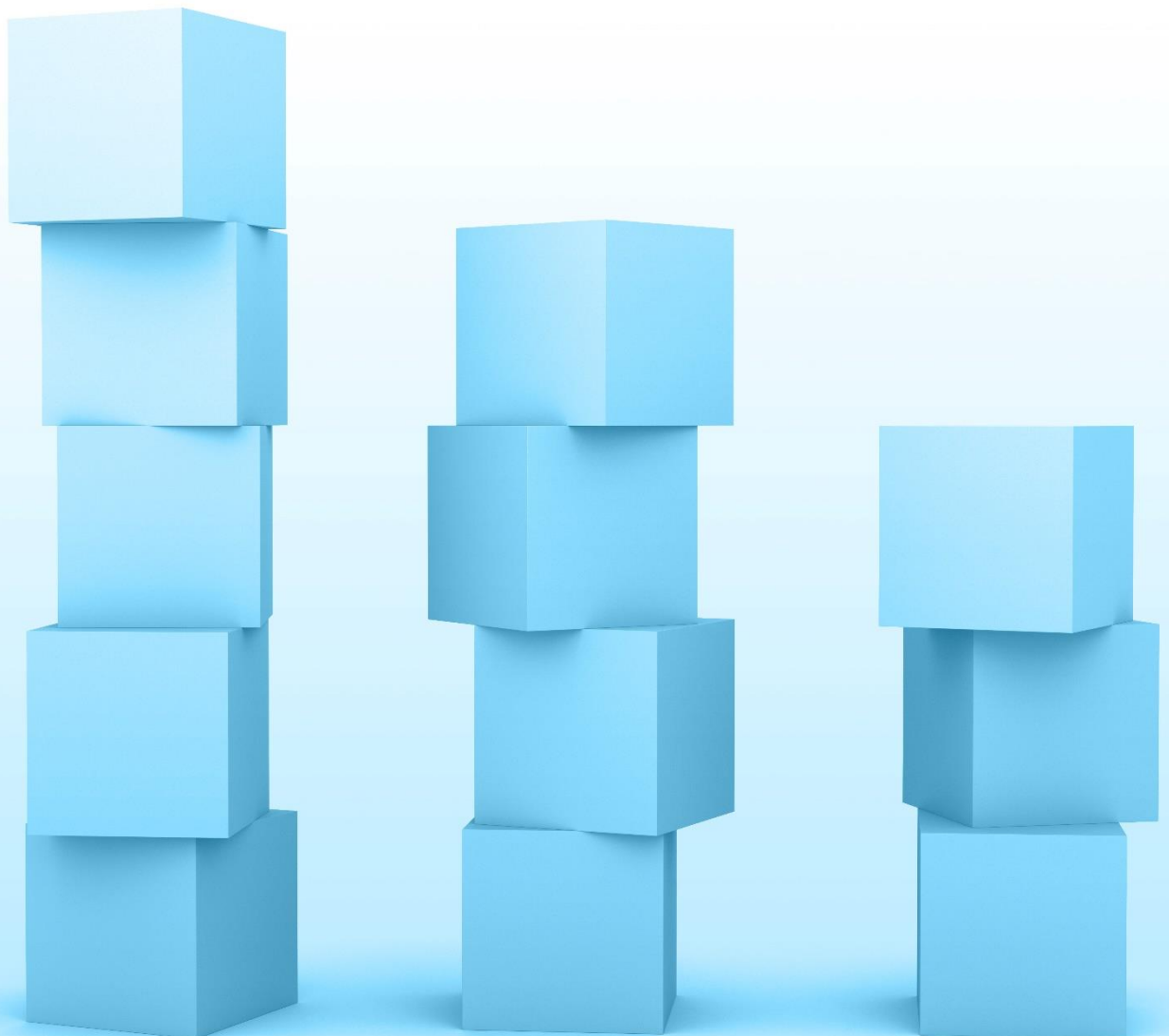# A path to universal early childhood education and care

Inquiry report – *volume 3*

Appendices

The Productivity Commission acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, waters and community. We pay our respects to their Cultures, Country and Elders past and present.

The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

Contents

The Commission's final report is in three parts. The inquiry report – volume 1 – includes an executive summary and the recommendations of the inquiry. It is available on the Commission's website: pc.gov.au/childhood. The supporting papers and appendices – volumes 2 and 3 – provide further detail on each of the main topics covered in the inquiry report.

Early Childhood Education and Care – volume 3

A.   Public consultation

This appendix outlines the consultation process undertaken and lists the organisations and individuals who participated in the Inquiry.

The Commission received the terms of reference for this inquiry on 9 February 2023. A call for submissions was released on 13 March 2023 inviting public submissions and brief comments. The draft report was released on 23 November 2023, and further submissions and brief comments were sought.

In total, 329 submissions were received (table A.1) and 272 brief comments. The submissions and brief comments are available at: View submissions and brief comments – Early Childhood Education and Care – Productivity Commission (pc.gov.au).

During the inquiry, the Commission held consultations (table A.2), roundtables (table A.3) and public hearings online and in-person (table A.4) with early childhood education and care (ECEC) services, educators and early childhood teachers, in addition to families who attend ECEC services, unions, advocacy groups, academics and researchers.

The Commission would like to thank everyone who participated in this inquiry.

Table A.1 – Submissions

Participants	Submission no.
1st Impressions Early Learning Centre	91
Academy of Social Sciences in Australia	116
ACT Government	27
AGJ Businesses Pty Ltd	2
Alannah and Madeline Foundation	53, 192
Albury Preschool	43
Allanson, Dr Susie	180
Ananda-Rajah, Dr Michelle	269
Anonymous	260
Association for Children with a Disability	78
Association of Graduates in Early Childhood Studies (AGECS)	208
Australian Childcare Alliance (ACA)	150, 255
Australia's Leading Home Care Agency	167, 179
Australian Children's Education and Care Quality Authority (ACECQA)	6, 256
Australian Council of State Schools Organisations Ltd (ACSSO)	115, 283
Australian Council of TESOL Associations (ACTA)	74, 199
Australian Early Childhood Teacher Education Network (AECTEN)	106
Australian Education Research Organisation (AERO)	137, 248
Australian Education Union (AEU)	144
Australian Government Department of Education	90
Australian Industry Group (Ai Group)	126
Australian Institute for Teaching and School Leadership (AITSL)	86, 198
Australian Institute of Family Studies (AIFS)	76
Australian Literacy and Numeracy Foundation (ALNF)	211
Australian Multiple Birth Association	165, 182
Australian Research Alliance for Children and Youth (ARACY)	107, 268
Australian Research Council Centre of Excellence for the Digital Child	67
B4 Early Years Coalition Tasmania	55
Bermagui Preschool	49
Berry Cottage Childcare and Preschool	141
BHP	136
Big Fat Smile	120
Binarri-binyja yarrawoo Aboriginal Corporation (BBY)	85
Black, Wayne	258

Participants	Submission no.
Blaxland, Megan and Skattebol, Jennifer	233
Borland, Prof Jeff	94, 235
Bray, Dr Rob J, and Gray, Prof Matthew	14, 279
Breen, Shelley	295
Bryant, Lisa	204
Burman, Gabi	317
Bridge Darebin	3
Brisbane, Darren	218
Brotherhood of St Laurence	96, 289
Business Council of Australia (BCA)	101, 308
Byrne, Brian, Larsen, Sally A., Coventry, William L	7
By Five Wimmera Southern Mallee Early Years Initiative and North Central LLEN	228
Byron Bay Preschool	18
Carlyle, Michelle	9
Carter, Cheyanne	177
Catholic Diocese of Parramatta Services	84
Catholic Education South Australia (CESA)	13
Catholic School Parents Australia	36
Centre for Excellence in Child and Family Welfare	59, 202
Centre for Policy Development (CPD)	156, 282
Centre for Research in Early Childhood Education (CRECE)	21, 244
Centre Support	113
Chief Executive Women (CEW)	142
Child Development Council (SA)	22
Children and Young People with Disability Australia (CYDA)	35, 238
Children's Ground	221
Children First Alliance	140
City of Sydney	65
Clarendon Children's Centre Co-operative Ltd	12
Cleveland, Gordon	278
Clifford, Mary Louise	267
Cobham, Alan	20
Colman Education Foundation	33
Commissioner for Children and Young People (WA)	259
Community Child Care Association (CCC)	111

Participants	Submission no.
Community Connections Solutions Australia (CCSA)	105
Community Early Learning Australia (CELA)	92
Community Hubs Australia	266
Community Industry Group and Early Childhood Education Services and Training (ECTARC)	285
Coorong District Council	236
Connect.Ed Trauma-Informed Education and Care	104
Cornelius, Shirley	75
Corowa Preschool	44
Costin, Cr. Graham	26
Council of Single Mothers and their Children	100
Cultural Au Pair Association of Australia (CAPAA)	31
Curtin University	175
Deniliquin Children's Centre	169
Diversity Council Australia (DCA)	71
Early Childhood Australia (ECA)	154, 302
Early Childhood Care and Development Policy Partnership (ECPP)	329
Early Childhood Organisation South Australia (EChO)	28
Early Childhood Teacher Education Council (ECTEC) NSW/ACT	246
Early Learning and Care Council of Australia (ELACCA)	153, 299, 322
Early Learning Association Australia INC.	48, 237
Early Years Intercultural Association (EYIA)	97
Education Standards Board (ESA)	310
Elder Street Early Childhood Centre	30
eQIPd	216
Faculty of Education, Monash University	80
Family Advocacy	118
Family Day Care Australia (FDCA)	66, 240
Finlay, Dr Summer May and Jackson, Ms Belinda	273
First People's Disability Network	257
Fischer, Glenn	172
fka Children's Services (fksCS)	200
Flinders University	99, 262
Future Women (FW)	270
G8 Education Limited	68, 301
Garland, Dr Carina	263

Participants	Submission no.
Glenelg Shire Council	242
Gallagher, Aisling	164
Goodstart Early Learning	125, 277
Gowrie Australia	79, 294
GrainGrowers Limited	46
Griffin, Dr Des AM FRSN, Krefft Gerard, Fellow	181
Guardian Childcare and Education	254
Harrison, Linda	325
Health and Wellbeing Queensland (HWQld)	193
Hicks, Tamika	61
Howlett, Nicole	178
Howlong Preschool	77
Independent Education Union of Australia (IEU)	243
Independent Schools Australia (ISA)	110, 251
Infinity Community Solution	296
International Child Care College	265
Jackson, Dr Jen	320
Karitane and UNSW	214
Kids First Australia	163
Killen, Dr Elizabeth	32
KPMG	190
KU Children's Services	83, 303
Lady Gowrie Child Centre Inc. (Gowrie SA)	25
Latrobe University	298
Lawson Grains and Rural Regional Remote Women's Network	134
Life Without Barriers	24
Little Scientists Australia	324
Local Government NSW and the NSW Children's Services Managers Group	287
Loddon Campaspe Group of Councils	11
Logan Together	292
Long, Vanessa	8
Lumsden, Anna	316
Manuka Occasional Childcare Centre Association (MOCCA)	42
McGregor, Carolyn	293
Meli	139

Participants	Submission no.
Menindee Children's Centre	203
Merewether, Netty, Taylor-Bush, Adam	60
Meuleners, Aleesha	185
Milgate, Gabby	183
Milton, Dr Alyssa	168
Moriarty Foundation	327
Mullins, Jill	184
Municipal Association of Victoria (MAV)	117, 213
National Aboriginal Community Controlled Health Organisation (NACCHO)	151
National Child and Family Hubs Network	220
National Catholic Education Commission (NCEC)	69, 274
National Foundation for Australian Women (NFAW)	10, 194
National Indigenous Australians Agency (NIAA)	152
National Indigenous Education Consultative Meeting (IECM)	309
National Nutrition Network-Early Childhood Education and Care (NNN-ECEC)	95, 225
National Outside School Hours Services Alliance (NOSHSA)	103, 305
National Rural Women's Coalition (NRWC) and Isolated Children's Parents' Association of Australia (ICPA)	297
Neighbourhood Houses Victoria	124, 230
Network of Communities Activities	171
Northern Rivers Preschool Alliance	195
Northern Territory Government	157, 314
NSW Aboriginal Education Consultative Group Inc	217
Northside Community Service	29
NSW Family Day Care Association (NSWFDCA)	89, 209
NSW Government	158, 312
NSW Small Business Commissioner	128
Ogrizek, Mick	4
O'Hare, Ann	189
One Tree Community Services (OTCS)	121
Outside School Hours Council of Australia (OSHCA)	82, 232
Parenting Research Centre	328
Parents Work Collective	73, 315
Parkville Institute	231
Pathways in Place Research program	130

Participants	Submission no.
Paul Ramsay Foundation	148
Peatfield, Jonathon and Wilson, Caitlin	38
Phillip Island Early Learning Centre	5
Playgroup Australia	160, 223
Preschool Directors Association of South Australia	47
Press, Prof Frances	135
Professionals and Researchers in Early Childhood Intervention (PRECI)	249
Queensland Brain Institute	252
Queensland Council of Deans of Education (QCDE)	206
Queensland Government	174, 319
Queensland University of Technology (QUT), School of Early Childhood and Inclusive Education	52, 205
RARE	45
Regional Australia Institute (RAI)	170, 229
Regional Development Australia, Barwon South West (RDA BSW)	112
Regional Development Australia, Kimberley	1, 226
Regional Development Australia, Loddon Mallee	15
Regional Development Australia, Mid-North Coast (RDAMNC)	245
Reid, Dr Gordon	286
Research in Effective Education in Early Childhood (REEaCh) Centre	54
Restacking the Odds (RSTO)	149, 291
Rogers, Dr Marg	323
Ross Circuit Preschool Inc.	62
Royal Australasian College of Physicians (RACP)	37
Royal Far West	41, 281
Rural Regional and Remote ECEC in Victoria	88
Sandgate Kids Early Education Incorporated	51
Sargood, Annie	166
SDN Children's Services	63
Search Light Inc	304
Settlements Services International	196
Shop, Distributive and Allied Employees Association (SDA)	72
Siraj, Prof Iram	23
Smith, Rosie	207
Smithie, Rose	261
Smith, Senator Marielle	264

Participants	Submission no.
SNAICC (Secretariat of National Aboriginal and Islander Child Care)	133, 290
Social Ventures Australia (SVA)	145, 247
South Australian Council of Social Service (SACOSS)	129
South Australian Government	313
South Australian Royal Commission into Early Childhood Education and Care	161
Special Teaching and Research (STaR) Ltd	87
Speech Pathology Australia	109. 210
Settlements Services International (SSI)	16, 196
Stanley, Fiona	34
Sutherland Shire Preschool Alliance	131
Swainson, Rebecca	114
Swallow Street Child Care Association Inc.	300
Tanimu, Ross	187
Tasmanian Government (Department of Education, Children and Young People)	159
Teachers in Early Education (TEE) Chief Investigators	212
Templeton, Susan	219
Tessier, Jessica	17
The Benevolent Society	98, 280
The Bryan Foundation	123
The Child Development Council South Australia	241
The Child Development, Education and Care Research Group	19
The Creche & Kindergarten Association Limited (C&K)	155, 306
The Front Project	143, 227
The Hive Mount Druitt (United Way Australia)	64, 234
The Hon. Fiona Nash, Regional Education Commissioner	102, 188
The Independent Education Union of Australia (IEUA)	40
The Parenthood	122, 276
The Salvation Army	56, 201
The Smith Family	108, 197
The University of South Australia	39
The Y Australia	127, 253
Thrive By Five – Minderoo	70, 288
Thrive Group Tasmania Inc.	81
Tregeagle, Dr Susan	173
Tyndale Christian School	215

