlines the results of a cost-benefit analysis applied to the three models of childcare. It considers:

- Key considerations relating to the method.
- Cost-benefit analysis of the three models applied to Northern Ireland.
- Summary of the results of the cost-benefit analysis for the three models.
- Possible impact of the other categories of costs and benefits which could not be quantified.
- Consideration of the key assumptions: Sensitivity analysis.
- Analysis of the fiscal impact.
- Conclusions.

Key considerations relating to the method

Categorisation of the main costs and benefits considered for each childcare model

We conducted a cost-benefit analysis which was consistent with Treasury *Green Book* standards.

Table 9 summarises our identification of the benefits and the costs by placing these into four categories:

- *Quantifiable and measurable*. In these cases the benefits or costs can be quantified. These impacts can be assigned a monetary value.

- *Measurable only*. In these cases it is possible to indicate the *direction* of an impact, i.e. is it a benefit or a cost, and perhaps the *relative* scale of impact, i.e. bigger or smaller than some other measurable only effect. These impacts are, however, non-quantifiable in the sense that a monetary value cannot be assigned.

- *Neither quantifiable nor measurable*. In these cases reliable assessment of the benefits or costs in either a quantitative or qualitative sense is unlikely.

- *Immaterial*. Cases where it is likely that the scale of impact is sufficiently small to imply that no further consideration of these benefits or costs is necessary. This may also have been indicated by previous studies.

Our cost-benefit analysis focused on the first category only, because it is the only one we could quantify. This need not mean, however, that the other three categories are unimportant. Some of the considerations relating to these four categories are discussed in Appendix IV, Part 1. However, in the following two sections we outline the assumptions we made about how costs and benefits would be profiled over time, and consider the impact on measured costs and benefits of the childcare policies which are already in place.

Table 9: Identification of the main costs and benefits

Quantifiable and measurable	
Benefits#	**Costs**
• Increased female employment. • Increased lifetime earnings of mothers. • *(Increased tax revenues).**	• Increased government spending.
Measurable only	
Benefits	**Costs**
• Decreased child poverty. • Decreased adult poverty. • Decreased inequality.	• Reduced choice for parents in terms of childcare provision. • Forced increase in labour supply to pay for higher tax burden.
Neither quantifiable nor measurable	
Benefits	**Costs**
• Positive impact on child development/education.** • Higher birth rate and hence higher population growth and reduced age dependency rate. • Decreased time required from informal child carers.	• Negative impact on child development/education.**
Immaterial	
Benefits	
• Increased paternal labour force participation.	

Note:# Any upgrade in the level of qualifications of child carers which might be associated with the adoption of a Denmark model or other publicly subsidised model of childcare provision might be considered a "benefit" in the loose sense of the word. However, for the purposes of formal cost-benefit analysis this would normally be considered as part of the public spending cost.

*Not a "benefit" from the point of view of cost-benefit analysis but to be estimated as part of the calculation of the fiscal impact.

**The direction of impact, positive or negative, is the subject of dispute in the literature. We therefore opted for the cautious assumption that any positive impacts are exactly compensated for by negative ones. That is, there is no net impact and the overall effect is neutral. For a review of such possible effects, both positive and negative, see below and Chapter 3.

Profiling the increase in benefits and costs up to the steady state

The costs of providing a highly subsidised childcare system are likely to ramp up over time, i.e. as the policies are introduced they would start off at a low level in year 1, climb in subsequent years and then probably stabilise at a high level. Similarly, the scale of the main benefits would be small in the early years but climb thereafter and also, probably, stabilise at a high level. In the absence of any definite data but using the indications supplied by the studies relating to Quebec and Scotland, we assumed benefits ramp up from zero in year 0 when the implementation of the policy begins through to full benefit and the steady state in year 10, with a linear increase in benefits during years zero to 10 and then the level remains constant in subsequent years. We thought it a reasonable and cautious assumption, one that might tend to overestimate benefits relative to costs, that costs would ramp up to their steady state value more rapidly than the benefits but not much more rapidly, i.e. over 8 years.

Impact of the costs and benefits associated with existing policies

We estimated costs and benefits as if compared to a zero base, i.e. an assumption of no publicly funded intervention in the absence of the particular model of childcare we were applying to Northern Ireland for the purposes of this cost-benefit analysis.

Clearly, in practice, there are existing childcare policies and an associated level of public spending. This *may* imply that in estimating the scale of benefits from application of the Denmark and Netherlands models in terms of impact on the employment of mothers we underestimate the scale of that impact to the extent that the existing labour supply already includes the impact of some policy intervention. However, we believe that the effect of any such bias may be small:

- The current level of spending on childcare policy is much smaller than what it would be if one of the international models were adopted. The total level of government spending supporting childcare in Northern Ireland, including WTCs and other welfare benefits, is not available. However, such a figure has been estimated for Scotland as £480m (SPICE 2014, *op.cit.*), and £311m once HMRC activity is excluded. Assuming a *pro rata* relationship, based on the sizes of the populations aged 1 to 14, the equivalent figure for Northern Ireland would be likely to be about 41.6% of the Scottish figure, i.e. £200m and £129m, respectively.

- The impact of the existing level of spending may be limited.

It is worth emphasising that such problems are likely to be less pressing in the case of the Quebec model. This is because the Quebec estimate of the responsiveness of maternal employment to childcare subsidy, which was then applied to Northern Ireland, deals with a case where there was a fairly sudden switch in policy from minimal intervention to large scale intervention.

In any case, it is probably not realistic to envisage that a Quebec, Denmark or Netherlands model could be added "on top" of the existing level of provision, together with the spending and consequent labour market impacts of the existing public subsidy of childcare. Rather, if a new approach to childcare was adopted it would be more likely that the existing methods of supporting childcare through public funding would be phased out. That would probably imply that most, if not all, of the benefits from the existing policies, as well as the public spending cost, would also be removed. So, it is probably reasonable to estimate the costs and benefits of the three models of childcare, as if these could be set against a zero base in terms of spending and impacts[55].

Cost-benefit analysis of the three models applied to Northern Ireland

The Quebec model

BENEFIT: Increased female employment

The baseline employment of mothers with dependent children in 2009 was increased by the percentage increase indicated by one study of the impact of Quebec's childcare policies. The estimated increase in maternal employment was divided into full-time and part-time workers using the percentage shares of full-timers and part-timers amongst maternal employment in 2009. GVA per full-timer and part-timer were estimated using the average wage levels of women working full-time and part-time; those levels being multiplied up by the general relationship between GVA per worker and average earnings for the entire Northern Ireland economy. The estimated increase in the number of full-time women workers was multiplied by the estimated GVA per full-time women worker and likewise for part-timers, and the total increase in GVA was implied. (More details are provided in Appendix IV, Part 2, and Part 3, Box 1).

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 years after the policy first began to be implemented- for the full effects to be felt.

BENEFIT: Increased lifetime earnings of mothers

We took the estimate of maternal employment after childcare subsidies had been applied. 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. An uplift of 1.5% was applied to the full-time wage and 0.5% to

[55] There is a separate but related point regarding the likely diminishing returns to policy interventions designed to increase employment through more affordable childcare. Consideration of the data on maternal employment rates, see Chapters 2 and 3, is suggestive of diminishing returns, i.e. as the maternal employment rates rise towards 80% the likelihood of further substantial increases is reduced. The maternal employment rate in both the UK and Northern Ireland has probably been characterised by a trend increase over time. This would imply that if we used the gap between Northern Ireland's maternal employment rate and that in Denmark in, say 1994, this might suggest very large scope for policy to increase that rate. For this reason, we decided to emphasise application of the Denmark and the Netherlands models based on an earlier year, i.e. data for 2009, as opposed to a later year, i.e. 2011 data. We also decided that in using the different method relating to the application of the Quebec model, i.e. direct application to Northern Ireland of the responsiveness of maternal employment indicated by the studies of Quebec, it was more realistic to use the data for 2009 rather than 2011.

the part-time one[56]. 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. The stream of annual benefits, i.e. the extent to which earnings were higher, was discounted to indicate the NPV[57]. We followed the practice recommended by HM 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. 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. (More details are provided in Appendix IV, Part 2, and Part 3, Box 3[58].)

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. Whilst it might be objected that it could take longer than 10 years to realise the gain in terms of an uplift to *lifetime* earnings, the profile of earnings by age for a typical female employee, rising in their 20s and peaking in the their 30s, is suggestive that this uplift effect could be felt relatively quickly (for the age profile of female earnings, see Appendix IV, Part 3, Box 3).

COST: Increased government spending

We used two sources and took an average of these. First, actual cost per childcare place data for Quebec and, second, the estimated cost per place data relating to a proposed universal childcare system in Scotland.

The cost per place in Quebec was converted from Canadian $ into £ using the purchasing power parity (PPP) rate of exchange. Given that the Quebec data related to pre-school provision, which was assumed to be full-time, an estimate of the cost for ages 5 to 14 was assumed to be 60% of the pre-school cost; similarly, it was assumed that part-time childcare would cost 60% of full-time. For children aged 1 to 4, i.e. pre-school, it was assumed that half of these would require part-time care and the other half full-time. These proportions reflected the proportions of all mothers with dependent children working full-time and part-time. For children aged 5 to 14, it was assumed that half would require a part-time childcare place; this was where the mother was working full-time and a part-time place would be required for those with working hours which fell outside school hours. For children aged 5 to 14, it was assumed that a further one-quarter of children would require no childcare; this was where the mother was working part-time and the hours of work were entirely contained within the school hours. For children aged 5 to 14, it was further assumed that for the remaining one-quarter of children part-time childcare would be required; this was where the mother was working hours which did not entirely coincide with school hours. We 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 Scottish data were adjusted in two main ways. First, given that they related to a 25 hour week, we doubled the cost per place figure; we assumed that a full-time place in Northern Ireland would be equivalent to 50 hours. Second, given that the Scottish proposal related to 100% subsidy but the Quebec system is based on 85% subsidy (see Chapter 3), we reduced the cost per place figure to 85% of its previous value. (More details are provided in Appendix IV, Part 2, and Part 3, Box 5.)

We took 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 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. See Table 10:

---

[56] These percentage uplifts derived from J. Mincer and S. Polachek 1974, "Family investments in human capital: Earnings of women", *Journal of Political Economy*, vol. 82, pp. 76-108.

[57] "The discount rate is used to convert all costs and benefits to "present values", so they can be compared. The recommended discount rate is 3.5%. Calculating the present value of the differences between streams of costs and benefits provides the net present value (NPV) of an option. The NPV is the primary criterion for deciding whether government action can be justified", HM Treasury 2011, *The Green Book Appraisals and Evaluation in Central Government*, HM Treasury, London.

[58] 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 in Appendix IV, Part 3 describes the use of 2011 data.