Participants	Submission no.
UNICEF Australia	93
United Workers Union (UWU)	147, 222
Uniting Early Learning	275
Uniting NSW, ACT	239
University of NSW, Social Policy Research Centre	176
Victoria University	384
Victorian Association of TESOL (VicTESOL) & QLD Association of TESOL (QATESOL)	224
Victorian Government (Department of Education)	146, 311
Victorian Peak Aboriginal Body in Education (VAEAI)	271
Vision Australia	119, 191
WA Government	162
WA Not for Profit Consortium	250
Wastell, Selma	186
Waverley Council	132
Western Sydney Primary Health Network (WentWest)	57
Woden Valley Early Learning Centre	50
Women's Legal Services Australia (WLSA)	272
Wonderschool Early Learning Centres	321
Work and Family Policy Roundtable (W+FPR)	138

Table A.2 – Consultations

Participants
ACT Chief Minister, Treasury and Education Development Directorate
ACT Children's Education and Care Assurance
ACT Education Directorate
Albury City Council
Albury Occasional Care
Albury Public School
API Childcare
Australian Bureau of Statistics (ABS)
Australian Childcare Alliance
Australian Children's Education and Care Quality Authority (ACECQA)
Australian Competition and Consumer Commission (ACCC)
Australian Early Childhood Teacher Education Network (AECTEN)
Australian Education Research Organisation (AERO)
Australian Education Union (AEU)
Australian Institute of Family Studies (AIFS)
Australian Institute of Teaching and School Leadership (AITSL)
Australia's Leading Home Care Agency
Australian Local Government Association (ALGA)
Australian Parents Council
Australian Research Alliance for Children and Youth (ARACY)
B4 Early Years Coalition Tasmania
Baptcare
Barang Regional Alliance
Beswick Creche
BetterStart Health and Development Research
Borland, Prof. Jeff
Bray, Dr Rob J
Breunig, Prof. Robert
CAAPS Aboriginal Corporation
Care for Kids
Care West
Cartmel, Associate Prof. Jennifer
Castillo, Prof. Marco
Catholic Education (SA)

Participants

Catholic Education (Tasmania)

Centre For Policy Development (CPD)

Charlton Street Childcare

Child Australia

Child Development Council

Childcare and Kindergarten Association (C&K)

Children and Young People with Disability Australia

Children's Ground

Clarence Children's Services

Cleveland, Associate Prof. Emeritus Gordon

Community Child Care Association (CCC)

Community Early Learning Australia (CELA)

Cornish, Ros

Craig, Prof. Lyn

Creche and Kindergarten Association (C&K)

Dandolo Partners

Darrandirra Child and Family Centre

Department for Education, Children and Young People (DECYP) (Tasmania)

Department of Children, Equality, Disability, Integration and Youth - An Roinn Leanai, Comhionannais, Michumais, Lanphairtiochta agus Oige (Ireland)

Department of Communities (WA)

Department of Education (DoE)

Department of Education (NT)

Department of Education (UK)

Department of Education (WA)

Department of Employment and Workplace Relations

Department of Prime Minister and Cabinet

Department of Social Services

Discovery Early Learning Centres

Doveton Early Learning Centre

Early Childhood Aboriginal and Torres Strait Islander Committee

Early Childhood Australia

Early Childhood Australia (NT)

Early Childhood Australia (SA)

Early Childhood Australia Regional Group

Participants

Early Childhood Management Services

Early Childhood Organisation (EChO)

Early Childhood Care and Development Policy Partnership (ECPP)

Early Learning and Care Council of Australia (ELACCA)

Early Learning Association Australia

Education and Care Regulatory Unit (WA)

Education Standards Board

Educators SA

Edwards, Prof. Ben (ANU)

Employment and Social Development Canada

Fair Work Commission (FWC)

Families Australia

Family Day Care Australia

Family Day Care (WA)

First People's Disability Network

Good Shepherd Lutheran School

Goodstart Early Learning

Gowrie SA

Grattan Institute

Gray, Prof. Matthew

Independent Education Union of Australia (IEUA)

Independent Regulatory and Pricing Tribunal (IPART)

Indigenous Education Consultative Meeting

Institute for Urban Indigenous Health (IUIH)

Isolated Children's Parents Association (ICPA)

Jobs and Skills Australia

Kalano Community Association

Kalb, Prof. Guyonne

Karlstad University

Kentish Lifelong Learning & Care Inc

KU Children's Services

Lady Gowrie Tasmania

Lady Huntingfield

LEAP Centre

Leederville Early Childhood Education Centre

Participants

Little Scientists Australia

Minderoo Foundation

Ministry of Education - Te Tahuhu o te Matauranga (NZ)

Ministry of Education and Research (Sweden)

Ministry of Social Affairs and Employment (Netherlands)

Municipal Association of Victoria (MAV)

Murdoch Children's Research Institute

National Children's Commissioner (Australian Human Rights Commission)

National Outside School Hours Service Services Alliance (NOSHSA)

National School Reforms Agreement Expert Panel

NDIS Review Secretariat

Neylon, Dr. Gerardine

Nido Early School

Northern Territory Department of Treasury and Finance

Northern Territory Department of Education

NSW Early Childhood Aboriginal and Torres Strait Islander Committee

NSW Cabinet Office

NSW Department of Education

NSW Productivity Commission

NSW Treasury

Office for Women, Department of the Prime Minister and Cabinet

One Tree Community Services

Out of School Hours Council of Australia (OSHCA)

Parkville Institute

Petrie, Prof. Ragan

Playgroup Australia

Plumtree Children's Services

Prom Coast Centres for Children

Preschool Directors Association of South Australia

Queensland Children's Activity Network (QCAN)

Queensland Department of Education

Questacon

Reform Management Office (NT)

Regional Education Commissioner

Remote and Isolated Children's Exercise (RICE)

Participants

Roper Gulf Shire Council

SA Department for Education - Office for the Early Years

SA Department of Treasury and Finance

SA Office of Early Childhood Development

SA Royal Commission into Early Childhood Education and Care

Seaton Community Children's Centre and Clarendon Children's Centre

Secretariat of National Aboriginal and Islander Child Care (SNAICC)

Services Australia

St Virgil's College

Stanley, Prof. Fiona

Tagari Lia Aboriginal Child and Family Learning Centre

Tasmanian Department for Education, Children and Young People

Tasmanian Department of Treasury and Finance

Tasmanian Education and Care Unit's Stakeholder Reference Group

Telethon Kids

The Front Project

The Nous Group

The Parenthood

The Parkville Institute

The Smith Family

The Y Australia

The Y NSW

Thorpe, Prof. Karen

Treasury

Tseng, Associate Prof. Yi-Peng

US Department of Health and Human Services

United Workers Union (UWU)

University of Canberra (NATSEM)

Victorian Aboriginal Education Association Inc

Victorian Department of Education

Whitehouse, Andrew (Telethon Kids)

WA Commissioner for Children and Young People

WA Treasury

Wodonga Council

Zubrick, Honorary Emeritus Research Fellow Steve

Table A.3 – Roundtables

Participants

15 August 2023 – Children's Outcomes Roundtable	
Dr Anne Kennedy	Co-Director of Research and Practice, Parkville Institute
Assoc. Prof. Catherine Neilsen-Hewett	Academic Director of The Early Years, School of Education, University of Wollongong
Dr Dan Cloney	Senior Research Fellow, Australian Council for Educational Research
Prof. Karen Thorpe	Queensland Brain Institute, University of Queensland
Prof. Linda Harrison	Macquarie School of Education
Myra Geddes	General Manager – Social Impact, Goodstart Early Learning
Prof. Sally Brinkman	UniSA, Education Futures
Prof. Sharon Goldfeld	Director, Centre for Community Child Health and Theme Director, Population Health at the Murdoch Children's Research Institute

3 October 2023 – Modelling Workshop
Australian Bureau of Statistics (ABS)
Australian Competition and Consumer Commission (ACCC)
Assoc. Prof. Ben Phillips (Centre for Social Research and Methods (ANU))
Emeritus Prof. Siobhan Austen (Curtin Business School)
Australian Government Department of Education
Department of Employment and Workplace Relations (DEWR)
Dr Angela Jackson (Impact Economics and Policy)
NSW Productivity Commission
Owain Emslie
Tim Murray (Precision Economics)
Prof. Robert Breunig (Tax and Transfer Policy Institute (ANU))
Treasury
Prof. Patricia Apps (University of Sydney)

Participants

April 2024 Joint Roundtable with Academy of Social Sciences

Dr Megan Blaxland

Prof. Jeff Borland (FASSA)

Dr Rob Bray

Mr John Burton

Prof. Mark Considine (AM FASSA)

Prof. Kim Cornish (AM FASSA)

Prof. Susan Danby (FASSA)

Dr Bob Davidson

Ms Jane Delaney

Prof. Cheryl Dissanayake (AM FASSA)

Prof. Jenny Downs

Prof. Susan Edwards

Emeritus Prof. Marilyn Fleer (FASSA)

Prof. Richard Holden (FASSA)

Prof. Guyonne Kalb (FASSA)

Prof. Ilan Katz

Prof. Gabrielle Meagher

Dr Allysa Milton

Dr Tim Moore

Mr Rob Ryan

Dr Monique Seymour

Prof. Peter Shergold (AC)

Prof. Helen Skouteris (FASSA)

Dr Catherine Smith

Prof. Sandie Wong

Table A.4 – Public hearings

Participants
In-person 19 February 2024
G8 Education
Thriving Queensland Kids Partnership
Queensland Brain Institute at the University of Queensland
Junior Adventures Group
The Creche and Kindergarten Association (C&K)
National Outside School Hours Services Alliance
Family Day Care Queensland (FDCQ)
Online 21 February 2024
Sanctuary Early Childhood Centre
Australian Education Research Organisation (AERO)
Brian Byrne
Women's Economic Equality Taskforce (WEET)
KU Children's Services
WentWest
Isolated Children's Parents' Association (ICPA)
Diversity Council Australia
Online 22 February 2024
GrainGrowers
Social Ventures Australia
Early Childhood Australia (SA)
Child Development Council (SA)
NSW Family Day Care Association
Lisa Bryant
Child Australia
In-person 26 February 2024
Royal Far West
Municipal Association of Victoria
The Parenthood
AGJ Businesses Pty Ltd
Australian Human Rights Commission (National Children's Commissioner)
Early Childhood Education Services and Training (ECTARC)

Participants

In-person 27 February 2024

PlayGroup Australia

The Benevolent Society

Goodstart Early Learning

Cheyenne Carter

Community Early Learning Australia (CELA)

Early Years Intercultural Association

Family Day Care Australia (FDCA)

Eva Cox

Online 4 March 2024

Outside School Hours Council of Australia

Brotherhood of St Laurence

Australian Childcare Alliance

TheirCare

Parents Work Collective

Monash University Early Childhood Academics

Centre for Community Child Health

Council of Single Mothers and their Children

In-person 5 March 2024

The Front Project

Victorian Association of Teachers of English to Speakers of Other Languages (VicTESOL)

Early Learning Association of Australia (ELAA)

Secretariat of National Aboriginal and Islander Child Care (SNAICC)

Community Child Care Association (CCCA)

Parkville Institute

Children and Young People with Disability (CYDA)

Australian Institute for Teaching and School Leadership Limited (AITSL)

Participants

Online 7 March 2024

Interim Disability Commissioner, Department of Premier and Cabinet (TAS)

Australian Council of State School Organisations

Centre for Policy Development

Australian Education Union (AEU)

Frances Press

Gordon Cleveland

Camp Australia

In-person 13 March 2024

South Australia Royal Commission into Early Childhood Education and Care

Minderoo

RDA Kimberley

Dr Ros Sambell

Online 19 March 2024

Plumtree Children's Services

Early Learning and Care Council of Australia

Several Wimmera Southern Mallee, Mallee, Loddon Campaspe and surrounding regions participants

National Farmers' Federation

Network of Community Activities

In-person 20 March 2024

Australian Research Alliance for Children and Youth

National Foundation for Australian Women

Early Childhood Australia

Australian Multiple Birth Association

Dr J Rob Bray and Prof. Matthew Gray

Participants from the Wimmera Southern Mallee, Mallee, Loddon Campaspe and surrounding regions

Independent Schools Australia

Speech Pathology Australia

Chief Executive Women

B. International models

The provision of early childhood education and care (ECEC) varies widely internationally – some countries frame ECEC as a legal right for all children and support the sector with high levels of public funding, and others place a higher value on parental and informal care, with less support for formal services. One common trend, however, is that many countries are undertaking reforms to their ECEC sector as additional research comes to light, and as views change on the function of ECEC and the role of government in supporting the sector.

The primary aim of the appendix is to describe some of the key characteristics of ECEC systems in different countries and illustrate the variety of approaches taken. While the data used in the appendix is useful for broad comparisons, selected indicators should not be relied upon alone to make judgments about the relative performance of ECEC systems of different countries.

Moreover, the ways in which governments design and manage their ECEC systems are a product of their social contexts and policy settings, such as those around taxation or industrial relations. These factors can have significant impacts on how governments approach ECEC but are beyond the scope of this appendix.

Finally, this appendix focuses primarily on the structural elements of ECEC. While it briefly looks at how governments influence quality through ratios and qualification requirements, it does not seek to compare the quality outcomes of different systems, or the extent to which countries improve child development outcomes through ECEC.

The paper first examines ECEC systems in OECD countries across some key indicators, then examines how several other small, advanced economies approach ECEC in more detail.

## B.1   An overview of international ECEC use and delivery

ECEC participation

Families' decisions and preferences about the type of ECEC they use are often rooted in complex social norms and cultural values which can lead to significant variation in ECEC participation.

Rates of ECEC participation for younger children (0-2 years old) in OECD countries vary from almost zero in **Türkiye** to almost 70% in the **Netherlands,** with Australia also featuring relatively high use (figure B.1). Participation then increases markedly as children approach school age, with participation rates for children in the year before full-time schooling ranging from about 80% in **Türkiye** to almost 100% in many other countries, including the **United Kingdom**, **Mexico, Portugal**, and **Switzerland** (figure B.2). Australia ranks behind these countries, with the OECD reporting that 82% of children in the year before full-time schooling participate in ECEC. It is important to note, however, that this is a lower figure than is used elsewhere in this report – domestic sources estimate that the share of four-year-olds enrolled in ECEC is about 90% (paper 2). This difference is likely due to methodological decisions made by the OECD for more effective cross-country comparison.

Many countries are working to increase their ECEC participation rates. In 2022, European Union member states adopted the Barcelona Targets for 2030, which feature a set of goals around ECEC access and participation (Council of the European Union 2022, pp. 21–23). The Targets designate that at least 45% of children below the age of three and at least 96% of children between the age of three and the country's school starting age should participate in ECEC, and that at least 25 hours per week should be available to each child. Many countries also provide entitlements to ECEC at certain ages, meaning that governments guarantee that a place will be available for any family that requests one. For example, a study of ECEC in European countries found that seven countries – including **Germany**, **Latvia** and **Denmark** – offer guaranteed places for children at very young ages (starting at six months old), and almost half guarantee a place for children from the age of three (European Commission 2019, pp. 10–11). Compulsory ECEC in the year before full-time schooling is also becoming more common, with at least one year of ECEC now compulsory in over a third of European countries, and some countries (such as **Greece** and **Hungary**) mandating that children attend multiple years of ECEC.

Figure B.1 – **ECEC enrolment in Australia is relatively high among children aged 0–2[a,b] ...**

Enrolment rate of children under three years of age in early childhood education and care services, 2020
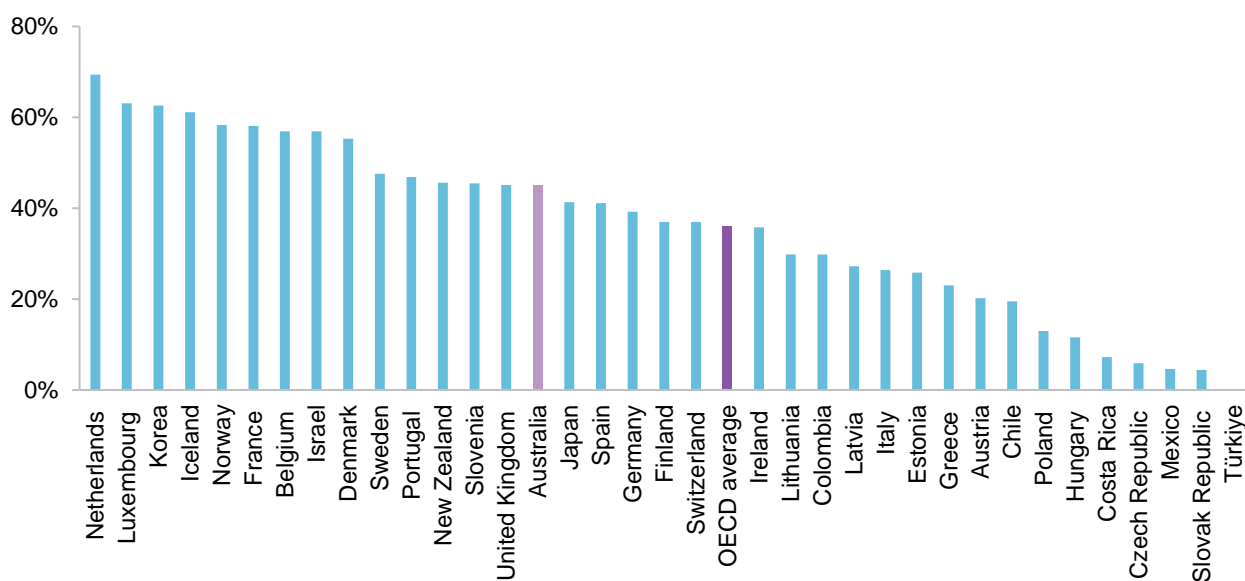
a. Data generally includes services within the scope of International Standard Classification of Education (ISCED) 2011 level 0 (formal ECEC services) and other registered ECEC services outside the scope of ISCED 0. Potential mismatches between enrolment data and population data (for example, due to different reference years or geographic coverage) may affect estimated enrolment rates. **b.** Data for Costa Rica, Iceland and United Kingdom is from 2018. Data for Japan is from 2019.

Source: OECD (2023e).

Figure B.2 – ... but preschool participation in Australia is lower than the OECD average[a]

Participation rate in organised learning one year before primary school entry, 2020
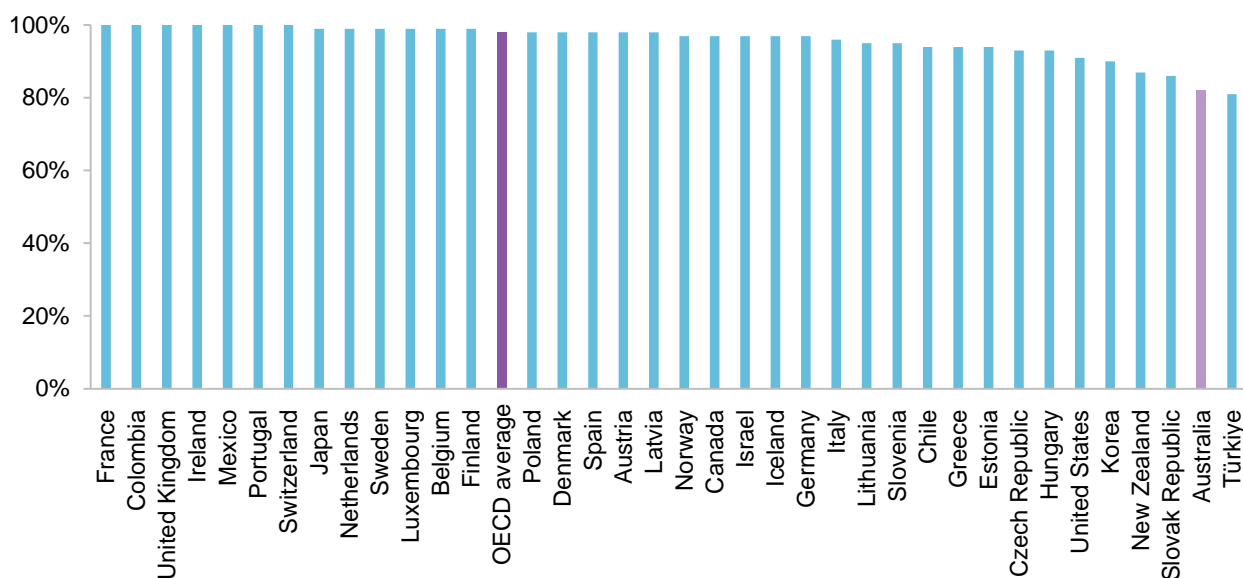
a. The official primary school entry age differs between countries.

Source: OECD (2022).

Paid parental leave

Publicly funded paid parental leave entitlements vary widely between countries (table B.1). The length of, and level of, income provided by paid parental leave schemes affect parents' decisions about when to return to work after the birth of a child, and whether they use ECEC services in a child's early years.

Figure B.3 provides an overview of the length of different countries' publicly funded paid parental leave schemes. However, in many countries, it is common for these allowances to be supplemented by additional leave funded privately by employers, and as such, the entitlements set out in the figure generally represent the minimum available to new parents.

Some countries also continue to provide payments to parents after they have used their paid parental leave entitlements if they decide to care for their children at home rather than enrolling them in an ECEC service. For example, in **Norway** and **Finland**, parents receive 'cash-for-care' benefits for young children if they do not attend an ECEC service or if they attend only part time. This provides families with financial support whether they choose informal or formal care for their child (Kela 2023; Norwegian Labour and Welfare Administration 2023). However, such models have been criticised as contradicting other policies aimed at promoting gender equality and female employment. Some countries have sought to unwind similar policies – for example, **Sweden** abolished their cash-for-care benefit in 2016 (which, at the time, was used by only about 5% of eligible families) (Ellingsæter 2012, p. 3; Giuliani and Duvander 2016, pp. 2–7).

Figure B.3 – Publicly funded paid leave for mothers is lower in Australia than in many other OECD countries[a,b,c]

Total paid leave available to mothers, 2023
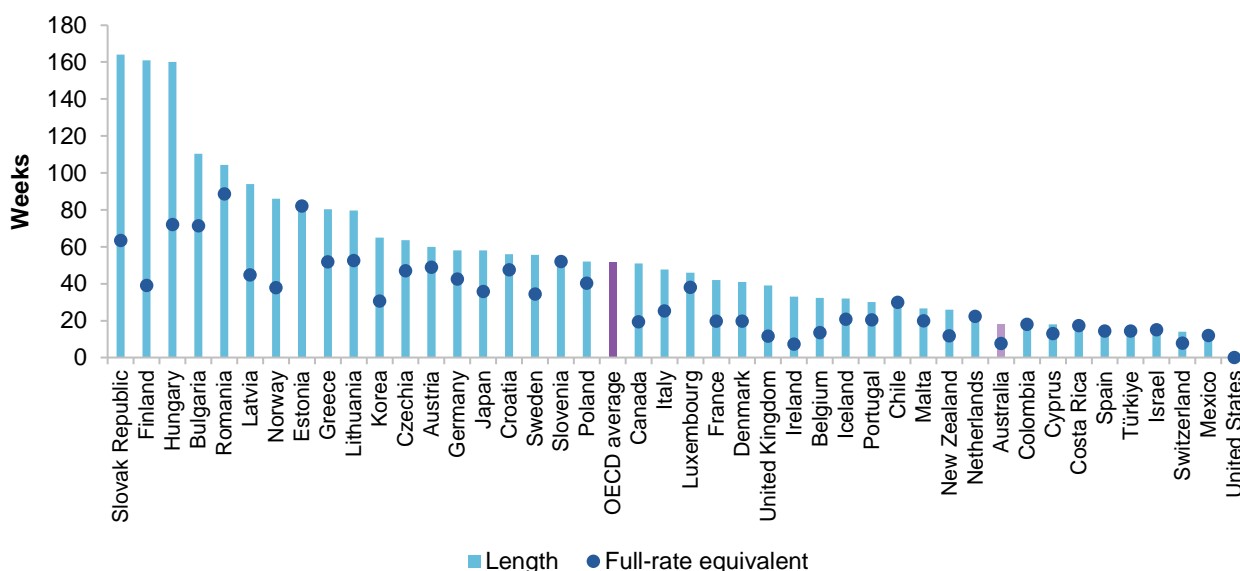
a. Paid leave includes maternity leave, parental leave and home care leave. Home care leave is offered in some countries as an additional period of leave following parental leave that allows parents to stay at home to care for children until about the age of two or three. **b.** Data only reflects entitlements at the national level. **c.** The full rate equivalent is the entitlement length multiplied by the average payment rate of the entitlement. The average payment rate refers to the proportion of previous earnings replaced by the leave benefit for a person earning 100% of average national full-time earnings.

Source: OECD (2023c).

Some countries also offer additional forms of parental leave that extend further into a child's life – in some countries parental leave can be used until a child turns 12 (table B.1).

Table B.1 – Paid parental leave entitlements vary between countries

Characteristics of parental leave entitlements in selected countries

	Maternity leave	Paid component	Leave for partners	Parental leave[a]
Canada	Parents can choose between **(a)** 35 weeks of leave over a 12 month period **or** **(b)** 61 weeks over an 18 month period	Payment depends on length of leave. Parents who use option **(a)** are paid 55% of their weekly earnings (up to C$638 (A$710) per week) and parents who use option **(b)** are paid 33% of their average weekly earnings (up to C$383 (A$425) per week)	If parents choose to share leave, they can access an additional 5 weeks under option **(a)** or 8 weeks under option **(b)**	
Ireland	42 weeks	26 weeks are paid at 262 euro (A$435) per week	2 additional weeks, paid at the same rate	Parents receive both: 7 additional weeks of parent's leave paid at 262 euro (A$435) per week (which must be used before a child

	Maternity leave	Paid component	Leave for partners	Parental leave[a]
				turns two); and 26 weeks of unpaid parental leave which can be used until a child turns twelve
Netherlands	6 weeks pregnancy leave (before childbirth) and 10 weeks maternity leave (after childbirth)	All weeks paid at 100% of usual income, up to a maximum of 256 euro (A$430) per day	6 additional weeks – one paid at full pay, and the other five paid at up to 70% of their usual salary	26 additional weeks which can be used until a child turns eight years old, of which 9 weeks are paid at 70% of the parent's salary and must be used in the child's first year
New Zealand	52 weeks	26 weeks are paid at the individual's average weekly wage, up to a maximum of NZ$712 (A$660) per week	The 52 weeks can be shared between both parents, and partners are also entitled to an additional 2 weeks of unpaid leave	
Sweden	68 weeks	55 weeks are paid at 80% of usual income and the remaining 13 weeks are paid at SEK180 (about A$25) per day	In couple families, the 68 weeks can be shared between both parents, however a minimum of 13 weeks is reserved for each parent	About 54 of the 68 weeks must be used before a child turns four, and the remaining 14 weeks can be used up until a child turns twelve
Australia	52 weeks	20 weeks paid at about A$880 per week	In couple families, leave can be shared between both parents, however a minimum of 2 weeks of the paid component is reserved for each parent	

a. Many countries offer 'parental leave' in addition to maternity and paternity leave, which can often be used later in a child's life. This is different to the definition of 'parental leave' in Australian national legislation, which is used as an overarching, gender-neutral term for leave entitlements in association with the birth or adoption of a child (otherwise known as maternity or paternity leave).

Source: Beach et al. (2023, p. xxxii); Irish Government Citizens Information Board (2023b); Netherlands Government (2022); New Zealand Ministry of Business, Innovation and Employment (Hīkina Whakatutuki) (2022b); European Commission (2019, p. 52, 2023c); Koslowski et al. (2022, p. 82); Services Australia (2023); Fair Work Ombudsman (2022, p. 1).

The split between private and public ECEC provision

There is wide variation in the share of ECEC that is provided privately (including by both for-profit and not-for-profit organisations) across OECD countries (figure B.4). Many European countries feature very low rates of private ECEC provision, while in other countries, such as *New Zealand* and *Ireland*, private providers dominate the market. While there is no directly comparable data for Australia, data from other sources suggests private providers make up 89% of all services, suggesting that Australia has a higher share of private service provision than most other OECD countries (paper 5).[1]

Figure B.4 – The proportion of ECEC services delivered through private providers varies widely between countries[a,b,c]

Percentage of children enrolled in private ECEC institutions, 2020
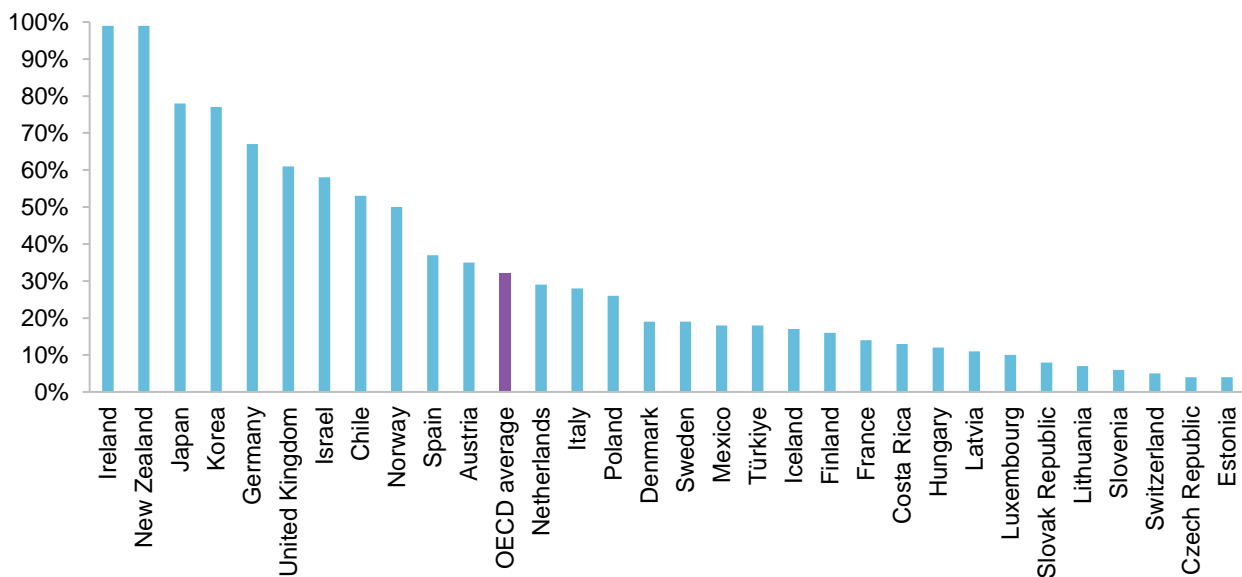
a. Data includes services within the scope of ISCED 0 (formal ECEC services). **b.** Private institutions include both government-dependent private institutions (which receive more than 50% of their core funding from government sources) and independent private institutions (which receive less than 50% of their core funding from government sources) **c.** Data for Costa Rica is from 2021 and data for Greece is from 2019.