Table 10: Comparison of estimates of the public spending cost per childcare place

Our estimate, age 1 to 14, average across 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 Appendix IV, Part 2.

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[59].

SUMMARY: Cost-benefit results for the Quebec model

Table 11 provides a summary:

Table 11: Summary of the cost-benefit results for the Quebec model in a snapshot or steady state comparison

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

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

The Denmark model

BENEFIT: Increased female employment

We used the 2009 data from the Labour Force Survey as a measure of the baseline employment of mothers with dependent children. We assumed that application of the Denmark model would result in half of the gap between Northern Ireland and Denmark maternal employment rates closing. 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. The levels of GVA per full-time woman worker and part-time woman 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 woman workers and part-time woman workers. The estimated increase in the number of full-time women workers was multiplied by the estimated GVA per full-time women worker and likewise for part-timers, and the total increase in GVA was implied. (More details are provided in Appendix IV, Part 2, and Part 3, Boxes 6 and 7).

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.

[59] 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 Politques Economique et L'Emploi, Quebec. Available at; http:/ideas.repec.org/p/lvl/lacicr/1334.html

BENEFIT: Increased lifetime earnings of mothers

The method was the same as for the Quebec model. (More details are provided in Appendix IV, Part 2)

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

We 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. Based on the assumption that the subsidy rate in the Denmark model would be 80% compared to 85% in the Quebec model, it was assumed that the government spending cost per place would be 95% of that in the case of application of the Quebec model. We 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 estimated cost was £554.0m[60]. 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 appear 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[61] 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). We judged that there were two possible reasons why it might be inappropriate to apply the very high figure from Denmark to Northern Ireland. First, the relatively high figures for Denmark may partly reflect a higher cost of living in Denmark, and hence relatively high labour and input costs, and such costs may not be entirely reflected in the exchange rate or PPP comparisons. Second, 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.*

SUMMARY: Cost-benefit results for Denmark model in a snapshot or steady state comparison

Table 12 provides a summary:

Table 12: Summary of the cost-benefit results for the Denmark model

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

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

[60] 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.

[61] 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.

The Netherlands model

BENEFIT: Increased female employment

The method was the same as for the Quebec model. (More details are provided in Appendix IV, Part 2, and Part 3, Boxes 8 and 9).

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

This was the same as for the Quebec model. (More details are provided in Appendix IV, Part 2.)

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 years after the policy first began to be implemented- for the full effects to be felt.

COST: Increased government spending

We took the OECD data for 2008 for spending on childcare per pre-school child. That data was adjusted from a $ to £ basis using a PPP. We adjusted to a per childcare place basis using OECD data on the participation rate in childcare in the Netherlands. The cost was reduced by one-third to allow for the contribution made to childcare costs through the levy on businesses. The estimate of cost for 2008 was projected to 2012 using the UK GDP deflator. (More details are provided in Appendix IV, Part 2, and Part 3, Box 10.)

The estimated cost was £423.5m[62]. 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.

SUMMARY: Cost-benefit results for the Netherlands model

Table 13 provides a summary.

Table 13: Summary of the cost-benefit results for the Netherlands model in a snapshot or steady state comparison

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

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

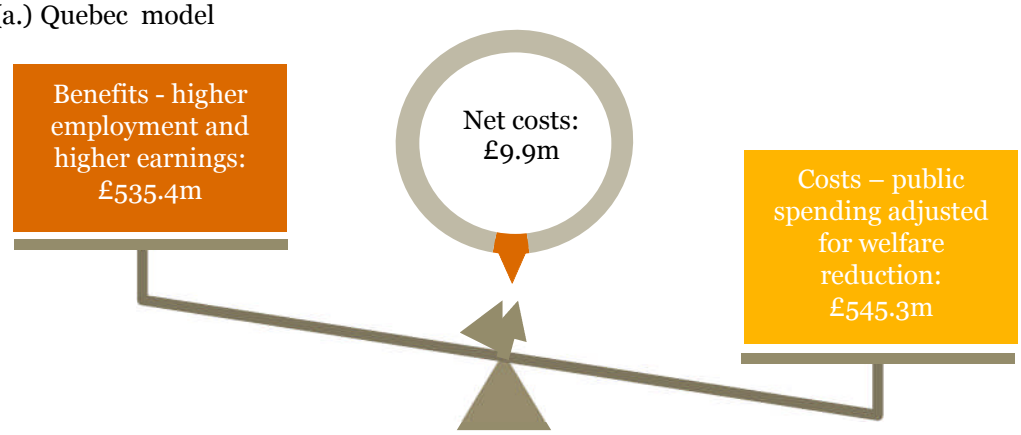
[62] i.e. took an estimated cost per place of £3,079.35 (for details of calculation see Appendix IV, Part 3, Box 10). Estimated the take up, i.e. the percentage use of formal childcare in 2011- 38.4%- increased by the same proportion as the estimated increase in maternal employment in the Netherlands 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.

Summary of the results of the cost-benefit analysis for the three models

Figure 8 summarises the results of a snapshot or steady state comparison.

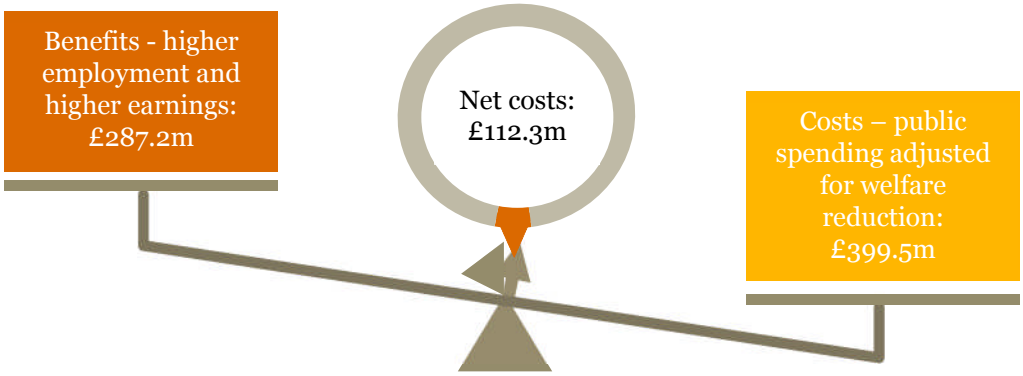
Figure 8: Weighing up the quantifiable benefits and costs in an annual snapshot or steady state comparison

(a.) Quebec model



(b.) Denmark model

(c.) Netherlands model



Source: See Tables 11, 12 and 13.

Table 14 confirms that for all three of the models the discounted value of the quantifiable benefits was indicated to fall short of quantifiable costs, i.e. the NPVs are negative.

Table 14: Summary of the quantifiable costs and benefits for the three models, discounted values (NPVs, discounting over 60 years)

	Quantifiable, benefits, £m*	Quantifiable costs, £m**	Net costs, £m
Quebec model, *using 2009 data*	11,455.1	12,149.4	-694.3
Denmark model, *using 2009 data*	10,433.2	11,439.4	-1,006.2
Netherlands model, *using 2009 data*	6,145.1	8,894.2	-2,749.0

Note: *Increase in female labour supply and increase in female lifetime earnings.

**Increased government spending but removing £44.5m for the Quebec model, £40.5m for the Denmark model, and £24m for the Netherlands model to reflect reductions in welfare spending. See text below for further explanation.

In making these comparisons we allowed for the fact that as childcare subsidies encourage more women into (or back into) work other areas spending, notably welfare spending, might decrease. One official estimate is that for every 100,000 reduction in unemployment, government spending decreases by £500m, i.e. by £5,000 for each person who comes off the unemployment register[63].

In the case of childcare subsidies in Northern Ireland it is worth reiterating that the increases in employment are small in absolute terms (in a range about 9,600 to 17,800) and some of those women who go into/return to work may not previously have been on benefit. We assumed that about 50% of those encouraged into work had previously been on benefit so the amount of reduction in welfare spending ranged from £24m to £44.5m.

Impact of the costs and benefits which could not be quantified

Is it plausible that measured deficits in quantifiable benefits relative to costs could be transformed by allowance for some of the non-quantifiable costs and benefits listed in Table 9, above? For these costs and benefits, as noted at the start of this Chapter, the available data for Northern Ireland and the international literature did not allow us to assign a monetary value. That said, a number of observations can be made:

- It is likely that a Denmark model, especially to the extent it is associated with a relatively high level of spending per childcare place, will be associated with lower levels of child and adult poverty and increased income equality.
- The Netherlands and Quebec type models, which have lower levels of public spending per place than in Denmark, are probably associated with more variability in the quality of the childcare provision and hence in terms of outcomes at both levels of society and the individual.
- It may also be of note that, relative to the rest of the OECD, the Netherlands stands out as having a relatively high rate of part-time working by women, see Chapter 2. It is unclear how much social value, whether negative or positive, to assign to this phenomenon.
- The Denmark model is associated with lower levels of choice amongst childcare providers and also relatively high levels of personal taxation.

Whilst there are likely to be widely differing views as to what monetary value *should* be applied to each of the non-quantifiable costs and benefits, what we can do is indicate what sort of values might have to be imputed in order to transform the cost-benefit results. For example, one of the most important considerations is the extent to which a publicly funded system of childcare if successful might reduce levels of child poverty, see Table 15.

[63] House of Commons Library 2010, "The economic recovery and the budget deficit", UK Parliament, London *House of Commons Library Research*.

Table 15: The possible social value of reduction in child poverty

Consideration of the social value of any reduction in child poverty arising from publicly subsidised childcare
• Based on the UK data, Waldfogel and Garnham (2008)[64] argued that a high quality childcare system could reduce child poverty by between one-half and one-sixth. • In Chapter 2 we indicated that the Northern Ireland childcare poverty rate in 2010 was 28%. • 28% of Northern Ireland's 1-14 year old population (330,800) in 2011 was 92,620. • Based on Waldfogel and Garnham (2008), we assumed a reduction in that figure of one-third, i.e. 30,900, based on the mid-point of their estimates. • We have estimated that for application of the Quebec model in steady state or year 10 terms quantifiable benefits would fall short of quantifiable costs by £9.9m. • The question is therefore whether moving 30,900 children out of poverty would be associated with a social value of at least £9.9m. • For this to be the case the social value placed on moving *each* one of those children out of poverty would have to be (£9.9m divided by 30,900=) £320. • Is a social value of £320 per child plausible? One might ask what would be the social value of alternative uses of £320, e.g. in terms of industrial development spending and hence the value of any jobs created, or in terms of health spending and hence the value of any procedures paid for. Perhaps significantly, £320 is unlikely to "purchase" many industrial development jobs or healthcare procedures. By implication, it becomes more plausible to argue that the social value of moving each child out of poverty exceeds the net cost (in terms of quantifiable costs relative to benefits).

[64] Waldfogel and Garnham 2008, *op.cit.* See Chapter 3.

Consideration of key assumptions: sensitivity analysis

Table 16: Summary of the key assumptions and their likely impacts (assumptions which are numbered were subjected to detailed sensitivity analysis - see below)

Assumptions tending to *overestimate benefits* (i.e. overestimate benefits relative to costs)-those which probably have the biggest impact ranked first	**Assumptions tending to *underestimate benefits* (i.e. underestimate benefits relative to costs)-those which probably have the biggest impact ranked first**
• **(1.)** Using the cost per place estimate for Quebec and Scotland. • **(2.)** Share of part-timers amongst the *addition* to maternal employment would be the existing share amongst employed mothers. • Additional working mothers would be at least as well skilled and have similar productivity to those already in employment. • **(3.)** Negligible additional deadweight in terms of substitution of formal care for informal[65]. • **(4.)** Costs per childcare place for after-school, or part-time, would be 60% those for ages 1 to 4[66]. • *For the Denmark model only* – Subsidy rate of 80% and not a rate of about 83% to 90% as suggested by the other Scandinavian countries. • Childcare not used until children aged at least 1. • The uplift to lifetime earnings could be realised by year 10. • A full-time year for childcare equals 46 weeks with no retainer fee for the remaining 6 weeks. • *For the Netherlands model only*- Same sensitivity of demand for labour in Northern Ireland to cost, i.e. elasticity of labour demand, as in the rest of the UK to the employer childcare levy whereas Northern Ireland has proportionally more SMEs which could imply greater sensitivity.	• **(5.)** More affordable childcare would close 50% of the gap between Northern Ireland and the Denmark or Netherlands maternal employment rates, rather than a proportion closer to 100%. • No increase in the hours of those mothers already in work. • No multiplier effects consequent on the increased maternal employment[67].
Assumptions which have an impact with *uncertain direction*	
• Any positive effects *on* child development and education are exactly compensated for by negative impacts-so overall impact zero. • 50% of the *mothers* encouraged into employment through more affordable childcare were previously in unemployment, as opposed to either a lower or higher %. • As a consequence of more affordable childcare, 50% of all mothers in employment avoid a significant career break, as opposed to either a lower or higher %.	

Table 16 indicates that in most cases the assumptions used were likely to *overestimate benefits* in Northern Ireland, i.e. overestimate benefits relative to costs.

[65] Strictly, we were not assuming zero deadweight because we assumed all mothers who already use formal childcare would continue to do so. What we also assumed was the increase in affordability would *not* be accompanied by any switching from informal to formal childcare.

[66] Rather than the 74% level implied by the comparative fees paid by parents for part-time and full-time childcare in 2013.

[67] We treated the impact of childcare as a supply side enhancement rather than a demand side shock. A multiplier could be applied to the latter.

Sensitivity analysis relating to the extent of closing of the gap in maternal employment rates and the extent of full-time work

Table 17 outlines the results of sensitivity analysis. (More details are provided in Appendix IV, Part 3, Box 11.)

Table 17: Summary of sensitivity analysis, impact on net cost in a snapshot comparison

How the variation in assumptions changed net costs, £m			
	Quebec model	**Denmark model**	**Netherlands model**
Using Denmark cost per childcare place	Changed from 9.9 to 383.5	Changed from 25.9 to 424.5	Changed from 112.3 to 605.4
Using a full-time: part-time split of 25%:75%	Changed from 9.9 to 126.2	Changed from 25.9 to 130.9	Changed from 112.3 to 183.9
Using a deadweight of one childcare place switched from informal to formal for each two associated with additional maternal employment	Changed from 9.9 to 45.5	Changed from 25.9 to 66.7	Changed from 112.3 to 128.3
Using part-time childcare costs 50% of full-time	Changed from 9.9 to -61.5, i.e. a change to a net benefit	Changed from 25.9 to -41.1, i.e. a change to a net benefit	Changed from 112.3 to 61.0
Using part-time childcare costs 74% of full-time	Changed from 9.9 to 109.8	Changed from 25.9 to 120.0	Changed from 112.3 to 184.0
Using assumption of 60% of the gap in maternal employment rates being closed	n.a.	Changed from 25.9 to -68.5, i.e. a change to a net benefit of 68.7	Changed from 112.3 to 48.5

Note: Colour coded - *Red*, implies net cost increased; amber implies a net cost becomes smaller; *blue* implies a net cost changed to a net benefit.

It was possible to test how far the measured net cost was to variation in some of the key assumptions. For example:

- Use of the cost per childcare place in Denmark rather than the lower value implied by an average of the data from Quebec and Scotland. The implication was that the net cost increased very substantially, by between about £374m to £493m depending on which model of childcare was considered.

- Use of the assumption that the additional maternal employment would be divided 25%:75% between full-time and part-time employment rather than a split of 50.3%:49.7%. This increased the net cost by a moderate amount, by between £72m and £116m.

- Use of the assumption that there would be some additional deadweight rather than an assumption of zero additional deadweight. To illustrate sensitivity, we assumed that for every two extra places required because of increase maternal employment a further one place would be required because of a switch from informal to formal care. This increased the net cost by a small amount, in the range £16m to £41m.

- Use of the assumption that part-time childcare would cost 50% of the cost of full-time rather than 60%. In the case of the Quebec and Denmark models this changed the small net cost into a small net benefit, of £62m and £41m, respectively.

- Use of the assumption that part-time childcare would cost 74% of the cost of full-time rather than 60%. This increased the size of the net cost.

- Use of the assumption that application of childcare model would result in the closing of 60% of the gap between the maternal employment rate in Northern Ireland and the comparator country rather than 50% of that gap closing. This reduced net costs for both the Denmark and Netherlands' models and changed the Denmark model from a small net cost to a small net benefit, of £69m.

The sensitivity analysis confirms that many of the assumptions made tend to underestimate the extent of net costs. At the same time, for both the Quebec and Denmark models if part-time childcare costs are 50% of full-time ones this would produce benefits at least as large as costs. However, given that in 2013 part-time charges were indicated as 74% of full-time we do not regard an assumption of part-time costs as 50% of full-time as realistic.

For the Denmark model the assumption that 60% of the gap in maternal employment rates could be closed would be sufficient to imply a small net benefit. This assumption may be plausible; PwC 2003, *op.cit.* implied that 70-75% of the gap between maternal employment rates in the UK and Denmark/Sweden could be closed, so by implication a 60% narrowing of that gap in the case of Northern Ireland is not unrealistic.

How realistic are the estimated increases in maternal employment?

Table 18 indicates by how much Northern Ireland's GVA would have to grow (based on the 2011 level) in order to earn back the estimated public spending cost of each childcare model:

Table 18: Summary of the likely scale of output and employment growth required to "earn back" the cost of childcare measures

Childcare model	% growth in GVA required to "earn back" the estimated public spending childcare costs*- based on 2011 GVA	Implied number of jobs (*assuming each equivalent to the NI average GVA per female in work*)**
Quebec	1.9	18,640
Denmark	1.8	17,550
Netherlands	1.4	13,660

Note:*Adjusted for estimated reduction in other areas of welfare spending (as in Table 14).

**GVA per female full-time worker was estimated as £41,454 and per part-time workers as £16,907 (see, Appendix IV, Box 1, below). The average for female workers was estimated by weighting these two productivities by the assumed shares of full-timers and part-timers in additional maternal employment (i.e. 50.3% and 49.7%). This gave an estimated average GVA per female in employment of £29,254.

Table 18 confirms that a very considerable increase in employment would be necessary in order to generate quantifiable benefits commensurate with the quantifiable costs. In fact, if such increases in maternal employment did occur it would imply Northern Ireland's maternal employment rate would reach 74% to 77%, approaching that of Nordic countries; in 2011 the maternal employment rate in Denmark was 84.0% and in the Netherlands 77.5%. This would be a stretching target.

Another way to express about 14,000 to 19,000 extra jobs is that such additional employment would be roughly equivalent to three-fifths or four-fifths of the entire employment in the Northern Ireland Civil Service, or three to four times one of Northern Ireland's largest private sector firms, e.g. Moy Park or Bombardier.

It is possible to give some consideration as to how plausible a growth in maternal employment of that order of magnitude would be. According to the 2009 data, the number of mothers with dependent children who were not employed was (192,000 minus 129,000=) 63,000. In other words, about one-fifth and possibly up to 30% of these would have to move into employment to achieve a growth in employment of 14,000 to 19,000. In fact, that proportion could be higher to the extent that employment of childcarers increased and to the extent that some of that increase occurred amongst the mothers[68].

[68] PwC 2003, *op.cit.,* suggested that introduction of a UK-wide highly subsidised system of childcare might require an additional employment of about 380,000 in the childcare sector. *Pro rata* that would imply about 12,000 extra staff in Northern Ireland. Our own assumption has been that introduction of a more highly subsidised system in Northern Ireland would increase the percentage of children aged 1 to 14 in formal childcare from about 38% to about 41% to 44% depending on the childcare model. That would imply up to about 18,000 extra children in childcare. Assuming a child:staff ratio of 4:1, as PwC 2003, *op.cit.,* did, would then imply about 4,500 extra childcarers being employed. That is very much a lower bound as there is no allowance for any additional deadweight. If for each two childcare places required because of additional maternal employment there was a shift of one child from informal to formal childcare then the additional employment would be about 7,000.

To assess whether such an increase is plausible we would ideally like to know a lot more about the characteristics of the group of mothers with dependent children who are not in employment such as why are they economically inactive and to what extent would they want to move into employment? The Northern Ireland Executive's consideration of policy to increase economic activity does provide some indication that it would be challenging to achieve an increase in maternal employment of the scale envisaged here[69].

In 2012 there were 21,600 lone parents on Income Support (these were 98% female) and these were identified as a target group for policies to increase labour market participation. A further 65,000 persons (these were 61% female) were identified as economically inactive because of family commitments and most of this group - 80% - did *not* want to work. By implication, this implies a pool of available labour of about 8,000. In other words, if *all* of the lone parents on Income Support plus *all* of the female inactive due to family commitments who want to work were encouraged into employment through more affordable childcare this would achieve an increase in employment of almost 30,000. In other words, subsidised childcare would have to be associated with moving at least half, and up to two-thirds, of the combined total of these two pools of economically inactive females into employment. This is probably a stretching target for policy.

Analysis of the fiscal impact

Importance of analysis of fiscal impact

Previous studies[70] have considered the fiscal impact, i.e. the cost of the policy in terms of extra government spending[71] is compared to the extra tax revenues generated. A number of considerations are relevant:

- This is not the same as the cost-benefit analysis. The fiscal impact may matter to government, especially in an era of austerity, but a policy could have *both* a net *fiscal cost* and a net *social benefit*.