Source: OECD (2023a, p. 189)

ECEC expenditure

OECD data suggests net out-of-pocket expenses for ECEC in Australia are relatively high compared to other countries, with ECEC costs (for a couple family with two children) representing about 15% of a family's net income – higher than the OECD average of 10% (figure B.5). Public spending on ECEC also represents a lower percentage of Australia's GDP compared to many other OECD countries (figure B.6), though this percentage is likely to have increased following the 2023 Cheaper Child Care reforms (appendix C).

Of note, many of the countries whose governments spend a relatively high proportion of GDP on ECEC report relatively low average out-of-pocket expenses for families, and, similarly, many countries that have lower public expenditure report higher out-of-pocket expenses.

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[1] This excludes services that do not fall under the NQF (including most WA dedicated preschools, all Tasmanian dedicated preschools and all IHC services), which are largely publicly provided.

Figure B.5 – Out-of-pocket ECEC expenses in Australia are above the OECD average[a,b,c]

Net ECEC costs as a percentage of net household income, for a couple and a single parent earning 67% of the average wage, 2022 or latest available data

■ Couple each earning 67% of average wage ● Single parent earning 67% of average wage
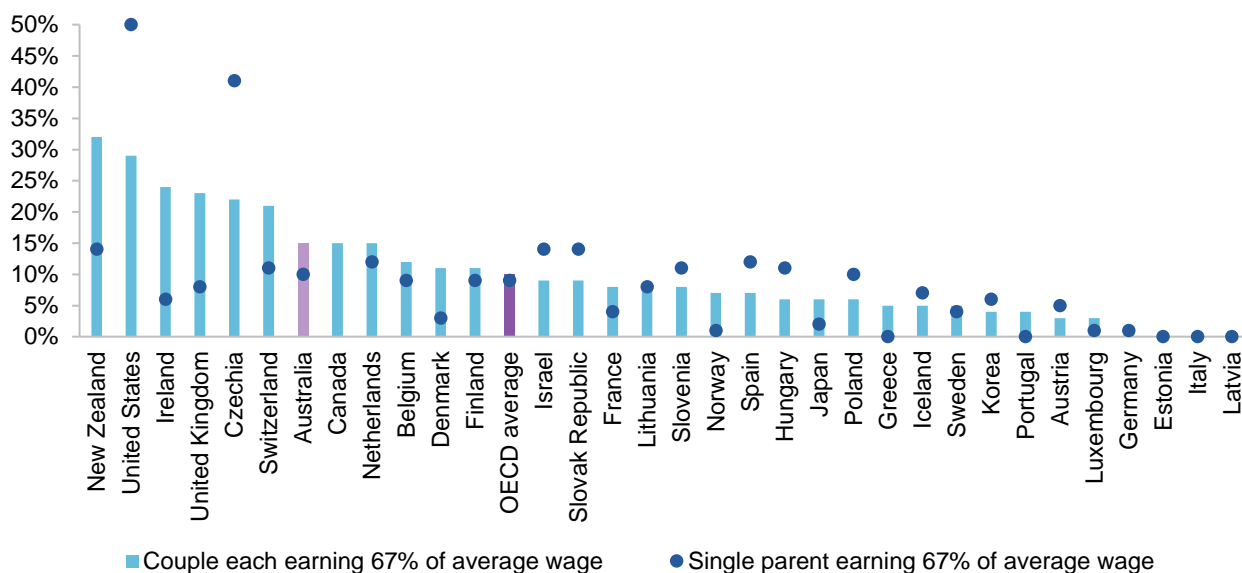
a. Costs are for full-time use of centre-based day care. Net ECEC costs are equal to gross ECEC costs less ECEC benefits and any resulting impact in taxes and other benefits following the use of ECEC. Net income includes social assistance benefits and family benefits, and is calculated after tax and social security contributions. **b.** Data assumes that families have two children aged two and three and that parents are aged 40 and work full time. **c.** Information on fees and benefits is based on national rules. Where fees are determined at the local level, in most cases the local authority of a country's capital is considered.

Source: OECD (2023b)

Figure B.6 – The share of GDP spent on ECEC in Australia is below the OECD average[a]

Public spending on ECEC, percentage of GDP, 2019
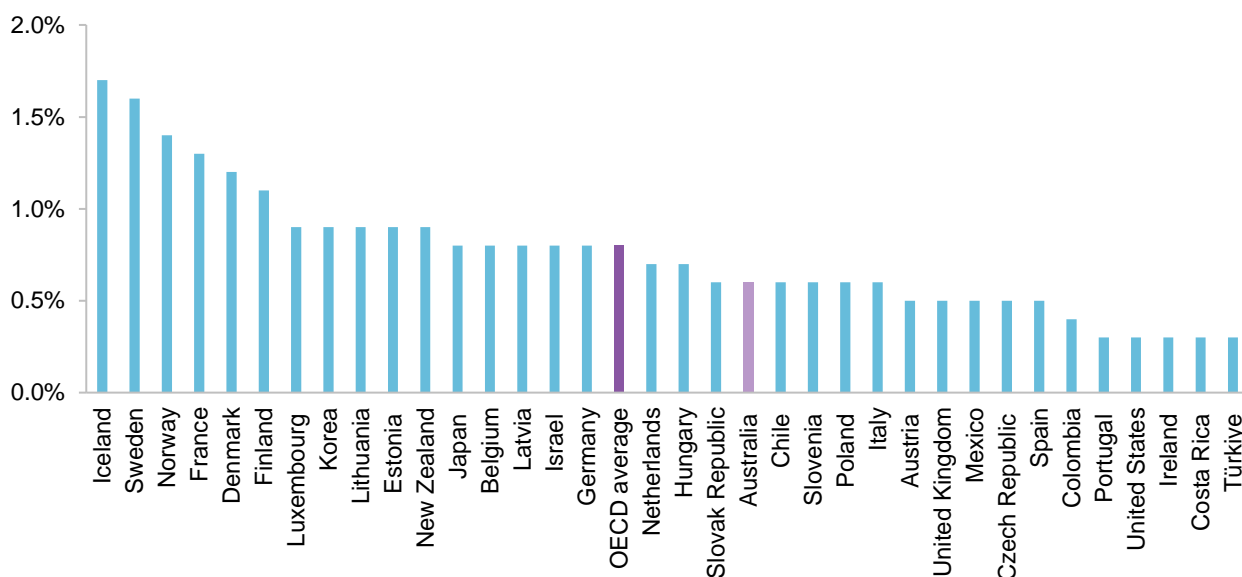
a. Local government spending on ECEC may not be fully captured in the data.

Source: OECD (2023d).

B.2   A closer examination of international examples

This section provides a more detailed analysis of the ECEC programs and funding models used in Canada, Ireland, the Netherlands, New Zealand and Sweden. These countries were selected to cover a range of contexts, including public and private provision, use of different service types, delivery by one or multiple levels of government, and different funding models. Many of these countries are experiencing similar challenges to Australia, and some are also undertaking reforms to their ECEC sectors to improve access, affordability and quality.

A ranking of international models by UNICEF provides a brief overview of the different characteristics of these systems (table B.2). However, it is important to note that while such rankings can provide helpful indications of the strengths of different systems, they also have limitations. Not all aspects of an ECEC system's access, quality and affordability can be consistently measured and assessed – for example, the quality measure in the table below only considers the ratios and minimum qualification standards set in each country, while in reality, quality is impacted by many other factors, such as the curriculum taught, quality assessment processes and the nature of child-to-educator interactions.

Table B.2 – UNICEF rankings highlight different characteristics of international models[a,b]

Country rankings out of 41 advanced economies

Country	Overall rank	Paid parental leave	Access	Quality	Affordability
Sweden	3	9	4	17	10
Canada	22	23	16		21
Netherlands	28	31	1	28	30
New Zealand	33	39	27	3	36
Ireland	36	38	14		33
Australia	37	37	34	12	34

a. A green background indicates a place in the top third of the ranking, yellow denotes the middle third, and red the bottom third. The blank cells indicate that no up-to-date comparable data is available. **b.** The paid parental leave ranking measures full-pay equivalent leave available to both parents. The access ranking measures access to ECEC for children under three for at least an hour a week and proportion of children in services in the year before full-time schooling. The quality ranking measures educator-to-child ratios and minimum qualification requirements for staff. The affordability ranking measures the cost for either two working parents or a single working parent to place two children in ECEC after subsidies.

Source: Gromada and Richardson (2021).

Policy contexts

Canada's ECEC sector is governed at the province and territory level, with each province employing its own set of schemes and programs. One province, Quebec, has often been cited as an example of affordable ECEC since a capped price of C$5 (A$5.60) per day was introduced in 1997. This price has since risen to C$8.85 (A$10) but is still far lower than the Canadian national average price per day of C$31 (A$35) (Beach et al. 2023, p. 97; Statistics Canada 2023a). It is likely that these lower fees have contributed to Quebec's relatively high rate of participation in ECEC – 71% of children aged 0-5 are enrolled in ECEC, compared to the national average of 52% (Statistics Canada 2023b).

In 2021 the Canadian Federal Government introduced the Canada-Wide Early Learning and Child Care plan, which aims to improve affordability and access to ECEC and bring all provinces in line with Quebec. As part of this plan, each province has signed an agreement with the Federal Government that unlocks new federal

funding for ECEC. In return, provinces were required to halve families' out-of-pocket expenses for ECEC by the end of 2022, and are now required to further lower fees to an average of C$10 per day by 2026 (Beach et al. 2023, pp. xxi–xxii).

The Canadian province of **British Columbia** is undertaking this process from a starting point that is relatively similar to Australia's current ECEC landscape – including similar proportions of for-profit and not-for-profit service provision, and similar rates of ECEC participation, with 53% of children aged 0–5 and 83% of children aged 3–5 attending ECEC (Statistics Canada 2022, 2023b). British Columbia will therefore be the primary province discussed in this appendix, with a focus on the levers it is using to achieve the objectives set out in its agreement with the Canadian Government under the Canada-wide plan.

ECEC in British Columbia is offered in a range of service types, including kindergarten (the equivalent of preschool in Australia), centre-based services, family day care (regulated and unregulated), outside school hours care (OSHC) and preschool (a part-day learning-based service for children over two and a half years old) (Beach et al. 2023).

Ireland is also undertaking significant reforms to their ECEC arrangements, with the Irish Government launching the First 5 program – a ten-year whole-of-government strategy aimed at improving the lives of babies, young children and their families – in 2019. This includes the introduction of the Core Funding scheme, which represents a significant shift from demand- to supply-side government funding (Government of Ireland 2018).

About 40% of Irish children under age three are enrolled in ECEC, and in the year before primary school almost all Irish children participate in ECEC (figures B.1 and B.2). A large number of service types are available, including playgroups, playschools, day nurseries, crèches, Montessori groups, Naíonraí (Irish language services), drop-in centres and OSHC (Irish Government Citizens Information Board 2023c).

Ireland also has a large childminding sector that was – until recently – almost entirely unregulated. Alongside their First 5 reforms, the Irish government set out an 8-year reform plan to bring Ireland's paid childminders into their ECEC regulatory framework and allow families using these services to receive public subsidies (Irish Government Department of Children, Equality, Disability, Integration and Youth 2021).

The *Netherlands* is also planning to undertake significant reform to their ECEC policy and funding settings, and they are set to transition to a universal 96% subsidy by 2027 (NL Times 2023). Children aged under three in the Netherlands are enrolled in ECEC services at a higher rate than any other OECD country (figure B.1), and these children primarily attend centre-based day care services or registered childminders. From age four, children have a legal entitlement to free ECEC in primary school settings – which most children attend – before primary school attendance becomes compulsory at age five. OSHC services are also available to children aged between four and twelve (European Commission 2023b).

Children in *New Zealand* also participate in ECEC at relatively high rates, with 81% of 3-year-olds, 87% of 4-year-olds and 98% of 5-year-olds attending services (Paull and Wilson 2020, p. 61). An unusual feature of the New Zealand system is that the types of services that children attend typically do not change as children approach school age, and there is no specific service type (such as preschool services) that caters to children in the year before primary school – as is the case in many other countries (New Zealand Ministry of Education (Te Tāhuhu o te Mātauranga) 2022a).

ECEC service types in New Zealand include centre-based services (such as education and care services and Kindergarten Association services), home-based services (such as family day care and in home care), and parent-led services (box B.1).

Children in **Sweden** have a legal entitlement to ECEC from the age of one, and all children must attend a year of compulsory pre-primary classes at age six (European Commission 2022a).[2] As such, participation in Sweden is relatively high – 48% of children below age three and 99% of children in the year before full-time schooling attend an ECEC service (figure B.2). ECEC systems are managed at the municipality (local government) level, and the majority (approximately 70%) of services are provided directly by municipalities (Garvis 2018, p. 3).

Other subsidised forms of ECEC available to families in Sweden include family day care – which makes up a very small proportion of the sector – and OSHC 'leisure centres', which are attended by almost all primary school aged children (European Commission 2022d; Nilsson et al. 2020). Families can also access publicly provided ECEC services on weekends and at night where this is necessary for parents to be able to work.

Many of the countries the Commission has examined also offer publicly funded parent-led ECEC services (box B.1).

Box B.1 – Many countries publicly fund and regulate parent-led ECEC

Many countries provide publicly funded drop-in ECEC services that are parent-led and free for families to attend – similar to playgroups in Australia. These sessions are often supported by qualified ECEC educators, and provide children with opportunities to socialise, while giving parents access to information and support.

British Columbia's StrongStart BC services, **Ireland's** playgroups, playschools and naíonra (Irish language playgroups), **New Zealand's** playcentres and Kōhanga Reo Māori services, the **Netherlands'** parent-run crèches and **Sweden's** 'open preschools' all offer these services to families (Beach et al. 2023, p. 200; Donegal Childcare 2022; European Commission 2022d; Expatica 2023; Irish Government Citizens Information Board 2023c; New Zealand Ministry of Business, Innovation and Employment (Hīkina Whakatutuki) 2022a).

New Zealand has a particularly high rate of participation in parent-led ECEC compared to most other countries, with 9% and 10% of children in formal care attending parent-led playcentres and Kōhanga Reo Māori services respectively (Paull and Wilson 2020, p. 60).

Funding models

Jurisdictions use a range of mechanisms to fund ECEC, although there are often similarities in approaches between countries.

Most countries offer free hours of ECEC as children approach school age

All five countries examined offer free hours of ECEC to children at particular ages, typically covering the year or two before children start primary school (table B.3).

The types of services that can offer these free hours vary between countries – in **British Columbia** and the **Netherlands**, free hours are delivered in primary school settings, while in **Ireland** and **New Zealand,** free hours can be accessed in settings that also deliver other paid services (such as long day care or services for

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[2] In some countries, including Australia, children may have already commenced primary school by age six.

younger children). *Sweden* uses a mix of these approaches, as free hours can be used in long day care services until age five, before children move to special 'six-year-old preschool' classes, located in primary school settings, to help them transition from preschool to primary school.