- Any estimations of the cost of extra publicly funded childcare are critically related to assumptions made about the "quality" standards of such care, notably child/staff ratios and the levels of qualifications of those staff. We believe it would overestimate the cost of applying, say, the Denmark system to Northern Ireland to use the Danish costs per childcare place. At the same time, it can be argued that use of proxy figures from Scotland which are likely to reflect a lower quality of provision tend to underestimate what that cost would be if Northern Ireland was aiming for substantial *qualitative* improvement.

- Previous studies considered the UK-wide fiscal impact. An attempt to examine this at the Northern Ireland level would have to allow for the reality that almost all taxes are not devolved to the Northern Ireland Executive. We made this distinction.

- Many of the costs are likely to be up-front but some of the benefits (e.g. greater female participation, and higher lifetimes earnings for females because they have fewer lengthy career breaks) may only be experienced in the long run and perhaps over the *very long run*. By implication, some of the benefits should be translated into a discounted present value. Even if the NPV of the benefits is positive it does not necessarily follow that government can or should borrow to spend up-front to realise longer term benefits. In any case, we have indicated negative NPVs.

[69] DEL and Department for Enterprise, Trade and Investment (DETI) December 2013, *Driving Social Change Through Economic Participation: A Strategic Framework to Tackle Economic Inactivity*, Department for Employment and Learning and Department for Enterprise, Trade and Investment, Belfast.

[70] PwC 2003, *op.cit.,* PPR 2011, *op.cit.*, and SPICE 2014, *op.cit.*

[71] Though, possibly with any reduction in other aspects of spending, notably welfare, netted off.

Results

Table 19: Size of total tax revenues in Northern Ireland, 2011-12

Total of all tax revenues (excluding North Sea oil related), £m		**14,137**
*Taxes which are currently devolved**		*1,068*
Total of taxes which could possibly be devolved, of which:		*896*
	Corporation Tax	649
	Stamp Duty	124
	Air Passenger Duty	76
	Landfill Tax	47
Tax which could hypothetically be devolved	*i.e. Income Tax*	*2,510*

Note:*Principally, domestic and non-domestic Rates, together with the small level of receipts from the Plastic Bag and Retail Levies.

Source: DFP March 2014, *Northern Ireland Net Fiscal Balance Report 2011-12,* Department of Finance and Personnel, Belfast.

Given that Northern Ireland's GVA in 2011 was £29,063m this implies that each £100 of GVA is associated with £48.64 of total tax revenues[72]. Similarly each £100 of GVA is associated with about £3.68 of tax revenues which are currently devolved and that sum rises to £6.76 if a further four taxes which could possibly be devolved are considered[73]. If Income Tax was also devolved then every £100 of GVA would be associated with £15.39 of devolved tax revenues.

We assume the relationship identified in 2011 between GVA and tax revenues would also apply to any increase in GVA which follows from the application of the three models for childcare. Table 20 illustrates the results:

Table 20: Estimation of the tax implications of the childcare models, using steady state values, £m

	Increase in GVA*	**Implied total tax revenues**	*Implied tax revenues-currently devolved*	*Implied tax revenues-currently devolved also possibly devolved*	*Implied tax revenues-currently devolved and also possibly devolved and Income Tax*	**Government spending on childcare model minus reduction in other welfare spending**
Quebec model	535.4	**260.4**	*19.7*	*36.2*	*82.5*	545.3
Denmark model	487.6	**237.2**	*17.9*	*33.0*	*75.1*	513.5
Netherlands model	287.2	**139.7**	*10.6*	*19.4*	*44.2*	399.5

Note:* Using the estimate for gain to GVA following from increase in labour supply and increase in female earnings but only in snapshot terms at the steady state.

The Table demonstrates that for all three models the estimated additional tax revenues, including the total of both devolved and non-devolved, fell short of the estimated public spending costs, by between about £260m and £285m.

[72] Not dissimilar to the assumption used in PwC 2003, *op.cit.*, which applied at the UK-wide level whereby each £100 of GDP would be associated with £40 of extra tax revenues. For Scotland, the Scottish Government indicated that for each £100 of additional GDP generated as a result of a universal subsidised childcare system there would be £32 of extra tax revenues, i.e. gains to tax revenues of £700m following on from an increase in GDP of £2.2bn, see Chapter 3.

[73] The four additional taxes which could possibly be devolved were Corporation Tax, Stamp Duty, Air Passenger Duty and Landfill Tax. These were identified given proposals and developments relating to these taxes in the other UK devolved administrations, i.e. Scotland Wales. See PwC 2013, *Fiscal Powers*, Report to NICVA, Belfast.

Significantly, in the case of all three models, the implied impact on currently devolved tax revenues in Northern Ireland is marginal; in the range of £11m to £20m.

Adding in the four taxes which are most likely to be devolved to Northern Ireland makes little difference, the implied tax revenues were in the range £19m to £36m. Even with Income Tax included, the total receipts remained small; in the range of £44m to £83m.

We have already noted that there could also be some offset to government spending on supporting childcare through any reduction in levels of welfare spending but such an adjustment is allowed for in the figures in Table 20. An additional consideration is that welfare spending by the Northern Ireland devolved government is treated as Annually Managed Expenditure, i.e. at least hitherto has not been part of the defined block of funding for spending which allocated from HM Treasury. Welfare spending has hitherto been entirely demand-led. This implies that if demand for welfare benefits fell in Northern Ireland the funding allocation to Northern Ireland would simply be reduced. The Northern Ireland Executive would be no better or worse off than before, although there would be gain to the UK government.

The conclusion that there is likely to be a sizeable fiscal deficit is robust given that our use of the *average* existing relationship between tax revenues and GVA may well exaggerate how much tax would be generated by an addition to employment and GVA which could well be skewed towards relative low wage and part-time female workers. As a result that the consequent increase in Income Tax receipts could be limited.

It is worth comparing our finding that there would probably be a considerable fiscal deficit with the results of similar analysis elsewhere:

- *Analysis of the potential fiscal impact of proposed universal free care for 1 to 4 year olds in Scotland:* In making this proposal, the Scottish Government implied that the consequent increase in tax revenues would more or less match the increase in public spending, see Chapter 3. SPICE 2014, *op.cit.*, questioned how likely this was. The nature of the assumptions which the Scottish government have made regarding the responsiveness of maternal employment remain unclear.

- *Analysis of the fiscal impact of subsidised childcare in Quebec/Canada during 1996-2008*: Fortin, Godbout and St.-Cerny (2012)[74] emphasised that the total fiscal impact, taking the Quebec Provincial government and Canadian federal government, together would be more than positive, i.e. revenues raised plus reductions in other welfare benefits would exceed the amount of public spending. This is a very strong finding but it is important to emphasise three major differences compared to Northern Ireland:

    - *The extent of fiscal decentralisation is much stronger in Canada*, the Quebec Provincial government will reap a much higher proportion of the fiscal benefits from an expansion in employment than the Northern Ireland Executive would.

    - Fortin, Godbout and St.-Cerny argued that in the Quebec case it was *realistic to assume that productivity of those encouraged into employment through subsidised childcare would be similar to that of those already in employment*. Thus, in the case of Quebec it was assumed a 1.78% increase in employment consequent on the impact of subsidised childcare would be associated with a 1.7% increase in GDP. In the case of Northern Ireland, given that the existing mothers who are in employment are about 50% part-time and 50% full-time, we argued that it was most realistic to assume a similar proportion would apply to the additional employment.

    - Fortin, Godbout and St.-Cerny also argued that *unit elasticity would apply in Quebec between additions to GDP and additions to tax revenues*, i.e. if GDP grows by 1% tax receipts would similarly grow by 1%. We think the elasticity in Northern Ireland is likely to be much lower, perhaps about 0.5, as the data in Table 19 indicate[75].

[74] Fortin, Godbout and St.-Cerny 2012, *op.cit.*

[75] Admittedly, in Table 20 we have made the simplifying assumption that the *average* relationship between GDP and tax receipts in Northern Ireland would also apply to the *marginal* relationship. Nevertheless, we think it is an *overestimate* to assume each £1 of additional GDP would generate £1 of extra tax revenues.

- *Analysis of the potential fiscal impact of subsidised childcare in the UK:* PwC (2003)[76] indicated fiscal deficits both in the short term and also when discounted, though not on the proportional scale indicated here.

Conclusions

There are the following conclusions from this Chapter:

- The principal benefit that could be quantified was the positive impact on the maternal employment rate. A further quantifiable benefit was the boost to lifetime earnings of mothers. The main quantifiable cost was the increase in public spending.

- For all three models in the steady state in year 10 and thereafter quantifiable costs exceeded quantifiable benefits by a margin of about £10m to £112m.

- Discounting over a 60 year time period is associated with a very sizeable deficit in terms of the scale of quantifiable costs relative to the benefits. In other words, the NPVs are substantial and negative.

- For each of the three models a sizeable fiscal deficit was implied indicating that any increase in public spending would be substantially greater than any increase in tax receipts which might be generated. A substantial deficit in the range about £260m to £285m was indicated. Such a deficit would be even greater, in the range of about £389m to £526m, if attention was limited to the gap between devolved spending and taxation, i.e. the overwhelming share of any increased tax revenues related to tax streams which are not devolved.

There are five main qualifications or caveats to these results:

- First, in addition to the quantifiable costs and benefits there are also some benefits and costs which could not be quantified. Some of these could be important from a public policy point of view. From the benefit point of view, these benefits included any reductions in child or adult poverty or income inequality which might be a consequence of a system of subsidised childcare. At the same time, it might be necessary to also make allowances for the non-quantifiable social costs such as any reduction in parental choice and any increase in personal taxation.

- Second, there may be concerns about the quality of some of the underlying data for Northern Ireland, especially regarding the maternal employment rate. The use of a sample-based data set, the Labour Force Survey, implied that some figures fluctuated substantially on a year to year basis.

- Third, in practice the demand for labour may not expand at the same rate as any increase in supply which is a consequence of greater childcare affordability.

- Fourth, the scale of impact of subsidisation of childcare may depend partly on the method used to deliver the subsidies, for example, direct payment or a cap on charges or tax reliefs.

- Fifth, the sensitivity of the results to some of the assumptions made. Our general approach in making assumptions was that these should be such as to be more likely to *overestimate* rather than underestimate *benefits* compared to costs. The most important of such assumptions in terms of the scale of possible impact were probably:

    - Use of data for Scotland or Quebec to imply the cost of a childcare place in Northern Ireland, not much higher cost figures from Denmark.

    - That the productivity, i.e. GVA per job, of the additional employment promoted through subsidised childcare would be the same as the productivity of those mothers already in employment and that the

[76] PwC 2003, *op.cit.*

extent of part-time work amongst the additional mothers brought into employment would be the same as the existing rate of part-time work amongst mothers in employment.

- That switches in use from informal to formal and subsidised childcare would be minimal.

At the same time certain assumptions were made which would tend to *overestimate* costs relative to benefits. The most important of these were:

- Application of subsidised Denmark or Netherlands model of childcare would lead to half the gap between maternal employment rates in Northern Ireland relative to Denmark or the Netherlands being removed but not a larger proportion of that gap.

- There would be no increase in the number of hours of those mothers already in employment.

On balance, however, the total impact of all the assumptions made probably tended towards *overestimating benefits* relative to costs. This was confirmed by our sensitivity analysis.

6. Conclusions

The following key messages emerged from this study:

Existing childcare provision in Northern Ireland

- Overall responsibility for childcare policy rests with the OFMDFM but specific responsibilities are spread across many Departments and public agencies.
- The *Programme for Government, 2011-15* committed the Executive to develop a childcare strategy. That strategy is to be published during the 2014-15 financial year.
- Survey evidence indicated a perception that childcare in Northern Ireland was expensive. Part-time childcare was indicated as particularly expensive. There may also be issues around the accessibility of childcare, e.g. under-supply in certain locations or at certain times such as during school holidays.
- In Northern Ireland government has already intervened to support more affordable childcare provision. This has partly been in terms of grant support to social economy providers with the intention to provide places which will have a relatively low charge.
- Northern Ireland shares in many of the fiscal and welfare interventions in childcare provision which occur in the rest of the UK. For example, childcare support through WTCs, tax-advantaged Employer Childcare Vouchers, the Budget 2014 proposals for Tax Free Childcare and support proposed under Universal Credit for lone parents and others.

Northern Ireland placed in the context of international comparisons

- Across the OECD, employment rates for all women tended to be higher than those for women with dependent children, although this was not true in every case.
- Iceland, Slovenia, Denmark, Sweden, Netherlands and Finland, in that order, had the highest maternal employment rates in 2011, but the UK was ranked twenty-third amongst the 38 countries in the OECD database.
- In general, within the OECD, countries with high maternal employment rates tended to have low rates of child poverty.
- The amount of public spending on pre-school education and childcare varied across the OECD ranging from more than 1% of GDP in the Nordic countries down to rates of spending of 0.2% of GDP in Switzerland and Canada. In the UK the spend was about 1% of GDP and therefore above the OECD average.
- When the pattern of total public spending to support families is considered across the OECD there were some notable contrasts. Some countries such as the UK concentrated such spending on benefits whereas the Nordics relied much more on spending on services.
- Childcare charges, full-time for two 2 year olds net of all forms of government support, for a couple with total household earnings 167% of the average wage[77] were indicated to be a high percentage of disposable income in countries such as Switzerland, at 51%, the UK, at 27%, and the Republic of Ireland, at 26%, compared to an average across the OECD of 12%.

[77] i.e. two earners, one at 100% of the average wage and the other at 67%.

- Participation rates in childcare, that is the percentage of all children using the care, were highest in the Nordic countries.

- When Northern Ireland was compared to the OECD countries the main findings were:

  - Northern Ireland's maternal employment rate in 2011 was 69.6%, compared to an OECD average of 66.2% and a UK average of 64.3%. When data for 2009 were used, the three rates were broadly the same, i.e. Northern Ireland, 67.2%, UK, 67.1% and OECD average 66.2%.

  - Whilst inter-regional and international comparisons of poverty rates are difficult to make because of variations in the definitions used, Northern Ireland's rate of child poverty is indicated to be at least as high as the UK average. According to some definitions of poverty, notably persistent poverty, the rate in Northern Ireland may be higher than the UK average. By implication, the Northern Ireland rate is probably at or below the OECD average.

  - Childcare charges to households in Northern Ireland are indicated to be lower in absolute terms than in other parts of the UK but at the same time represent a higher percentage of the average wage level.

International research on the impact of childcare

- Cross-sectional international studies suggest good quality childcare is usually associated with a relatively low child:staff ratio, relatively high qualifications amongst the childcarers and application of a curriculum to guide the educational content of childcare activities.

- A number of longitudinal studies, some of which included control groups, indicate that childcare provision, especially when targeted towards groups which might otherwise be characterised by various social problems has the potential to produce favourable social outcomes especially over the long term.

- Other detailed studies, however, point to the possibility that use of childcare may be associated with negative outcomes in terms of child behaviour and development.

- It was possible to consider data on childcare provision and outcomes across the OECD in general and in particular for 15 of the 34 members of the OECD.

Results cost of -benefit analysis

- In summary, the results of the cost-benefit analysis were unfavourable. Costs exceeded benefits albeit by a small margin. For each of the three models of childcare considered, the Quebec, Denmark and Netherlands models, the quantifiable costs were indicated to exceed the quantifiable benefits in a steady state or snapshot comparison. The gap was in the range of about £10m to £112m. By steady state or snapshot we mean the level of annual benefits and costs once the policies have been fully implemented and their full effects have been felt.

- Our working hypothesis had been that increased childcare subsidies through increasing affordability would also increase maternal employment and hence generate quantifiable benefits in excess of quantifiable costs. The results of the cost-benefit analysis did not support that hypothesis.

- Over the very long run, using discounting, there is a very sizeable deficit in terms of the scale of quantifiable benefits relative to the costs. The NPVs are substantial and negative. None of this is surprising and follows from the fact that in the steady state quantifiable costs exceed quantifiable benefits, so discounting over 60 years produces a substantial negative number.

- For each of the three models a sizeable fiscal deficit was implied. Any increase in public spending would be substantially greater than any increase in the tax receipts which might be generated. The fiscal deficit was in the range of about £256 to £285m. Such a deficit would be even greater, up to £526m, if attention was limited to the gap between devolved spending and taxation, i.e. the overwhelming share of any increase in tax revenues related to tax streams which are not devolved. Admittedly, a small part of such a fiscal deficit

could be offset by transferring the funds the Executive currently commits to subsidising childcare through existing programmes.

Qualifications to these cost-benefit results[78]

- First, in addition to the quantifiable costs and benefits there are also some benefits and costs which could not be quantified. Some of these could be important from a public policy point of view. On the benefit side, these benefits included any reductions in child or adult poverty or income inequality which might be a consequence of a system of subsidised childcare. At the same time, if non-quantifiable aspects are to be considered it might be necessary to also make allowance for the non-quantifiable social costs such as any reduction in parental choice and any increase in personal taxation.

- Second, there may be concerns about the quality of some of the underlying data for Northern Ireland, especially regarding the maternal employment rate. The use of a sample based data set, the Labour Force Survey, implied that some figures fluctuated substantially on the year to year basis.

- Third, in practice the demand for labour may not expand at the same rate as any increase in supply which is a consequence of greater childcare affordability.

- Fourth, the scale of impact of subsidisation of childcare may depend partly on the method used to deliver the subsidies, for example, direct payment or a cap on charges or tax reliefs.

- Fifth, the sensitivity of the results relating to some of the assumptions made. Our general approach in making assumptions was that these should be such as to be more likely to *overestimate* rather than underestimate *benefits* compared to costs.

How variations in some of the assumptions changed the results

- It was possible to test how sensitive the measured net cost was to variation in some of the key assumptions. The sensitivity analysis confirmed that many of the assumptions made have tended to underestimate the extent of net costs.
- At the same time, for both the Quebec and Denmark models if part-time childcare costs are 50% of full-time ones this would bring the results to a break-even point, i.e. benefits at least as high as costs. This assumption that part-time costs would be 50% of full-time may not be plausible[79].
- For the Denmark model the assumption that 60% of the gap in maternal employment rates could be closed would be sufficient to imply a small net benefit. Such an assumption that 60% of the gap in maternal employment rates could be closed may be plausible. PwC 2003, *op.cit.*, implied that 70-75% of the gap in maternal employment rates between the UK and Denmark/Sweden could be closed.

Comparison between our results and earlier studies

- The result of our cost-benefit analysis was that costs exceeded benefits but not by a very large margin. Finely balanced results were produced by a previous UK-wide cost-benefit study, PwC 2003, *op.cit.* That study suggested that benefits could exceed costs but this result was very sensitive to the assumptions used. It was notable that it was implied that 70-75% of the gap in maternal employment rates relative to Denmark/Sweden could be closed, and it was assumed that the rate of full-time working would be 56%[80] and that there would be a positive impact on the lifetime earnings of the children experiencing childcare[81]. Our assessment is that it would not be realistic to apply such assumptions to Northern Ireland.

---

[78] Given these qualifications we would caution against drawing any conclusions about the *differences* in results *between* the three models.

[79] Given that in 2013 part-time childcare charges were 74% the level of full-time.

[80] Given that the baseline full-time share amongst mothers in employment was 56%. In contrast, data for Northern Ireland in 2009 and 2011 indicated a rate close to 50%.

[81] PwC 2003, *op.cit.*, therefore assumed the positive impacts on child development would outweigh any negative effects. Critically, it was assumed that publicly funded childcare would be of sufficiently high quality to ensure this outcome.

- Our results contrast even more strongly with a study on the impact of the system of childcare in Quebec which implied unambiguously benefits exceeded costs[82]. That Quebec study, however, assumed that the productivity of those workers encouraged into employment as a result of more affordable childcare would be almost as high as those already in work. Our assessment is that it would be overly optimistic to apply such an assumption to Northern Ireland. Previous UK and Northern Ireland experience suggests it is more realistic to assume a roughly half and half split between full-timers and part-timers, the latter having a relatively low level of wages and productivity.

- Confirmation that public subsidisation may not yield quantifiable benefits in excess of the costs was indicated by a recent study by the IFS[83]. This used variations in maternal employment during the period over which the free universal provision for 3 year olds in England was being rolled out to indicate the impact of the subsidy. The study suggested a boost to maternal employment from 53% to 56%, equivalent to 12,000 jobs. Given the cost of provision was £800m this was equivalent to a cost per job created of about £67,000. It is extremely unlikely the quantifiable benefits per job would have exceeded that figure.