Table B.3 – Many countries offer free hours of ECEC to children of certain ages

Universal free hours offered in international ECEC systems

	Program name	Service types	Ages	Amount
British Columbia	Kindergarten	Preschool in a primary school setting	Age five (school starts at age six)	School hours
Ireland	Early Childhood Care and Education	Registered ECEC services (including family day care)	Age three onwards (school starts at age five)	Three hours per day, 5 days per week, 38 weeks per year
Netherlands		Preschool in a primary school setting	Age four (school starts at age five)	School hours
New Zealand	20 Hours Early Childhood Education (ECE)	ECT-led services (including home-based services with a qualified coordinator)[a]	Age three onwards (school starts at age five)	Up to six hours per day, up to 20 hours per week, 52 weeks per year
Sweden		Long day care services or 'six-year-old preschool' classes in primary school setting	Age three onwards, compulsory from age six (school starts at age seven)	525 hours per year, often 15 hours per week over 35 weeks[b]

a. Home-based services include what would be referred to in Australia as family day care and In Home Care services, as well as services provided in any other home nominated by the families attending the service. **b.** Municipalities in Sweden have some agency in how they deliver free preschool.

Source: Beach et al. (2023, p. 199); European Commission (2022d); European Commission (2023b); Irish Government Department of Children, Equality, Disability, Integration and Youth (2022, pp. 16, 29); New Zealand Government Ministry of Education (Te Tāhuhu o te Mātauranga) (2023a).

Subsidies are a common mechanism for improving affordability of additional hours of ECEC

In addition to funding a level of free ECEC for children in the years before school, many countries provide subsidies to support families to access other types of ECEC. This covers services such as ECEC for younger children who are not yet eligible for free hours, or for care outside of preschool and primary school operating hours. The rationale for subsidising ECEC in these circumstances tends to focus less on educational benefits and more on facilitating parents' workforce participation. As a result, funding for these services tends to be delivered through more targeted, activity- and means-tested subsidies.

British Columbia and *New Zealand* offer subsidies that are activity- and income-tested, and are provided as a set subsidy amount that varies according to household characteristics. In British Columbia, subsidies vary with family income, child age and service type, and they may or may not fully cover the ECEC fees families face. The maximum subsidy available – which would apply to a low-income household using a high-cost care type, such as care for a very young child – is C$1250 (A$1400) per month, and parents must be working, studying or have a medical exemption to be eligible for the subsidy (Beach et al. 2023, p. 212).

Similarly, New Zealand's Childcare Subsidy offsets fees for low- and middle-income families by up to NZ$6.10 (A$5.60) per hour, and families can access nine hours of this subsidy per week if they are not working, or 50 hours if they pass an activity test. Like in Australia, the subsidy rate varies with the number of children attending an ECEC service from the same family, with the income test becoming more generous as the number of children using ECEC increases (New Zealand Ministry of Social Development (Te Manatū Whakahiato Ora) 2023b, 2023a).

Ireland uses a mix of two different subsidy schemes – a universal subsidy of 2.14 euro (A$3.60) per hour (that is activity tested but does not vary with income) and a subsidy available to low-income families that is both income- and activity-tested. Families cannot receive both at once and must choose the one that will benefit them most. Parents participating in work or study are eligible for 45 hours of subsidised care per week, and those who are not are eligible for 20 hours per week (Irish Government Citizens Information Board 2023a).

The *Netherlands* currently has a means and activity tested ECEC benefit, with the broad aim being that families, government, and employers each contribute to a family's ECEC costs – employers must reimburse one-third of the ECEC fees that their employees incur and, depending on family income, government also reimburses between 0% and 63% of fees through refundable tax credits (Paull and Wilson 2020, p. 32). In cases where parents are not working, the government will also cover the employer's contribution as long as parents are undertaking other approved activities (Statistics Netherlands 2023).

As noted above, however, these subsidy arrangements are expected to change substantially by 2027 – government funding to ECEC is set to double as the Netherlands transitions to a universal 96% subsidy that will not vary with household income or activity levels (NL Times 2023; Ottens 2022; Utrecht University 2022).

Fees for ECEC in *Sweden* – beyond the free hours – are proportional to parental income and set at 3% of gross parental income for the first child (up to a cap of SEK1,572 (A$225) per month), 2% for the second child, 1% for the third child, and there is no fee for any subsequent children. Low-income families do not pay any out-of-pocket fees (European Commission 2022c)**.**

Many countries also use supply-side funding mechanisms

Operational funding is commonly used overseas in addition to demand-side subsidies to improve affordability for families, though governments can also use this type of funding to steer the behaviour of services and influence their fees and quality. Supply-side funding has also proven to be a preferred mechanism for governments undertaking reforms, with many countries introducing or strengthening existing operational funding mechanisms to improve affordability and access for families.[3]

As part of its plan to first halve ECEC fees and then transition to a universal $10-a-day ECEC system, *British Columbia* has expanded its use of operational funding. In 2018, The Child Care Fee Reduction Initiative was introduced, which provides supply-side funding to services on top of the funding that services already received under the Child Care Operating Funding program. The initiative provides C$260-550 (A$290-620) per month per child attending full-time services – varying by child age and service type – to eligible licensed providers to reduce and stabilise fees for families. Participating providers must agree not to increase fees beyond an amount approved by the province, and any new facilities must set fees at or below the 70th percentile for fees in their region for the same type of care (Beach et al. 2023, pp. 213–214). The government also funds more than 12,000 spaces at Universal Child Care Prototype Sites, which provide

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[3] Examination of the relative contributions of demand-side and supply-side subsidies to total government expenditure on ECEC is difficult. Overall, the different combinations of demand- and supply-side funding mechanisms used in each country have led to out-of-pocket expenses for families that are similar to or higher than in Australia in all of the countries studied except Sweden (in the examples reported in figure B.5).

ECEC services for $10 per day to test funding models and support a transition to a universal $10-a-day system by 2026 (Beach et al. 2023, p. 207). There are also a range of other grant funding opportunities that encourage new services to open and existing services to renovate their spaces – these are typically designed to expand public and not-for-profit provision, particularly in communities that face additional barriers to access (Beach et al. 2023, pp. 213–216).

Ireland is similarly relying on its recently introduced supply-side Core Funding mechanism to deliver policy reforms as part of the government's plan to introduce a greater degree of public management to the ECEC sector. This program provides funding to services that varies according to service operating hours, number of places offered, age of children enrolled, type of service, and qualification levels of staff. In return for the increased funding and stability that Core Funding delivers, providers must meet conditions relating to fees – including a fee freeze until August 2024 – and service quality, among other things (Government of Ireland 2023b).

The **New Zealand** government uses supply-side funding instruments to subsidise up to 30 hours of ECEC per child each week. This includes the 20 Hours ECE program (mentioned above) and an additional ten hours that are partially subsidised through the ECE Funding Subsidy. New Zealand also uses this supply-side funding to incentivise services to operate at a higher quality level – supply-side funding rates are based on an Operating Cost Survey, and additional funding is provided to services that employ a certain proportion of certificated teachers, and to services that pay educators according to a salary scale (New Zealand Ministry of Education (Te Tāhuhu o te Mātauranga) 2023c; Paull and Wilson 2020, p. 60).[4]

The **Netherlands** is the only one of these five countries to transition in the opposite direction, moving from a system that provided funding through both the demand and supply sides, to relying only on demand-side funding since 2005 (Akgunduz and Plantenga 2014).

The mix of provider management types influences how governments manage affordability and access

While most countries use a mix of public and private provision of ECEC, the proportion of services that are private for-profit, private not-for-profit and publicly provided affects the affordability and accessibility of services for families.

In countries where ECEC is established as a legal right of all children, such as in **Sweden**, there tends to be higher rates of public provision because governments (often local governments) are required to act as a provider of last resort to ensure all children have access to a service (European Commission 2022c). As noted above, the majority of Swedish ECEC services are delivered publicly, with approximately 70% of services operated by local governments (Garvis 2018, p. 3).

However, in other countries, it is more common for the ECEC sector to be made up of private (for-profit and not-for-profit) providers. While preschool services in **British Columbia** and the **Netherlands** are largely delivered publicly within schools, there is little public provision for other types of ECEC – such as services for younger children – and private for-profit services make up the majority of the rest of the sector (Beach et al. 2023, pp. 200, 205; European Commission 2023b; Friendly et al. 2021, p. 135). In **Ireland** and **New Zealand** there is minimal public provision of any type of ECEC, and for-profit providers make up a substantial proportion of the sector in both countries – representing 74% and 41% of services respectively (Early Childhood Ireland 2022; Neuwelt-Kearns and Ritchie 2020, p. 6).

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[4] Teacher certification requires satisfactory recent teaching experience and participation in professional development, among other requirements. Practising certificates expire and must be renewed every three years.

The prevalence of different provider management types in a country's ECEC sector influences which policy levers are available to government to steer the sector towards desired outcomes. The public provision of services in **Sweden** gives local governments direct control over the fees charged to families and the accessibility and quality of services. Where for-profit providers are common, governments often closely manage funding mechanisms and quality standards to be confident that increases in public funds are not flowing directly into higher profits for businesses. For example, **Ireland** has introduced a fee freeze as a condition for services receiving new operational funding, and services participating in a new supply-side funding scheme in **British Columbia** are not allowed to increase fees above a rate set by the government (Beach et al. 2023, p. 213; Government of Ireland 2023b).

As noted above, **British Columbia** is also using its new funding mechanisms to influence the mix of provider management types that are most prevalent in the sector, in accordance with the specification of the Canada-wide plan that service growth should primarily be in the not-for-profit and public sectors. All Canadian provinces, including British Columbia, are seeking to expand their respective ECEC sectors either exclusively or predominantly through not-for-profit and public provision (Beach et al. 2023, p. xxiii).

Supporting children with additional needs and those experiencing disadvantage

Most countries have additional programs that aim to help children and families experiencing disadvantage or who face barriers to accessing ECEC.

British Columbia, **Ireland** and **New Zealand** have programs to support children with disabilities or developmental delay, and typically provide additional support to services to fund extra staff, train existing staff or buy equipment. These programs can support individual children (such as Ireland's Access and Inclusion Model) or be provided to services with a high proportion of children experiencing disadvantage more generally (such as New Zealand's Targeted Funding for Disadvantage) (Beach et al. 2023, p. 203; Government of Ireland 2023a; New Zealand Ministry of Education (Te Tāhuhu o te Mātauranga) 2023b). The **Netherlands** also offers a supplementary play-based early education program for children at risk of developmental delay, hosted within mainstream centre-based services and primary schools (European Commission 2023a).

Services in isolated or low socio-economic areas in **New Zealand** are provided with additional funding through initiatives such as Equity Funding or the Annual Top-Up for Isolated Services (New Zealand Ministry of Education (Te Tāhuhu o te Mātauranga) 2023b, 2023a). As mentioned above, in **Canada**, providers can also access additional funding to renovate or build new services in communities that face barriers to access, including in rural, remote, and low-income areas (Government of Canada 2023).

For culturally and linguistically diverse families, many countries offer language-specific services, such as Naíonraí (part-time) and Naíolann (full-time) Irish language services in **Ireland,** bilingual services in the **Netherlands** and Māori Kōhanga Reo in **New Zealand** (Donegal Childcare 2022; European Commission 2022a)**. Canada's** Aboriginal Head Start program also provides free culturally-based ECEC services while connecting families to other wrap-around services (Beach et al. 2023, p. 217).

As services in **Sweden** are largely publicly provided, funding to support children with additional needs is delivered as part of each service's general operational funding, rather than through particular programs.

Quality assessment

Many countries require services to be regularly inspected so that their quality can be monitored and assessed. The **Netherlands** conducts inspections annually, and in **Ireland** they are required every three years and are almost always conducted without forewarning (Government of the Netherlands 2023a;

Tusla 2023b). In the **Netherlands**, quality assessments also involve consultation with parents, and in **Sweden** inspectors must meaningfully consult with both parents and the children attending the services (European Commission 2019, pp. 130–132).

Inspection reports are available online for parents to access in the **Netherlands**, **New Zealand** and **Ireland**, and the Irish government also provides a guide for parents on how to read the reports (Government of the Netherlands 2023a; Irish Government Department of Education 2022; New Zealand Ministry of Education (Te Tāhuhu o te Mātauranga) 2022b). Some countries also use assessment results to monitor and evaluate their ECEC systems overall. For example, in the **Netherlands,** the local government bodies that are responsible for conducting assessments are required to report on their overall findings to provide a wider view of the strengths and weaknesses of the system as a whole (European Commission 2019, p. 133).

Workforce

Ratios

Educator-to-child ratios are fairly consistent between the countries examined, with ratios stricter at younger ages before loosening at about ages three to four (table B.4). While there are no regulations on the number of children per educator in **Sweden**, the average ratio in preschools (children age one to five) is relatively low – at about five children per staff member – and is roughly consistent with formal ratios in other countries (European Commission 2022e).

Table B.4 – Educator to child ratios are fairly consistent across the five countries

Educator to child ratios in centre-based settings

	British Columbia	Ireland[a]	Netherlands	New Zealand[b]	Australia[c]
0–1 years	1:4	1:3	1:3	1:5	1:4
1–2 years	1:4	1:5	1:5	1:5	1:4
2–3 years	1:4	1:6	1:8	1:10	1:5
3–4 years	1:8	1:8	1:8	1:10	1:11
4 years to school age	1:8	1:8	1:10	1:10	1:11
School age (OSHC)	1:15[d]	1:12	1:12[e]	1:10[f]	1:15

a. Ratios for sessional (up to 3.5 hours per day) services in Ireland are different to other centre-based services, at 1:3 for children ages 0-1, 1:5 for children ages 1-2.5 and 1:11 for children ages 2.5-6. **b.** For children two years and over in New Zealand, the ratio is 1:6 where there are six or fewer children, 2:7–20 where there are between seven and twenty children, and 1:10 where there are more than twenty children. **c.** Ratios for Australia vary by state – the presented ratios are the National Quality Framework minimum standards **d.** OSHC ratios in British Columbia are 1:12 for children in grade 1 (typically age 6) and younger. **e.** OSHC ratios in the Netherlands are 1:12 for children age 7-13, and 1:11 for groups with children ages 4-13. **f.** OSHC ratios in New Zealand are recommended but not mandatory.

Source: ACECQA (2023, p. 448); Beach et al. (2023, p. 209); Government of the Netherlands (2023b); Citizens Information (2022); European Commission (2022e, 2022b); New Zealand Government (2023); Tusla (2023a); *Education (Early Childhood Services) Regulations 2008* (New Zealand).

Qualification requirements

As in Australia, it is common for other countries to require vocational qualifications for educators in contact roles in centre-based services. Educators in centre-based settings in **British Columbia, Ireland** and the **Netherlands** are required to hold a relevant vocational qualification (at a minimum), and in British Columbia,

staff must also undertake additional training if they are working with children younger than 36 months or who have additional support needs (Beach et al. 2023, p. 208; European Commission 2023b; Government of Ireland 2021, p. 31). In **New Zealand**, for a service to be eligible to receive 20 Hours ECE funding, at least 50% of required staff must have a recognised teaching qualification, such as a bachelors degree or graduate diploma (New Zealand Government Ministry of Education 2020). While there is no requirement that all educators have qualifications, as mentioned above supply-side funding is tied to 'quality funding bands' that link funding to the proportion of educators that are certificated (New Zealand Ministry of Education (Te Tāhuhu o te Mātauranga) 2020; Teaching Council of Aotearoa New Zealand 2023). There are no minimum qualification requirements for staff in **Sweden** in most preschools, but staff should have relevant training or experience, and there must be at least one person with a relevant university degree in the service. All staff in Sweden's preschool classes that specifically cater to 6-year-olds, however, must have a university degree (European Commission 2022e).