Policy considerations

- Whilst the narrow *economic case* for further subsidisation remains unfavourable there is also a much wider range of non-quantifiable costs and benefits, e.g. reduced child poverty alongside any reduction in parental choice and increase in levels of taxation, which may be relevant. The following considerations could apply to any consideration as to whether to subsidise childcare more heavily:

    - This cost-benefit analysis indicates deficits with respect to both quantifiable benefits relative to costs and the fiscal balance. The Northern Ireland Executive *could* still determine that the wider social value of subsidised childcare was sufficient to justify the policy. This would present the dilemma as to which other government spending programmes would be cut in order to fund increased childcare subsidies. Admittedly, the Northern Ireland Executive already commits some funds to support childcare. Whilst the total value of such spending is not available, it is unlikely to much exceed £129m annually; that £129m figure is 41.6% of an estimate of total childcare support in Scotland, excluding HMRC activities; see SPICE 2014, *op.cit.* (41.6% being the relationship in 2011 between Northern Ireland's population for ages 1 to 14 compared to Scotland's).
    - An interesting comparison is to the recent proposal to introduce a lower rate of Corporation Tax in Northern Ireland. As in the case of public subsidy of childcare, there could be a considerable, up-front fiscal cost to the Northern Ireland Executive. Our analysis suggests that this could be larger in the case of subsidised childcare; between £260m and £397m annually, *having made allowance for existing spending on childcare which could theoretically be diverted to the new policy*. Crucially, in the case of Corporation Tax, the hope is that a lower rate of tax would promote a sufficient up-turn in investment and output to create new tax revenues to close any fiscal gap. Our analysis points to the pessimistic conclusion that such an outcome is unlikely in the case of subsidised childcare; in the steady state, the fiscal deficit that results is likely to persist.
    - International experience, notably in the Nordic countries, suggests that if the intention is to get more of the social benefits of subsidised childcare this implies a level of spending per childcare place which is considerable. This then begs the question as to how far one part of the Nordic model could be transferred to Northern Ireland. Leaving aside any cultural differences between Northern Ireland and Denmark, Denmark's approach to childcare may well "work" but it does so as part of a "high level equilibrium", i.e. very high levels of public spending alongside relatively high GDP per person and per worker. The major challenge for Northern Ireland would be how it might move from its present position, which is probably a low level equilibrium, to such a high level equilibrium.
    - Some of the international evidence, e.g. from Quebec, suggests that a low spending level and therefore low quality of publicly funded childcare might produce worse outcomes than no publicly funded childcare, to the extent the former is associated with negative outcomes in terms of child development.

[82] Fortin, Godhout and St.-Cerny 2012, *op.cit.*

[83] M. Brewer, S. Cattan, C. Crawford and B. Rabe 22 October 2014, "The impact of free, universal pre-school education on maternal labour supply", *Report*, Institute for Fiscal Studies, London.

This was partly why we did not consider it realistic to use simply the relatively low spend per place figures from Quebec.

- International experience also suggests that once the maternal employment rate rises towards 80%, policies to promote further increases by reducing childcare costs may be liable to diminishing returns.

- Devolution introduces further layers of complication when considering policy options. First, how far would Northern Ireland be willing or able to depart from HMRC policies regarding support for childcare through the tax system. Second, any policy to heavily subsidise childcare will have to be paid for largely by the Northern Ireland Executive whereas most of the fiscal benefits in the form of increased tax revenues will go to the UK government.

Suggestions for further research

In a recent evaluation of current childcare proposals and developments in England and Scotland, IFS came to the following conclusion[84]:

"...despite increasing cross-party support, there is a remarkable lack of clarity over objectives and evidence underlying the current debate...robust evidence on the impact of ECEC on parents' labour supply is surprisingly limited...We have stumbled a long way in the dark in this policy area...It is time to stop stumbling, shine a light on the policy landscape and plot an effective route forward."

Our intention in this study was to provide some more light on the policy landscape in Northern Ireland and part of this has included identification of areas beyond the terms of reference of this study where further research could be especially beneficial:

- A direct modelling, as has been done for Quebec, of the extent to which maternal labour supply in Northern Ireland might respond to more affordable childcare.

- A detailed, and bottom up, analysis of what the public spending costs might be of providing a much larger number of heavily subsidised childcare places in Northern Ireland.

- Research focused on children in Northern Ireland as to what is, and might be, the impact on cognitive and behavioural development of early years' childcare and, in particular, what might be the impacts both positive and negative on reducing educational underachievement, illiteracy and innumeracy.

- Collection of more reliable data, e.g. on the use of informal and formal childcare, the current extent of maternal employment and the characteristics of that employment, e.g. how much of it is full-time, how much part-time?

- Consideration of the impact of the non-cost aspects of accessibility of childcare, e.g. geographical location and flexibility of hours of provision, such as the extent to which there is provision out of hours and at unusual hours[85]. Also, how far is there flexibility in provision if there are changes in demand at short notice?

- Consideration of how far and how quickly the supply-side and particularly the supply of staff for the childcare sector could be responsive to an increase in demand which was a consequence of a highly subsidised system[86].

---

[84] IFS February 2014, *op.cit.*

[85] Brent Council in London has compiled a list of 40 childminders willing to look after children overnight. Sweden and Norway have had 24 hour nurseries for a number of years; *Daily Telegraph* 26 March 2014, "Childminders to be available 24 hours a day".

[86] The requirement for a substantial number of childcare staff was also implied by Quebec's experience. Development of the subsidised system in Quebec was accompanied by a doubling of employment in childcaring during 2001-2010, i.e. from 29,200 to 62,200, an increase of 33,000. To indicate comparative orders of magnitude, Quebec's population is about four and a half times that of Northern Ireland's but Quebec's policy applied largely only to pre-school children so Quebec's subsidised places policy related to about 210,000 places in 2012 and subsidised childcare model in Northern Ireland, assuming a 43.7% take up, would imply about 145,500 children aged 1 to 14 using the childcare.

7. Bibliography

D. Ackerman, S. Barnett, L. Hawkenson, K. Borwn, and A. McGonigle 2009, "Providing pre-school education for all 4-year olds: Lessons from six State journeys", National Institute for Early Education Research, Rutgers University, New Jersey, *Policy Brief,* issue 18. Available at: http://nieer.org/resources/policybriefs/19.pdf

M. Baker, J. Gruber and K. Milligan 2005, "Universal childcare, maternal labor supply and family well-being", National Bureau of Economic Research, Cambridge, Massachusetts, *Working Paper*, no. 11832.

M. Baker, J. Gruber and K. Milligan 2008, "Universal childcare, maternal labor supply and family well-being", *Journal of Political Economy*, vol. 116, no. 4, pp. 709-45.

W. S. Barnett, M. E. Carolan, J. Fitzgerald and J. H. Squires 2012, *The State Pre-school Yearbook,* The National Institute for Early Education Research, Rutgers University, New Jersey. Available at: http://nieer.org/publications/state-pre-school-2012.

Belfast Telegraph July/August 2014, "This month's indicators at a glance", *Business Month*, no. 45, p. 36.

L.J.H. Bettendorf, E.L.W. Jongen and P. Muller 2012, "Childcare subsidies and labour supply: Evidence from a large Dutch reform", Tinbergen Institute, Rotterdam, Netherlands, *Discussion Paper*, TI 2012-093/1.

E. Birnie April 2014, "Is Northern Ireland ready to embrace the Nordics?", *AgendaNI*, Belfast. Available at: http://www.agendani.com/15-northern-ireland-ready-to-embrace-the-nordics/

P. Blackburn, "Future directions for a mature UK childcare market", in E. Lloyd and H. Penn (eds.) 2012, *Childcare Markets: Can They Deliver an Equitable Service?*, Policy Press, Bristol, p. 52.

D. Blau and J. Currie 2006, *Handbook of the Economics of Education*, Elsevier, Amsterdam, pp. 1163-78.

M. Brewer, S. Cattan, C. Crawford and B. Rabe 22 October 2014, "The impact of free, universal pre-school education on maternal labour supply", *Report*, Institute for Fiscal Studies, London.

R. Brind, O. Norden, S. McGinigal, E. Garnett, D. Oseman, I. La Velle and H. Jelicic 2011, *Childcare and Early Years Providers Survey 2010*, Department for Education, London.

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

J. Browne and B. Roantree 2013, *Universal Credit in Northern Ireland: What Will its Impact be, and what are the Challenges?*, Institute for Fiscal Studies, London. Available at: http://www.ofmdfmni.gov.uk/universal-credit-ni-impact-challenges-report.pdf

P. Camiero and J. Heckman 2003, "Human capital policy", National Bureau of Economic Research, Cambridge, Massachusetts, *Working Paper*, no. 9495.

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/

Centre for Economic and Social Inclusion and Joseph Rowntree Foundation October 2012, *Implementing Universal Credit Will the Reforms Improve the Service for Users?*, Centre for Economic and Social Inclusion and Joseph Rowntree Foundation, London.

Centre for Economic and Social Research February 2013, *End Child Poverty: Child Poverty Map of the UK*, Loughborough University, Loughborough.

J. Christa, R. Tremblay and S. Côté 2005, "Quality Counts!"*, Institute for Research on Public Policy Choices*, vol. 12(4). Available at: http://www.irpp.org.

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

CPB 2011a, *CBS Ex post analyse effect kinderopvangtoeslag op arbeidsparticipatie*, Central Plan Bureau, The Hague.

CPB 2011b, *CBS Kinderopvang in Kaart ('Mapping Childcare'),* Central Plan Bureau, The Hague.

CRSP 2013, *End Child Poverty: Child Poverty Map of the UK*, Centre for Research in Social Policy, Loughborough University, Loughborough. Available at: http://www.endchildpoverty.org.uk/why-end-child-poverty/poverty-in-your-area

Daily Telegraph 24 March 2014, "Childminders to be available 24 hours a day".

Danish Ministry of Social Affairs and Integration 2012, *Day-care, after-school and club facilities,* Danish Ministry of Social Affairs and Integration, Copenhagen.

Daycare Trust and Save the Children 2014, *Making Work Pay – The Childcare Trap,* Daycare Trust and Save the Children, Edinburgh. Available at:

http://www.savethechildren.org.uk/sites/default/files/docs/Making_Work_Pay_Scotland_briefing_1.pdf

DEL and DETI December 2013, *Driving Social Change Through Economic Participation: A Strategic Framework to Trackle Economic Inactivity*, Department for Employment and Learning and Department for Enterprise, Trade and Investment, Belfast.

Deloitte 2013, *Taxation and Investment in Denmark 2013,* Deloitte Touche Tohmatsu Limited, London. Available at: http://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-denmarkguide-2013.pdf

R. Dennison 2013, *Managing Expectations: A Survey of New Mums and Dads*, Employers for Childcare Charitable Group, Lisburn.

R. Dennison and N. Smith 2012, *Northern Ireland Childcare Cost Survey 2012*, Employers for Childcare Charitable Group, Lisburn. Available at: http://vouchers.employersforchildcare.org/media/Northern%20Ireland%20Childcare%20Cost%20Survey%202012.pdf

R. Dennison and N. Smith 2013, *Northern Ireland Childcare Cost Survey 2013*, Employers for Childcare Charitable Group, Lisburn. Available at: http://vouchers.employersforchildcare.org/media/full-childcare-cost-survey-report-2013.pdf

Department for Education 2013, *More Great Childcare – Raising Quality and Giving Parents more Choice*. Department for Education, London. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/219660/More_20Great_20Childcare_20v2.pdf

M. De Weerd, M.C. en Paulussen-Hoogeboom 2012, *Ontwikkelingen in de omvang en de gemeentelijke financiering van het Peuterspeelzaalwerk, Eindrapport,* Regioplan Beleidsraad, Amsterdam.

DHSSPS 2013, "Children's Social Care Statistics for Northern Ireland 2012/13", Department of Health, Social Services and Public Safety, Belfast, *Statistical Press Release*. Available at: http://www.dhsspsni.gov.uk/microsoft_word_-_childrens_social_care_statistics_201213_press_release.pdf

G. Doherty, D. Lero, A. LaGrange, H. Goelman and J. Tougas, J. 2001, *You Bet I Care! Caring and Learning Environments Quality in Family Child Care Homes Across Canada*. Centre for Families, Work and Well-Being, University of Guelph, Ontario.

G. Duncan and J. Brooks-Gunn 1998, *Consequences of Growing up Poor*, Russell Sage Foundation, New York.

EIU 2012, *Starting well: Benchmarking Early Education across the World, Lien* Foundation/Economist Intelligence Unit, London. Available at http://www.lienfoundation.org/pdf/publications/sw_report.pdf

J. Ermisch and M. Francesconi 2002, "Intergenerational mobility in Britain: new evidence from the BHPS", Centre for Household Income, Labour and Demographic Economics/ChilD, University of Essex, Colchester, *Working Paper,* no. 06/2002. Available at: http://www.child-centre.it/papers/

G. Esping-Andersen July 2003, "Towards a new welfare equilibrium", *Report to the Progressive Governance Conference*, London.

European Commission 2011, Communication from the Commission: *Early Childhood Education and Care: Providing all our children with the best start for the world of tomorrow*, European Commission, Brussels. Available at: http://ec.europa.eu/education/school-education/doc/childhoodcom_en.pdf

European Commission 2011b, *Eurypedia*, European Commission, Brussels. Available at: https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Main_Page

European Commission 2013, *Report on Childcare Provision in the Member States and Study On the Gender Pension Gap, MEMO/13/490 03/06/2013 Q&A*, European Commission, Brussels.

R. Fairholm 2011, *Economic Impacts of Early Learning and Care,* The Centre for Spatial Economics, Canada. Available at: http://www.oise.utoronto.ca/atkinson/UserFiles/File/EarlyLearningEconomicForum_Fairholm.pdf

P. Fortin, L. Godbout and S. St-Cerny 2011, *Economic Consequences of Quebec's Educational Childcare Policy,* Early Years Economics Forum, Toronto. Available at: http://www.oise.utoronto.ca/atkinson/UserFiles/File/EarlyLearningEconomicForum_Fortin.pdf

P. Fortin, L. Godbout and S. St-Cerny 2012, "Impact Of Quebec's Universal Low Fee Childcare Program on Female Labour Force Participation, Domestic Income, and Government Budgets", University of Sherbrooke, Quebec, *Working Paper*, no. 2012/2.

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.

W. Gormley Jr., D. Phillips and T. Gayer June 2008, "Pre-school Programs Can Boost School Readiness", *Science*, vol. 320, pp.1723-24

C. Haeck, P. Lefebvre and P. Merrigan 2013, *Canadian Evidence on Ten Years of Universal Pre-school Policies: the Good and the Bad,* Centre Interuniversitaire Sur le Risque, les Politiques Economiques et L'Emploi, Quebec. Available at: http://ideas.repec.org/p/lvl/lacicr/1334.html

K. Hamm 2014, *Progress Cuts to the Child Care Subsidy System Force Parents and Providers to Make Difficult Choices,* Center for American Progress, Washington DC. Available at: http://www.americanprogress.org/issues/education/news/2014/01/06/81602/cuts-to-the-child-care-subsidy-system-force-parents-and-providers-to-make-difficult-choices/

S. Harkness 2012, *The Influence of Employment on Depression: A Study of British Single and Partnered Mothers*, University of Bath, Bath.

R. Haveman and B. Wolfe 1995, *Succeeding Generations on the Effects of Investment in Children*, Russell Sage Foundation, New York.

Head Start 2012, *Program Facts Fiscal Year 2012,* Administration for Children and Families, Washington DC. Available at: http://eclkc.ohs.acf.hhs.gov/hslc/mr/factsheets/docs/hs-program-fact-sheet-2012.pdf

J. Heckman 2008, *Return on Investment: Cost vs Benefits*, University of Chicago Economics, Chicago. Available at: http://childandfamilypolicy.duke.edu/pdfs/10yranniversary_Heckmanhandout.pdf

J. Heckman 2014, *Why Early Investment Matters,* University of Chicago Economics, Chicago. Available at: http://www.heckmanequation.org/content/resource/why-early-investment-matters

G. Henry, B. Ponder, D. Rickman, A. Mashburn, L. Henderson and C. Gordon 2004, *An Evaluation of the Implementation of Georgia's Pre-K Program: Report of the Findings from the Georgia Early Childhood Study*, Applied Research Center, Georgia State University, Atlanta, Georgia.

J. Hill, J. Waldfogel, J. Brooks-Gunn and W. Han 2005, "Maternal employment and child development: A fresh look using newer methods", *Developmental Psychology,* vol. 41, pp. 833-50.

A. Hizen and P. Swaim 2010, "Offshoring, labour market institutions and elasticity of labour demand", *European Economic Review*, 54(8), pp. 1016-34.

House of Commons Library 2010, "The economic recovery and the budget deficit", UK Parliament, London, *House of Commons Library Research*.

HMRC 2011, *Working Tax Credit – Help with the Costs of Childcare*, Her Majesty's Revenue and Customs, London. Available at: http://www.hmrc.gov.uk/leaflets/wtc5.pdf

HMRC 2013, *480(2014) Expenses and Benefits: a Tax Guide*, Her Majesty's Revenue and Customs, London. Available at: http://hmrc.gov.uk/guidance/480.pdf

HMRC 2013b, *Help with Childcare Costs – Do you Qualify for Extra Tax Credits?*, Her Majesty's Revenue and Customs. Available at: http://www.hmrc.gov.uk/taxcredits/start/whoqualifies/children/childcare-costs.htm

HM Treasury 2011, *The Green Book Appraisals and Evaluations in Central Government*, Her Majesty's Treasury, London.

HM Treasury 2014, *Budget 2014*, Her Majesty's Treasury, London. Available at: https://www.gov.uk/government/publications/budget-2014-documents

HM Treasury 2014b, *Tax-free Childcare: Consultation on Design and Operation*, Her Majesty's Treasury, London. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/226460/tax-free_childcare_consultation_on_design_and_operation.pdf

IFS February 2014, "State support for early childhood education and care in England", in, *The IFS Green Budget*, Institute for Fiscal Studies, London, pp. 172-197.

IPPR 2011, *Making the Case for Universal Childcare*, Institute for Public Policy Research, London.

IPPR 2012, *Double Dutch The Case Against Deregulation and Demand-led Funding in Childcare*, Institute for Public Policy Research, London.

IPPR 2014, *Childmind the Gap*, Institute for Public Policy Research, London.

IRS February 2011, *Tax Tip 2011-29*, Internal Revenue Service, Washington DC. Available at: http://www.irs.gov/uac/Ten-Facts-about-the-Child-Tax-Credit

ISQ 2004, *Québec Survey on the Quality of Educational Daycare 2003,* Institut de la statistique du Québec /Gouvernement du Québec, Quebec. Available at: http://www.grandirenqualite.gouv.qc.ca/grandir_qualite_an.htm

JRF 2012, *Monitoring Poverty and Social Exclusion in Northern Ireland*, Joseph Rowntree Foundation, York. Available at: http://www.jrf.org.uk/sites/files/irf/poverty-northern-ireland-social-exclusion-2012-summary%20.pdf

M. Kottelberg and S.F. Lehrer October 2010, "Reinvestigating who benefits and who loses from universal childcare in Canada", Queen's University,Ontario 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

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 Economiques et l'Emploi (CIRPÉE), Montreal, *Working Paper*, no. 11-01. Available at: http://www.cirpee.org/fileadmin/documents/Cahiers_2011/CIRPEE11-01.pdf

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

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

S. Mathers et al 2011, "Evaluation of the graduate leader fund final report", Department for Education, London *Research Report,* DFE-RR144.

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/

L. McGinnis, V. Mangiaterra and J.F. Sanchez 2005, *Children and Youth: A Framework for Action,* The International Bank for Reconstruction and Development/The World Bank, Washington DC.

J. Mincer and S. Polachek 1974, "Family investments in human capital: Earnings of women", *Journal of Political Economy*, vol. 82, pp. 76-108.

Ministry of Health, Welfare and Sport, and the Ministry of Education, Culture and Science 2000, *Early Childhood Education and Care Policy in the Netherlands*, Ministry of Health, Welfare and Sport, and the Ministry of Education,The Hague.

P. Moss and J. Bennett 2010, *Working for inclusion: an overview of European Union early years services and their workforce*, Children in Scotland, Edinburgh. Available at: http://www.childreninscotland.org.uk/docs/WFI_Researchoverviewreport_Jan10.pdf

I. Mulheirn and R.Shorthouse 2011, *The Parent Trap: Illustrating the Growing Cost of Childcare,* Social Market Foundation, London.

NACCRRA 2012, *Parents and the High Cost of Child Care*, National Association of Child Care Resource and Referral Agencies (NACCRRA), Washington, DC. Available at: http://www.naccrra.org/sites/default/files/default_site_pages/2012/cost_report_2012_final_081012_0.pdf

I. Naumann, C. McLean, A. Koslowski, K. Tisdall and E. Lloyd 2013, *Early Childhood Education and Care Provision: International Review of Policy, Delivery and Funding,* Scottish Government Social Research, Centre for Research on Families and Relationships, the University of Edinburgh, Edinburgh. Available at: http://www.scotland.gov.uk/Publications/2013/03/4564/0

New Policy Institute 2014, *Monitoring Poverty And Social Exclusion In Northern Ireland*, Joseph Rowntree Foundation, York. Available at: http://www.jrf.org.uk/publications/monitoring-poverty-and-social-exclusion-northern-ireland-2014

NISRA 2011, *Women in Northern Ireland*, Northern Ireland Statistics and Research Agency, Belfast. Available at :http://www.detini.gov.uk/women_in_northern_ireland_september_2011.pdf

NISRA 2012, *Women in Northern Ireland*, Northern Ireland Statistics and Research Agency, Belfast. Available at :http://www.detini.gov.uk/women_in_northern_ireland_september_2012_final version.pdf

NISRA 2013, *Population and Migration Estimates Northern Ireland Statistical Report 2012*, Northern Ireland Statistics and Research Agency's, Belfast. Available at: http://www.nisra.gov.uk/archive/demography/population/midyear/MYE_2012_Report.pdf

NISRA 2013b, *Northern Ireland Annual Survey of Hours and Earnings,* Northern Ireland Statistics and Research Agency, Belfast. Available at: http://www.detini.gov.uk/northern_ireland_ashe_2013_bulletin.pdf

NISRA 2013c, *Women in Northern Ireland*, Northern Ireland Statistics and Research Agency, Belfast. Available at: http://www.detini.gov.uk/women_in_northern_ireland_september_2013.pdf

Northern Ireland Executive March 2012, "Economic Strategy- Rebuilding and rebalancing the economy: An evidence base", *Slide deck on the Northern Ireland Executive website,* Slide 123. Available at http://www.northernireland.gov.uk/nies-evidence-base-slides-march-2012.pdf

Northern Ireland Executive 2013, *Bright Start: The Northern Ireland Executive's Programme for Affordable and Integrated Childcare*, Northern Ireland Executive, Belfast.