In some countries, qualification requirements are less strict outside of centre-based settings. In **British Columbia**, educators working in family day care settings or in OSHC services (with school-age children) do not require any ECEC qualifications and are only required to be deemed 'responsible adults' – they must be over 19 years old, complete a 20-hour course, have some relevant work experience and complete a criminal record check (Beach et al. 2023, p. 209). Similarly, 'childminders' in **Ireland's** family day care sector do not currently have any minimum qualification requirements, however these will be introduced by 2028 as the sector is brought into the scope of government regulation (Government of Ireland 2021, p. 15).

Measures in response to workforce constraints

Like Australia, many countries are struggling with workforce constraints in their ECEC sectors. There is a large focus internationally on the relatively low wages paid to ECEC educators, and this is resulting in challenges in attracting and retaining staff.

Workforce constraints have meant some countries have had to delay or alter plans to introduce reforms, such as in the **Netherlands** where the rollout of a 96% universal subsidy has been delayed by two years due to concerns regarding service quality and workforce size (NL Times 2023). In 2021 in **British Columbia** – which, as noted above, is also undertaking significant reforms to their ECEC policy – 45% of ECEC employers were losing more staff than they could hire, and 27% of services had to refuse enrolments due to a lack of qualified staff (The Social Research and Demonstration Corporation 2021, pp. 279–282).

Pay parity with similarly qualified educators working in other settings is another issue shared by other countries. In **New Zealand**, wages for educators in education and care services (the equivalent of centre-based day care services in Australia) have traditionally been lower than wages for educators working in kindergarten services.[5] Education and care educators earned 23% less (on average) than those working in kindergartens in 2019 – despite having the same qualifications and largely working with children of the same age. It was estimated that this gap could widen to up to 49% in some cases after kindergarten educators received an 18.5% pay increase over two years from 2019, which was aimed at keeping their own pay rates in line with those of primary school teachers (Collins 2020).

The policies that governments are introducing to combat these challenges vary. As noted above, **New Zealand** and **Ireland** are requiring services to increase wages as a condition of receiving new operational funding. The pay parity opt-in scheme in New Zealand provides higher funding rates to ECEC services that pay all teachers in line with the national ECE Funding Handbook, and Ireland is supporting services to

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[5] Kindergarten in New Zealand is a particular type of centre-based ECEC service for children age two to five. Kindergartens are not-for-profit services and are managed by a Kindergarten Association.

increase educator wages by introducing minimum pay rates as part of services' Core Funding budgets (New Zealand Ministry of Education (Te Tāhuhu o te Mātauranga) 2023c; O'Gorman 2022). **British Columbia** is also expected to introduce a 'wage grid' for educators as a commitment under the Canada-wide plan, which will set minimum wages and pay increases that correspond to educators' skills and experience (Beach et al. 2023, p. 196).

Some governments have also introduced direct wage subsidies to publicly fund these pay increases. In **New Zealand**, the government announced a publicly funded 10% increase in the minimum pay rate for qualified educators working in education and care services to match the starting rate for kindergarten educators. While this is largely only provided to new teachers entering the sector, the government has indicated that this is only a first step and that further support can be expected (New Zealand Government 2020). **British Columbia** has introduced a wider government funded 'wage enhancement' to all ECEC educators, which started as a one dollar (A$1.10) per hour wage increase in 2019 and has risen to six dollars (A$6.60) per hour by 2024 (Government of British Columbia 2023). This represents approximately a 30% increase on the median wage for educators of C$21 (A$24) per hour (Beach et al. 2023, p. 208).

In response to workforce constraints, the **Netherlands** has tried to help services reduce the number of staff required to meet demand for ECEC, including by introducing fee discounts on days with lower occupancy rates, and extending an exemption that allows half of all employees in a service to be 'working towards' a qualification until July 2024. A measure to relax educator-to-child ratios was also proposed but was not introduced (Álvarez Umbarila 2022).

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C. Overview of the National Quality Framework

Since 2012, most early childhood education and care (ECEC) services have been regulated under the National Quality Framework for Early Childhood Education and Care (NQF). The NQF is a framework of agencies, laws, regulations and standards, which combine to provide a national approach to the regulation and quality assessment of ECEC services. This appendix outlines the structure, governance arrangements and processes of the NQF.

C.1 Background

The NQF was developed in response to a growing recognition of the importance of ECEC for children's development and learning. Before the NQF, there was no national system for regulation and compliance in the ECEC sector – requirements such as those relating to the safety of a service's physical environment were often duplicated in state/territory licensing and Australian Government quality assurance processes (ACECQA 2022b, p. 5). The quality of services receiving Australian Government funding was overseen by the National Childcare Accreditation Council until 2011, when it was replaced by the Australian Children's Education and Care Quality Authority (ACECQA) (ACECQA n.d.; CPD 2023, p. 4). Expectations across the states and territories were also inconsistent, with a complex system of requirements and minimum standards for different service types in different jurisdictions. The result was a sector facing high regulatory burdens and significant variation in the standard of education and care (ACECQA 2022b, p. 5).

In December 2009, the National Partnership Agreement on the National Quality Agenda for Early Childhood Education and Care (NQA) was established to contribute to the achievement of outcomes set out in the *Early Childhood Development Strategy* – which had been endorsed by the Council of Australian Governments (COAG) in July 2009 (COAG 2009a, p. 4, 2009b, p. 3). The strategy included the vision that 'by 2020 all children have the best start in life to create a better future for themselves and for the nation' (COAG 2009a, p. 4) and contained seven key outcomes:

1. children are born and remain healthy
2. children's environments are nurturing, culturally appropriate and safe
3. children have the knowledge and skills for life and learning
4. children benefit from better social inclusion and reduced disadvantage, especially Indigenous children
5. children are engaged in and benefiting from educational opportunities
6. families are confident and have the capabilities to support their children's development
7. quality early childhood development services that support the workforce participation choices of families (COAG 2009a, pp. 13–14).

The NQA gave effect to a commitment by all parties to the development of the NQF. Box C.1 sets out the steps involved in developing the NQF and changes that have occurred since the framework came into effect in 2012.

Box C.1 – NQF development timeline

2009   Early Years Learning Framework for Australia published.

National Partnership Agreement on the National Quality Agenda for Early Childhood Education and Care comes into effect.

2010   National Law passed.

2011   National Regulations passed.

2012   NQF comes into effect, quality assessments and ratings begin.

2013   First national registers of service quality are published.

2014   New staffing requirements increase the number of early childhood teachers in services.

2015   Starting Blocks website launched.

2016   New educator-to-child ratios.

2017   Changes to National Law and Regulations from 2014 NQF Review.

2018   Revised National Quality Standard (NQS) introduced.

2019   2019 NQF review commences.

2020   New staffing requirements increase number of early childhood teachers and suitably qualified persons in services.

Quality assessment and rating temporarily suspended due to impacts of COVID-19.

2021   NQF Approved Learning Frameworks Update project begins.

2023   Changes to National Law and Regulations from 2019 NQF Review.

Source: ACECQA (2022b, pp. 3–4; 2023a).

C.2   Governance arrangements

A national legislative framework

The national legislative framework underpinning the NQF consists of:

- the Education and Care Services National Law (the National Law)
- the Education and Care Services National Regulations (National Regulations).

The legislative framework was established through an applied laws system. Under this system, a host jurisdiction (Victoria) first passed the *Education and Care Services National Law Act 2010* (Vic). This legislation was then adopted by all other states and territories except Western Australia, which passed corresponding legislation with some minor variations.

This legislative framework replaced separate licensing and quality assurance processes, as noted above, and aimed to create a jointly governed, uniform national approach to the regulation and quality assessment

of ECEC services (an aim which has been partly achieved (paper 8)). The approach aimed to reduce red tape, which was particularly complex for providers operating across multiple jurisdictions.

The National Law and National Regulations set out:

- approval processes for the operation of education and care services
- the assessment and rating system
- key operational requirements
- compliance, monitoring and enforcement powers
- the functions and powers of the Education Ministers, ACECQA and the regulatory authorities in each jurisdiction
- key transitional arrangements.

The NQF covers most long day care (LDC), family day care (FDC), preschool (or kindergarten) and outside school hours care (OSHC) services in Australia. Most preschools (kindergartens) in Tasmania and Western Australia are not covered (ACECQA 2023f, p. 5). All other forms of care, including in home, mobile, occasional care and most former Budget Based Funded[1] services were excluded from the NQF (ACECQA 2023d, pp. 37–38). Box C.2 details the types of services that sit outside the scope of the NQF.

Reviews of the framework and its elements

The NQF was envisaged to be reviewed every five years, with reviews occurring in both 2014 and 2019, although there is currently no mechanism to mandate reviews (paper 8). The 2014 review reforms included:

- removing conceptual overlap between elements and standards, clarifying language and reducing the number of standards and elements
- improving oversight and support within FDC
- removing supervisor certificate requirements so service providers have more autonomy in deciding who can be the responsible person in each service
- introducing a national educator to child ratio of 1:15 for services providing education and care to school age children (ESA 2022, p. 27).

Likewise, the 2019 review gave rise to changes. These included:

- new requirements regarding the safety, health and wellbeing of children
- improved oversight and compliance tools for regulatory authorities
- new workforce requirements, which include increasing minimum qualification requirements for FDC educators and alleviating staffing requirements during short-term absences
- increasing the period of approval for the service 'Excellent' rating from three to five years
- improved regulatory guidance through government-developed resources (ACECQA 2019, 2023b).

Outside of these more regular, scheduled reviews, sections of the NQF may, from time to time, come under examination via targeted reviews. For example, the 2021 NQF Approved Learning Frameworks Update project had two rounds of consultation in 2021, a pilot in 2022, and led to an update to learning frameworks for young children from birth to five years of age, as well as those for care of school-age children (Macquarie University 2023).

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[1] The Budget Based Funded program provided a contribution to the operational costs of some services, predominantly located in rural, remote and Indigenous communities. In 2018, most Budget Based Funded services transitioned to funding under the Child Care Package.

Box C.2 – Services out of scope from the NQF

- A service principally conducted to provide instruction in a particular activity (for example, a language class or ballet class).
- A service providing education and care to patients in a hospital or patients of a medical or therapeutic care service.
- Care provided under a child protection law of a participating jurisdiction.
- Disability services defined under state or territory law, and early childhood intervention services for children with additional needs.
- Education and care in a child's home.
- Except in Western Australia, education and care in a residence, other than as part of a FDC service.
- Primarily ad hoc or casual education and care (commonly referred to as occasional care).
- Education and care provided by a hotel or resort to children of short-term guests at the hotel or resort.
- Education and care that is provided on an ad hoc basis to children of a guest, visitor or patron where the person who is responsible for the children is readily available at all times.
- Education and care that is primarily provided or shared by parents or family members.
- Education and care provided at a secondary school to a child of a student attending the school, where the parent retains responsibility for the child.
- Mobile services.
- Services that provide education and care for no more than four weeks per calendar year during school holidays.
- Transition to school programs provided by a school to orient children to that school.
- Services that on 30 June 2018 were funded under the Budget Based Funded program and were not approved under Family Assistance Law.
- Services that on 30 June 2018 were funded under the Indigenous Advancement Strategy but were not approved under Family Assistance Law nor regulated under the NQF.
- Playschools licensed in the Australian Capital Territory.
- Stand-alone services in Queensland.
- Playcentres in South Australia and New South Wales.
- Services licensed as Centre-based Class 4 or 5 services under the Child Care Act 2001 in Tasmania.
- Licensed limited hours or short-term services in Queensland or Victoria.
- Government-funded services under the Children and Community Services Act 2004 of Western Australia.

Source: ACECQA (2023d, pp. 37–38).

Likewise, the National Children's Education and Care Workforce Strategy (*Shaping Our Future)* committed ACECQA to a review of staffing and qualification regulations for early childhood teachers and OSHC educators. The review commenced in May 2023 and aimed to improve consistency, support quality and reduce the complexity of current qualification and staffing requirements. It made recommendations in December 2023 (ACECQA 2023k; ESA 2021, p. 55).

Governing bodies

The NQF is jointly governed by the Australian, state and territory governments in the form of two key national bodies and eight jurisdictional regulatory authorities (figure C.1).

Education Ministers provide ongoing oversight and ultimate decision-making for the NQF, with the Education Ministers Meeting (EMM, the successor of the COAG Education Council) offering a forum for collaboration on ECEC, school education, higher education and international education (ACECQA n.d.; DoE 2023).

The Australian Education Senior Officials Committee (AESOC) is directly responsible to the EMM for the execution of EMM decisions. AESOC consists of senior officials with responsibility for ECEC, school education, higher education and international education. It performs a number of functions including providing policy advice to the EMM and performing supervisory and coordination roles (Australian Government 2022). Three standing working groups support AESOC – one of which is the Early Childhood Policy Group (ECPG) (ACECQA 2018). The ECPG provides 'high-level strategic policy advice' to the EMM through AESOC on ECEC policy matters (Australian Government 2021; Tudge 2021, p. 2).

ACECQA is the independent national authority responsible for guiding and monitoring the implementation and administration of the NQF. It is responsible for matters including consistency of the application of the NQF between states and supporting the ECEC sector to improve service quality for children, and it assesses and approves qualifications for ECEC staff and organisations. It also undertakes various ongoing research and evaluation functions under the National Law and Regulations.

State and territory-based regulatory authorities administer the NQF in each state and territory. The regulatory authority is typically the first point of contact for service providers and is responsible for a range of functions including approving ECEC providers and services and assessing and rating ECEC services (figure C.1).

The role of regulatory authority in most jurisdictions is typically undertaken by that state or territory's Department of Education, although Western Australia situates the regulator within its Department of Communities (box C.3). In South Australia, the regulator is an independent statutory authority.

Box C.3 – State and territory regulatory bodies

- **New South Wales:** Early Childhood Education Directorate, NSW Department of Education
- **Victoria:** Victorian Department of Education and Training
- **Queensland:** Regulation, Assessment and Service Quality, Early Childhood and Education Improvement, Queensland Department of Education
- **Western Australia:** Education and Care Regulatory Unit, WA Department of Communities
- **South Australia:** Education Standards Board
- **Tasmania:** Tasmanian Department for Education, Children and Young People
- **Australian Capital Territory:** Children's Education and Care Assurance, ACT Education Directorate
- **Northern Territory:** Quality Education and Care NT, NT Department of Education

Figure C.1 – National Quality Framework

Education Ministers' Meeting
(Formerly the COAG Education Council)

- Oversees the implementation and administration of the NQF
- Promotes uniformity in the application and enforcement of the NQF
- Reviews and approves the NQS and sets specific standards for education and care services and classes of education and care services
- Reviews and approves the rating level system to be used in rating education and care services
- Reviews and approves the fee structure under the National Law
- Reviews and approves new learning frameworks for the National Law
- Monitors the implementation and operation of, and recommends and approves amendments to, the National Law
- Monitors the implementation and operation of the National Regulations
- Reviews the education and care services to which the National Law applies and recommends, or amends the National Regulations to provide for, new classes of ECEC services under the National Law
- Appoints the members of the ACECQA board
- Monitors and reviews the performance of ACECQA

ACECQA

Guides and monitors implementation and administration of the NQF to promote consistency across all states and territories
- Approves qualifications for education and care services workers
- Trains, tests and provides resources to state and territory regulatory authority authorised officers
- Awards the Excellent rating
- Undertakes second tier reviews of quality ratings
- Hosts the National Quality Agenda IT System
- Publishes guides and other resources
- Publishes the national registers of approved providers and services (including their quality rating)

Regulatory authorities

Day-to-day contact with education and care providers and services
- Grant approvals, including provider and service approvals
- Assess and quality rate services against the NQS and the National Regulations
- Monitor and enforce compliance with the National Law and Regulations, including receive and investigate serious incidents and complaints
- Work with ACECQA to promote continuous quality improvement and educate the sector and community about the NQF

Education and Care Services National Law

Education and Care Services National Regulations

National Quality Standard

Assessment and quality rating process

National Approved Learning Frameworks

Source: ACECQA (2023d, pp. 12–13).