Northern Ireland Executive 27 March 2014, "Up to 7,000 affordable school age childcare places supported and 750 jobs to be created- McCann and Bell", Northern Ireland Executive, Belfast, *Press release*. Available at: http://www.northernireland.gov.uk/index/media-centre/news-departments/news-ofmdfm/news-ofmdfm-270314-up-to-7000.htm

OECD 2011, *Doing Better for Families*, Organisation for Economic Co-operation and Development, Paris.

OECD 2012, *Country statistical profile*, Organisation for Economic Co-operation and Development, Paris.

OECD 2013, "Employment rates", in OECD 2013, *Factbook 2013: Economic, Environmental and Social Statistics*, Organisation for Economic Co-operation and Development Publishing, Paris. Available at: http://dx.doi.org/10.1787/factbook-2013-51-en

OECD 2013b, *Social Expenditure Database (SOCX)*, Organisation for Economic Co-operation and Development, Paris. Available at: http://www.oecd.org/social/expenditure.htm#socx_data

OECD 2013c, *Country Statistical Profile: Denmark 2013,* Organisation for Economic Co-operation and Development, Paris.

OECD 2014, *OECD Family Database*, Organisation for Economic Co-operation and Development, Paris. Available at: www.oecd.org/social/family/database

OECD Forum 2006, *Starting Strong II: Early Childhood Education and Care,* Organisation for Economic Co-operation and Development, Paris. Available at: http://www.oecd.org/newsroom/37425999.pdf

OECD Forum 2012, *Starting Strong III: A Quality Toolbox for Early Childhood Education and Care,* Organisation for Economic Co-operation and Development, Paris. Available at: http://www.oecd.org/edu/school/startingstrongiii-aqualitytoolboxforearlychildhoodeducationandcare.htm

Office for National Statistics 2013, *Population Estimates for UK, England and Wales, Scotland and Northern Ireland, Mid-2011 and Mid-2012,* Office for National Statistics, Newport.

C. Pascal, T. Bertram, S. Delaney and C. Nelson 2013, "A comparison of International Childcare System Research Report", Centre for Research in Early Childhood, London, *Research Report*, DFE-RR269. Available at: http://www.crec.co.uk/DFE-RR269.pdf

E.S. Peisner-Feinberg, J.M. Schaaf, D.R. LaForett, L.M. Hildebrandt and J. Sideris 2014, *Effects of Georgia's Pre-K Program on Children's School Readiness Skills: Findings from the 2012–2013 Evaluation Study,* FPG Child Development Institute, The University of North Carolina, Chapel Hill, North Carolina. Available from http://fpg.unc.edu/projects/georgia-pre-kindergarten-evaluation

H. Penn and E. Lloyd 2013, *Childcare costs*, Child Wellbeing Research Centre, London.

J. Plantenga 2002, *Het Kind en de Rekening*. Inaugural Lecture. University of Groningen , Groningen.

Playboard Northern Ireland 2012, *State of the School Age Childcare Sector Report,* Playboard Northern Ireland, Belfast. Available at: http://www.playboard.org/pages/state-of-the-school-age-childcare-sector-report/

F. Porter, *The Carolina Abecedarian Programme*, Graham Child Development Institute, The University of North Carolina, Chapel Hill, North Carolina. Available at http://abc.fpg.unc.edu/

PwC 2003, "Universal childcare provision in the UK – towards a cost-benefit analysis", PricewaterhouseCoopers LLP, London, *Discussion Paper*.

PwC 2003b, *The New Green Book*, PricewaterhouseCoopers LLP, Belfast.

Reform/K. Trewhitt 3 July 2012, "Childcare: Potential insights for the UK from Denmark", *Blog on website of the Reform Think Tank*. Available at: http://www.reform.co.uk/blog_entry/1199/events/events_blog/reform_events_blog/childcare_potential_insights_for_the_uk_from_denmark.

Resolution Foundation January 2014, *The State of Living Standards*, Resolution Foundation, London.

A.J. Reynolds, J.A. Temple, D.L. Robertson and E.A. Mann, 2002, "Age 21 cost-benefit analysis of the Title I Chicago Child-Parent centers", *Educational Evaluation and Policy Analysis,* vol. 24, no. 4, pp. 267–303.

A.J. Reynolds , J.A. Temple, S.R. Ou, D.L. Robertson, J.P. Mersky, J.W. Topitzesan and M.D. Niles August 2007, "Effects of a school-based, early childhood intervention on adult health and well-being: a 19-year follow-up of low-income families", *Archives of Pediatrics and Adolescent Medicine,* vol. 161, no. 8, pp. 730-9.

A. Rolnick and R. Grunewald 2003, "Early childhood development: Economic development with a high public return", Federal Reserve Bank of Minneapolis, Minneapolis, Minnesota, *Research Paper*.

C. Ruhm 2004, "Parental employment and child cognitive development", *Journal of Human Resources,* vol. 39, no. 1, pp. 155-92.

Save the Children October 2009, "A child's portion: An analysis of public expenditure on children in the UK", Save the Children, Belfast, *Save the Children Briefing*. Available at: http://www.savethe children.org.uk/sities/default/files/doc/A_childs_Portion_NI_Briefing.pdf

Save the Children and ARK 2008, "Persistent child poverty in Northern Ireland", Queen's University and University of Ulster, Belfast, *Report by Save the Children and ARK*.

K. Schulman and H. Blank 2013, *Pivot Point State Child Care Assistance Policies,* National Women's Law Center. Available at: http://www.nwlc.org/sites/default/files/pdfs/final_nwlc_2013statechildcareassistancereport.pdf

L.J. Schweinhart, J. Montie, Z. Xiang, W.S. Barnett, C.R. Belfield and M. Nores 2005, "Lifetime effects: The HighScope Perry Preschool through age 40", High Scope Press, Ypsilanti, Michigan, *Monographs of the High Scope Educational Research Foundation*, no. 14.

Scottish Government 2013, *Scotland's Future Your Guide to An Independent Scotland*, Scottish Government, Edinburgh.

Scottish Government 2013b, *Building Security and Creating Opportunity Economic Policy Choices in An Independent Scotland*, Scottish Government, Edinburgh.

SPICE 2 April 2014, "Early learning and childcare", Scottish Parliament Information Centre, Scottish Parliament, Edinburgh, *Briefing*, no. 14/26

SQW, Economic Advisory Group and Cambridge Econometrics June 2013, *Competitiveness Index for Northern Ireland*, Cambridge Econometrics, Cambridge.

Statistics Denmark 2012. Available at: http://www.dst.dk/en

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/

I. Siraj-Blatchford, A. Mayo, E. Melhuish, B. Taggart, P. Sammons and K. Sylva 2011, "Performing against the odds: developmental trajectories of children in the EPPSE 3-16 study", Department for Education, London, *Research Report,* DFE-RR128.

K. Sylva, E. Melhuish, P. Sammons, I. Siraj-Blatchford and B. Taggart 2004, "The Effective Provision of Pre-School Education (EPPE) Project: Findings from the pre-school period", Department for Education and Skills, London, *Research Brief,* RBX15-03.

K. Sylva et al 2008, "Final Report from the Primary Phase: Pre-school, School and Family Influences on Children's Development during Key Stage 2 (Age 7-11)", Department for Education and Skills, London, *Research Report,* DCSF-RR061.

The Courier.co.uk 4 April 2014, "Flaws found in Scottish government's flagship childcare plans"*, Article on the Courier website*. Available at: http://www.thecourier.co.uk/news/politics/flaws-found-in-scottish-government-s-flagship-child-care-plans-1.302081

The Economist 2010, *Pocket World in Figures 2010 Edition*, Economist Publications, London.

The Economist 2 February 2013, "Survey of the Nordics: The next supermodel", Economist Publications, London.

The Economist December 2013, *The World in 2014*, Economist Publications, London.

The Guardian 12 February 2012, "What Britain can learn from Denmark's childcare model", *Article on The Guardian website*. Available at: http://www.the guardian.com/society/2012/feb/18/Britain-learn-denmark-childcare-model

The Guardian January 2013, "Childcare changes: Why the Danish model won't work in the UK", *Blog on Guardian Women's website*. Available at: http://www.theguardian.com/money/the_womens_blog_with_jane_martinson/2013/jan/30/childcare_changes_danish_model_uk

The Scottish Government 2013, *Early Childhood Education and Care Provision: International Review of Policy, Delivery and Funding Final Report*, Scottish Government Social Research, Edinburgh. Available at: http://www.scotland.gov.uk/Publications/2013/03/4564/0

J. Tougas undated, *Child Care in Québec: Where There's a Will, There's a Way*, Child Care Advocacy Association of Canada, Toronto. Available at: http://www.acpsge.ca/PDF/research/QUE_CHILDCARE.pdf

US Census Bureau 2011, *Who's Minding the Kids? Child Care Arrangements*, US Census Bureau, Washington DC.

US Census Bureau 2013, "Detailed Tables: Average Weekly Child Care Expenditures of Families with Employed Mothers that Make Payments, by Age Groups and Selected Characteristics", *US Census Bureau website*. Available at: http://www.census.gov/hhes/childcare/data/sipp/2011/tables.html.

US Chamber of Commerce 2010, *Why Business Should Support Early Childhood Education,* Institute for a Competitive Workforce, Washington DC.

J. Waldfogel and A. Garnham 2008, *Eradicating Child Poverty: The Role of Key Policy Areas*, Joseph Rowntree Foundation, York.

J. Waldfogel, W. Han and J. Brooks-Gunn 2002, "The effects of early maternal employment on child cognitive development", *Demography*, vol. 39, no. 2, pp. 369-92.

C. Welzel 2005, *Modernization, Cultural Change and Democracy: The Human Development Sequence*, Cambridge University Press, Cambridge.

G. Whitham. 2012, *Ending Child Poverty: Ensuring Universal Credit Supports Working Mums*, Save the Children, London. Available at: http://www.savethechildren.org.uk/sites/default/files/docs/Ending-Child-Poverty.pdf

G. Whitham. 2012, *Ending Child Poverty: Ensuring Universal Credit Supports Working Mums*, Save the Children, London. Available at: http://www.savethechildren.org.uk/sites/default/files/docs/Ending-Child-Poverty.pdf