C.3   How the system works

The NQF provides a national system for ECEC, meaning that providers and staff should have equivalent experiences in each jurisdiction and services undergo consistent assessment processes.

Licensing of providers and services

The NQF includes three interrelated types of nationally recognised and ongoing approvals for providers and services.

- Provider approval enables an individual, body corporate, eligible association, partnership or prescribed entity to apply for one or more service approvals. Approval is recognised nationally.
- Service approval authorises an approved provider to operate an approved service. Each approved service must have one or more nominated supervisors. Approved providers must determine if a person is suitable to be a nominated supervisor.

  - There are two types of service approval: one for centre-based services[2] (LDC, preschool/kindergarten and OSHC); one for FDC services (ACECQA 2023d, pp. 19, 39).

State and territory regulatory authorities are responsible for granting each type of approval, and although authorities reference the NQF at the time of approval, a centre's quality rating is determined at a later stage. State regulators may consider the following factors when granting service approvals:

- the NQF
- the suitability of the service premises and its site and location for operating an ECEC service
- the adequacy of the policies and procedures for the service
- whether the applicant is an approved provider
- whether the nominated supervisor for the service has given their written consent
- any suspension or conditions on the applicant's provider approval
- any other matter that the regulator thinks is relevant (NSW Department of Education 2021, p. 13).

The regulatory authority can also consider a provider's assessment and ratings history and history of compliance with the National Law when considering an application to open a new service. Typically, ratings may be considered to determine whether granting a service approval would pose a significant risk to the health, safety and wellbeing of children (NSW Department of Education 2021, pp. 16–17).

Regulating quality

The National Quality Standard

The NQS encourages a uniform approach to assessment and ratings for ECEC services and rates services across seven 'quality areas' (box C.4). These quality areas are divided into 15 standards containing 40 elements. For example, 'Standard 2.2 – Each child is protected' is one of two standards in quality area 2 (child safety) and contains three elements:

- Element 2.2.1 – At all times, reasonable precautions and adequate supervision ensure children are protected from harm and hazard

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[2] 'Centre-based' services include long day care (services that offer a full day of care in a centre), preschool (also known as kindergarten, and is for children in the year or two years before school) and outside school hours care (care provided before and/or after school).

- Element 2.2.2 – Plans to effectively manage incidents and emergencies are developed in consultation with relevant authorities, practised and implemented
- Element 2.2.3 – Management, educators and staff are aware of their roles and responsibilities to identify and respond to every child at risk of abuse or neglect.

Each quality area contains two or three standards, and each standard comprises between two and three elements. Several key aspects of the NQS – quality improvement plans, educator-to-child ratios and staff qualification requirements – are discussed in further detail below.

Box C.4 – The seven quality areas of the National Quality Standard

Quality Area 1: Educational program and practice

- Comprises three standards and nine elements in total.
- Requires the service to use and document an approved learning framework and develop an educational program.

Quality Area 2: Children's health and safety

- Comprises two standards and six elements in total.
- Relates to policies and procedures regarding hygiene practices, healthy eating, physical activity, preventing harm to children and dealing with injury or illness.

Quality Area 3: Physical environment

- Comprises two standards and five elements in total.
- Requires the design of indoor and outdoor areas to be safe, suitable and provide a diverse range of experiences, and for the service to use sustainable practices.

Quality Area 4: Staffing arrangements

- Comprises two standards and four elements in total.
- Relates to educator to child ratios, staff qualification requirements and professional staff interactions.
- Requirements vary substantially between centre-based and family day care services.

Quality Area 5: Relationships with children

- Comprises two standards and four elements in total.
- Relates to interactions with and support for children.

Quality Area 6: Collaborative partnerships with families and communities

- Comprises two standards and six elements in total.
- Includes relationships with and information provided to families, engagement with the local community and facilitation of access to support assistance.

Quality Area 7: Governance and leadership

- Comprises two standards and six elements in total.
- Includes governance arrangements and the development of key documentation, records and administrative systems.

Source: ACECQA (2023e).

Quality Improvement Plans

The National Regulations require that each approved service develops a Quality Improvement Plan (QIP) within three months of the granting of the service approval. Developing a QIP is a core requirement of the NQF that requires each service to evaluate their current practices and conduct a self-assessment against the NQS. A QIP must:

• include an assessment by the provider of the quality of the practices of the service against the National Quality Standard and the National Regulations
• identify any areas that the provider considers may require improvement
• contain a statement of the philosophy of the service.

Services must submit a QIP to their state or territory's regulatory authority at least annually, or when requested by their local regulatory authority. A QIP must be kept at the education and care service premises, be made available for inspection by the regulatory authority or an authorised officer and, on request, to the family of a child who is enrolled at the service or who are seeking to enrol a child at the service (ACECQA 2023d, pp. 44, 349).

Staffing

Qualification requirements

The NQF establishes minimum qualification requirements for both centre-based and FDC services. These requirements are prescribed only for educators working with children who are under school age, so they are not applicable to OSHC services. Some states and territories have qualification requirements relating to the care of school-age children.

ACECQA maintains and publishes a list of nationally approved qualifications for centre-based and FDC services. It also maintains a separate list of approved qualifications for school-age children (where qualifications are approved separately for each jurisdiction).

There are two sets of qualification requirements for LDC and preschool:

• the hiring of up to two full-time equivalent early childhood teachers, dependent on how many children are cared for on a given day (table C.1)
• minimum qualifications for other educators at the service.

A person is counted as an early childhood teacher if they:

• hold an approved early childhood teaching qualification that is published on ACECQA's approved qualifications lists. This includes current approved early childhood teacher qualifications, and former approved early childhood teaching qualifications that commenced before 1 January 2012, or
• hold a qualification that ACECQA has recognised to be an equivalent early childhood teacher qualification, or
• are taken to hold an early childhood teaching qualification approved under former state and territory laws in place before the National Law (ACECQA 2023d, pp. 458–459).

Likewise, a 'suitably qualified person' is someone who:

• is actively working towards an approved early childhood teaching qualification and has completed at least 50% of the qualification or holds an approved early childhood education and care diploma, or
• is registered as a primary or secondary school teacher in Australia and holds an ACECQA-approved early childhood education and care diploma (or higher approved qualification) (ACECQA 2023d, p. 459).

Extra conditions on qualifications exist depending on the nature of the provider.

- In preschools (kindergartens) and long day care services, at least 50% of educators must be diploma level qualified or higher. All other educators must be certificate III level qualified (ACECQA 2023g).
- As of July 2023, new FDC educators must hold an approved certificate III level (or higher) qualification prior to commencing their role in an FDC service. Existing educators engaged at an FDC service have until 1 July 2024 to complete an approved qualification (ACECQA 2023h).
- As noted above, there are state and territory-based standards for OSHC, which can be accessed via ACECQA's website (ACECQA 2022a, 2023i).
- Educators working at an education and care service may be required to complete a first aid qualification, anaphylaxis management training and emergency asthma management training. There are differing requirements for centre-based, school-based and FDC services (ACECQA 2023j).

Table C.1 – Qualification requirements under the NQF

Long day care and preschool

Number of children	Centre's weekly hours of operation	First early childhood teacher must be present	Second early childhood teacher or suitably qualified person must be present
<25	NA	20% of centre operating hours[a]	NA
25–59	<50	60% of centre operating hours	NA
	>=50	6 hours per day	NA
60–80[b]	<50	60% of centre operating hours	30% of centre operating hours
	>=50	6 hours per day	3 hours per day
>80[c]	<50	60% of centre operating hours	60% of centre operating hours
	>=50	6 hours per day	6 hours per day

a. Centres with fewer than 25 children need only have access to an early childhood teacher (ECT), and this access need not be in person (for example, via videoconferencing is permissible). **b.** This requirement can also be satisfied by employing one full-time ECT, and one part -time ECT or suitably qualified person. **c.** This requirement can also be satisfied by hiring one full-time ECT and one-full time ECT or suitably qualified person.

Source: ACECQA (2023d, pp. 456–458).

Educator-to-child ratios

The NQF established national educator-to-child ratios for long day care and preschool services, and FDC services. Although the NQF extends to children of school age, it does not include a national staff ratio for these children – individual jurisdictions have their own arrangements (table C.2). While national ratios were phased in from 2012 to 2016, some jurisdictions have retained higher standards that override the national ratios.

The National Regulations require ratios to be maintained at all times and there are no nationally consistent educator provisions in relation to taking breaks (ACECQA 2023d, p. 480). The Guide to the National Law and National Regulations states that regulatory authorities will 'allow' educators at centre-based services to take up to 30 minutes per day 'off the floor' without their position needing to be backfilled. Services must have sufficient staff available (whether full-time, part-time or casual) to fill planned or unplanned staff absences outside of this 30 minute period (ACECQA 2017b, p. 91).

This system of staff ratios also allows for children in older age groups to be 'mixed' into the ratio allocation for younger age groups, in cases where an educator has excess capacity. For example, if a service has one educator caring for three children aged 0 to 24 months, then that educator has the capacity to care for one additional child in an older age group (thereby reaching the maximum 1:4 ratio allowed for the 0-to-24-month age group) (ACECQA 2023d, p. 478).

Table C.2 – Educator to child ratios – long day care and preschool

Age of children	Educator to child ratio	Jurisdiction
Birth to 24 months	1:4	All states and territories
Over 24 months and less than 36 months	1:5	All states and territories excluding VIC
	1:4	VIC
36 months up to and including preschool age	1:11	ACT, NT, QLD, SA, VIC
	1:10	NSW, TAS, WA
	2:25[a]	TAS
Over preschool age	1:15	NT, QLD, SA, TAS, VIC, NSW
	1:11	ACT
	If no Kindergarten children present: 1:10 for first 12 children then 1:13	WA

a. For children attending a preschool program.
Source: ACECQA (2017a).

Family day care

Family day care facilities are limited to a ratio of seven children to one educator, with no more than four being preschool age or under. If the educator's own children (under 13 years old) are present, then they are counted in the total (ACECQA 2017a).

However, one educator can care for more than seven children (or more than four children preschool age or under) where:

- all the children being cared for are siblings in the same family, or
- a child is in need of protection under child protection law and the family day care educator is the best person to educate and care for the child, or
- the family day care residence or approved family day care venue is in a rural or remote location and no alternative care is available (ACECQA 2023d, p. 480).

Waivers

A service may apply to receive a waiver exempting it from certain requirements in the National Regulations where an issue is likely to be either temporary (fixable within 12 months), or ongoing (also known as a service waiver). A service may apply for one or more waivers for it to be exempted from requirements relating to the service's physical environment (including requirements regarding fencing, indoor or outdoor space, ventilation and glass) and/or staffing arrangements (including educator–child ratios and educator qualifications) (ACECQA 2023d, pp. 61–62).

As of April 2024, 72% of waivers were temporary and 28% were service waivers. A total of 1865 services had active waivers, accounting for about 11% of approved services (Productivity Commission estimates using ACECQA data (unpublished)). Across the country, Western Australia, South Australia and New South Wales had higher rates of waiver use (figure C.2). Of waiver types, waivers for staffing dominate (figure C.3), but the gap between waiver types is less pronounced in higher-income areas (figure C.4). Long day care services dominate staffing waivers (figure C.5). About 15% of private for-profit services use a waiver of some sort (figure C.6) – a considerably higher proportion than for other provider types.

Figure C.2 – Use of waivers varies across jurisdictions

Percentage of all services with at least one waiver, by jurisdiction, April 2024

Source: Productivity Commission estimates using ACECQA data (2024a).

Figure C.3 – Most waivers are granted for staffing

Percentage of waivers in force in a state or territory, April 2024
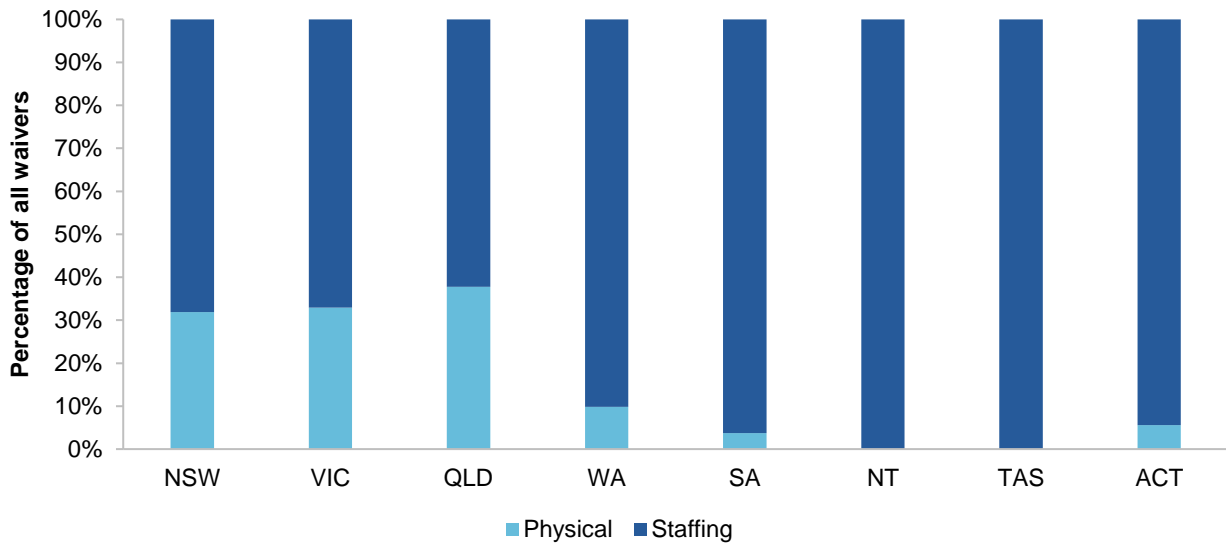
Source: Productivity Commission estimates using ACECQA data (unpublished).

Figure C.4 – Waiver types change with area demographics[a,b]

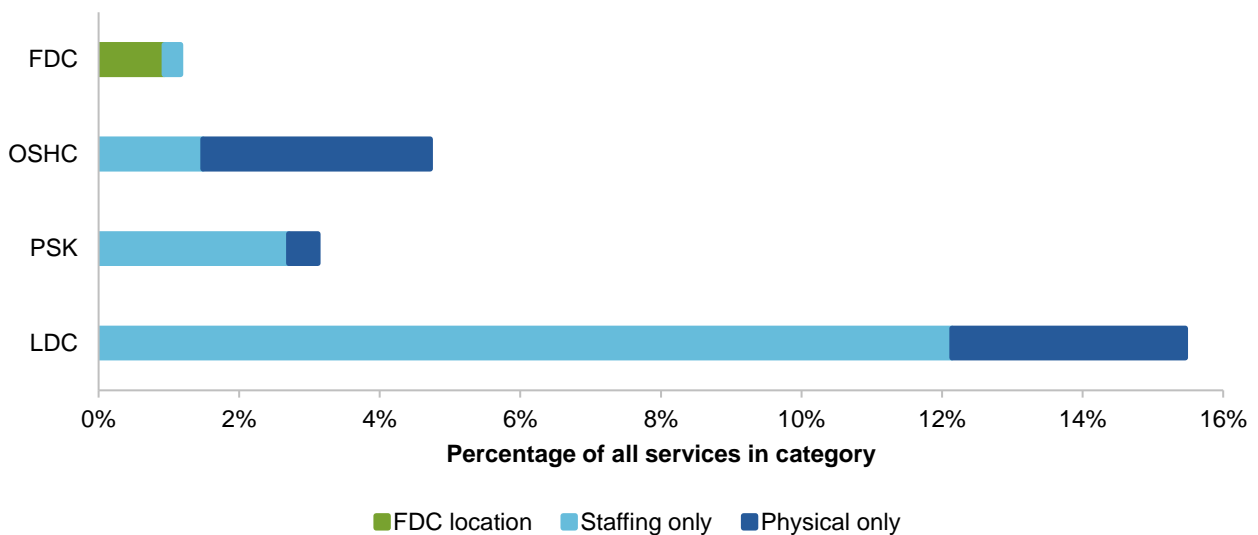**Waiver types as a percentage of services across socio-economic areas, April 2024**
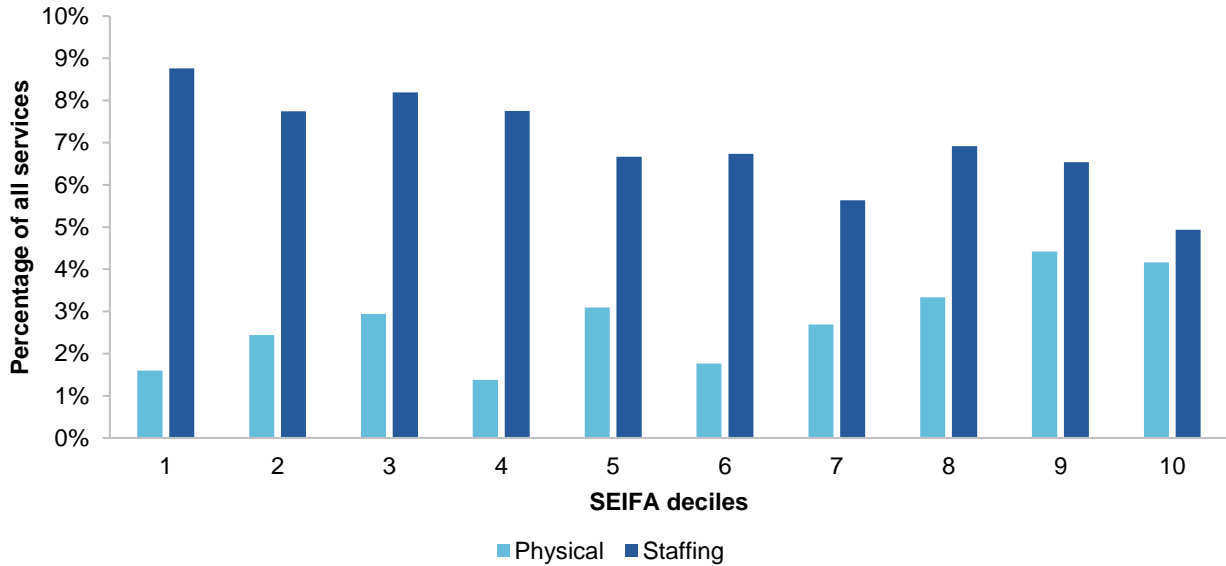
a. Calculated as the share of all services with any waivers of a particular type. The total number of services is based on data from the December quarter of 2022. Dashed lines are trend lines. **b.** SEIFA refers to Socio-Economic Indexes for Areas, and ranks areas in Australia according to relative socio-economic advantage.

Source: Productivity Commission estimates using ACECQA data (unpublished) and ACECQA (2024b).

## Figure C.5 – Long day care services are much more likely to hold staffing waivers[a,b]

Waiver types as a percentage of services in category, April 2024

a. PSK = preschool/kindergarten; OSHC = outside school hours care; LDC = long day care; FDC = family day care.
b. Calculated as the share of all services with any waivers of a particular type. The total number of services is based on data from the March quarter of 2024. At that time, one service had both a staffing and physical waiver in force, and was excluded.

Source: Productivity Commission estimates using ACECQA data (unpublished) and ACECQA (2024b).

Figure C.6 – For-profit providers are more likely to hold waivers[a]

Percentage of services with waivers by management category, April 2024

Percentage of all services in category
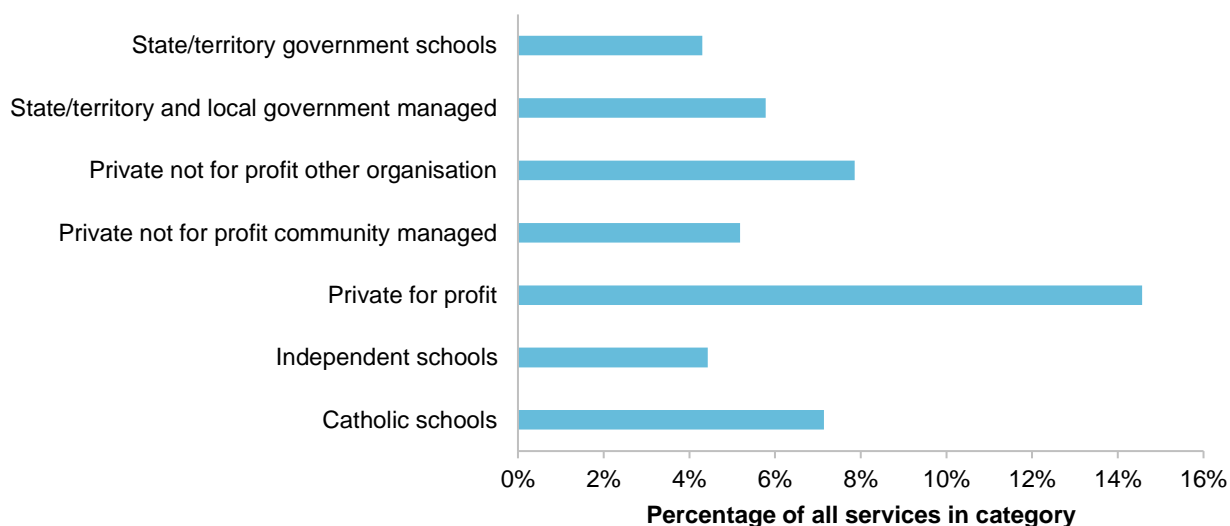
a. Total number of services is based on data from the March quarter of 2024.

Source: Productivity Commission estimates using ACECQA data (unpublished) and ACECQA (2024b).

Assessment and ratings process

Approved services are assessed by their jurisdiction-based regulatory authority. A service receives a rating for each standard and quality area in the NQS and this determines its overall rating. The possible ratings are:

- Excellent (overall rating only) – awarded by ACECQA on application
- Exceeding NQS
- Meeting NQS
- Working Towards NQS
- Significant Improvement Required.

These ratings must be displayed by the service and are published on the Starting Blocks website and the national register (ACECQA 2023d, pp. 92–93).

There has been a general improvement in quality ratings across the ECEC sector since the introduction of the NQF (figure C.7). As at 1 April 2024, 90% of assessed services had a rating of Meeting the NQS or higher (Productivity Commission estimates using ACECQA 2024b). This improvement has been driven by an increase in the proportion of services assessed as Meeting the NQS. The proportion of services rated as Exceeding the NQS or above has declined since 2018 but this most likely reflects changes made in 2018 to the NQS and the assessment criteria to receive an Exceeding rating.

At April 2024, FDC services were more likely than centre-based service types to be rated as Working Towards the NQS (26% versus 9%), and less likely to be rated as Exceeding (6% versus 21%) (ACECQA 2024b).

Figure C.7 – Quality ratings have improved over time[a,b,c,d]

Quality ratings of assessed services, as a proportion of all assessed services, 2013–2024
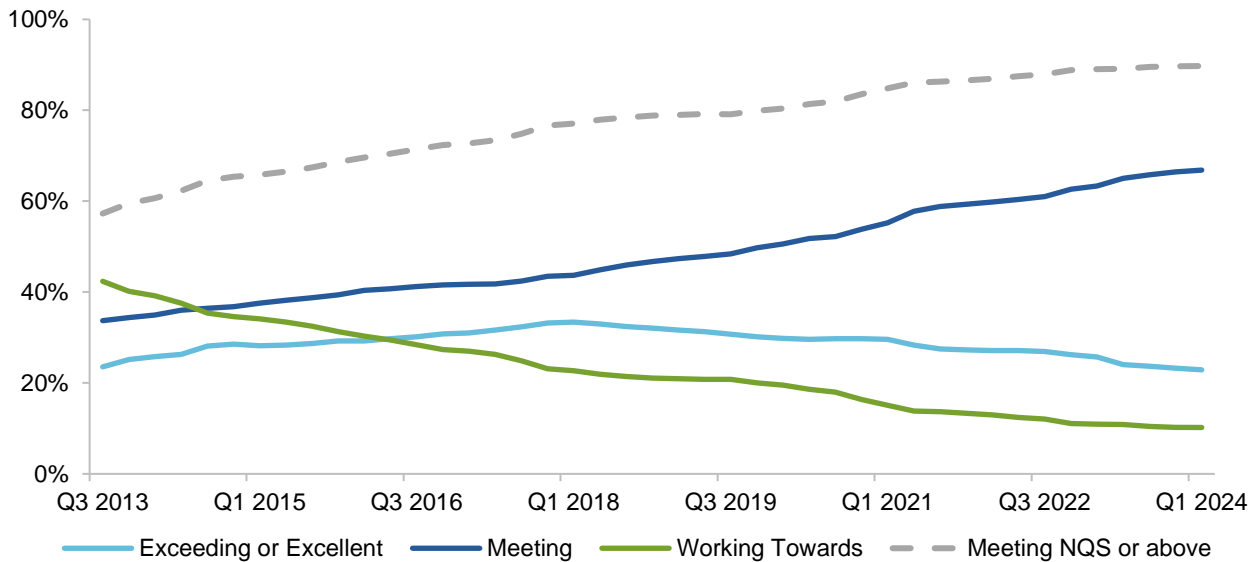
a. Subject to data caveats outlined in paper 8, box 8.1. **b.** Data covers the period from Q3 2013 to Q1 2024. **c.** Data captures services that had received at least one assessment by the end of the relevant quarter, regardless of whether the assessment and rating was conducted during that quarter. **d.** A very small proportion of services are assessed as Significant Improvement Required. These have not been depicted graphically but have been included in the total number of assessed services for the purposes of calculating the proportion of services achieving the respective quality ratings depicted in the figure.

Source: Productivity Commission estimates using ACECQA (2024b).

Under ACECQA guidelines, the current assessment process takes about nine weeks (figure C.8). The tiered design of the system means that a service must meet all 40 elements to receive an overall rating of at least Meeting the NQS (figure C.9). If a service does not meet one element of the NQS, it cannot receive a higher overall rating than Working Towards the NQS.

Services that are rated as exceeding the NQS in all seven quality areas can apply to ACECQA to be considered for an Excellent rating, which is the highest rating a service can achieve (ACECQA 2023d, p. 358). ACECQA assesses applications according to three criteria:

- the service exemplifies and promotes exceptional education and care that improves outcomes for children and families, across at least three of five quality 'themes'
- the service demonstrates leadership that contributes to the development of a community, a local area or the wider education and care sector
- the service demonstrates commitment to sustained excellent practice through continuous improvement and comprehensive forward planning (ACECQA 2023c, p. 2).

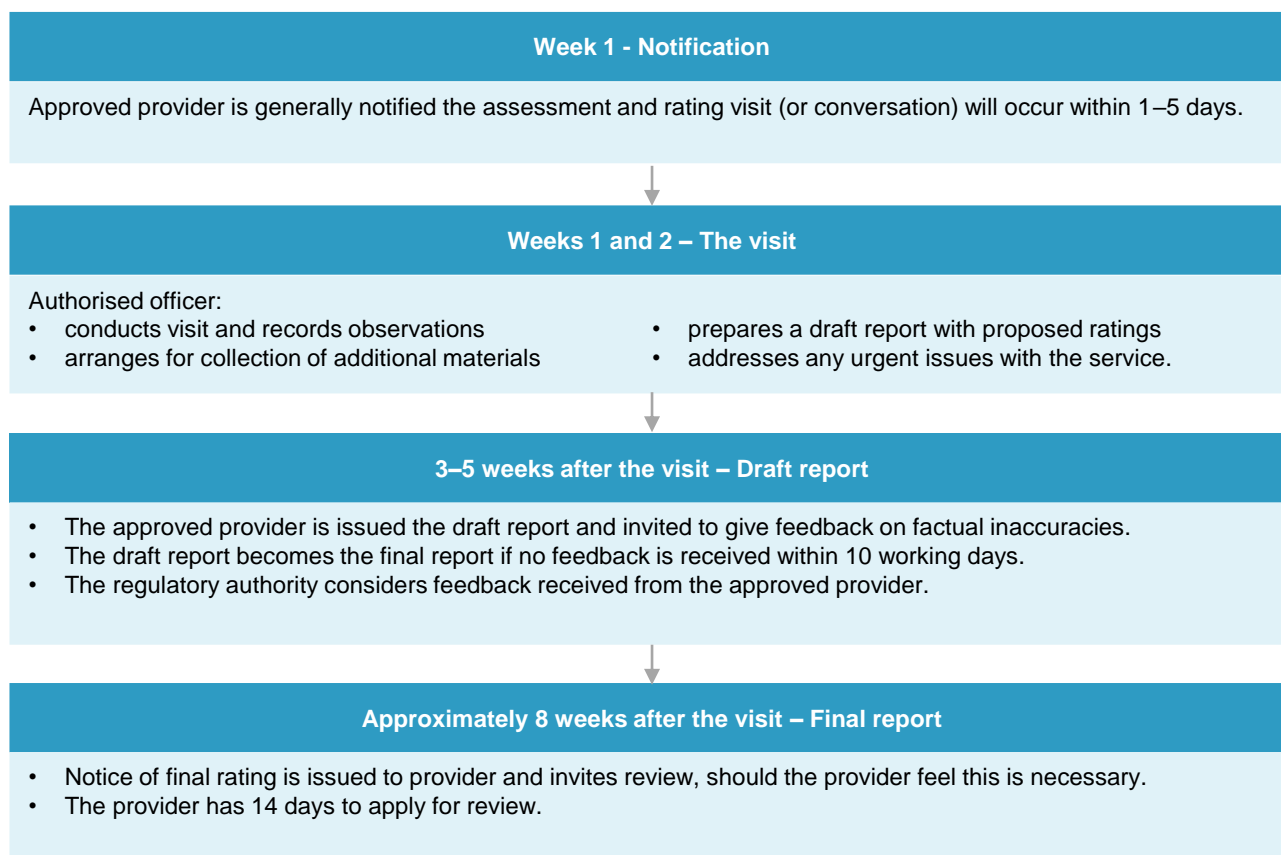## Frequency of the assessment and rating cycle

Regulatory bodies schedule quality rating assessments with a view to rating the quality of services, supporting continuous improvement and keeping information for families and communities accurate and up to date. The schedule for reassessment follows a risk-based framework, which considers:

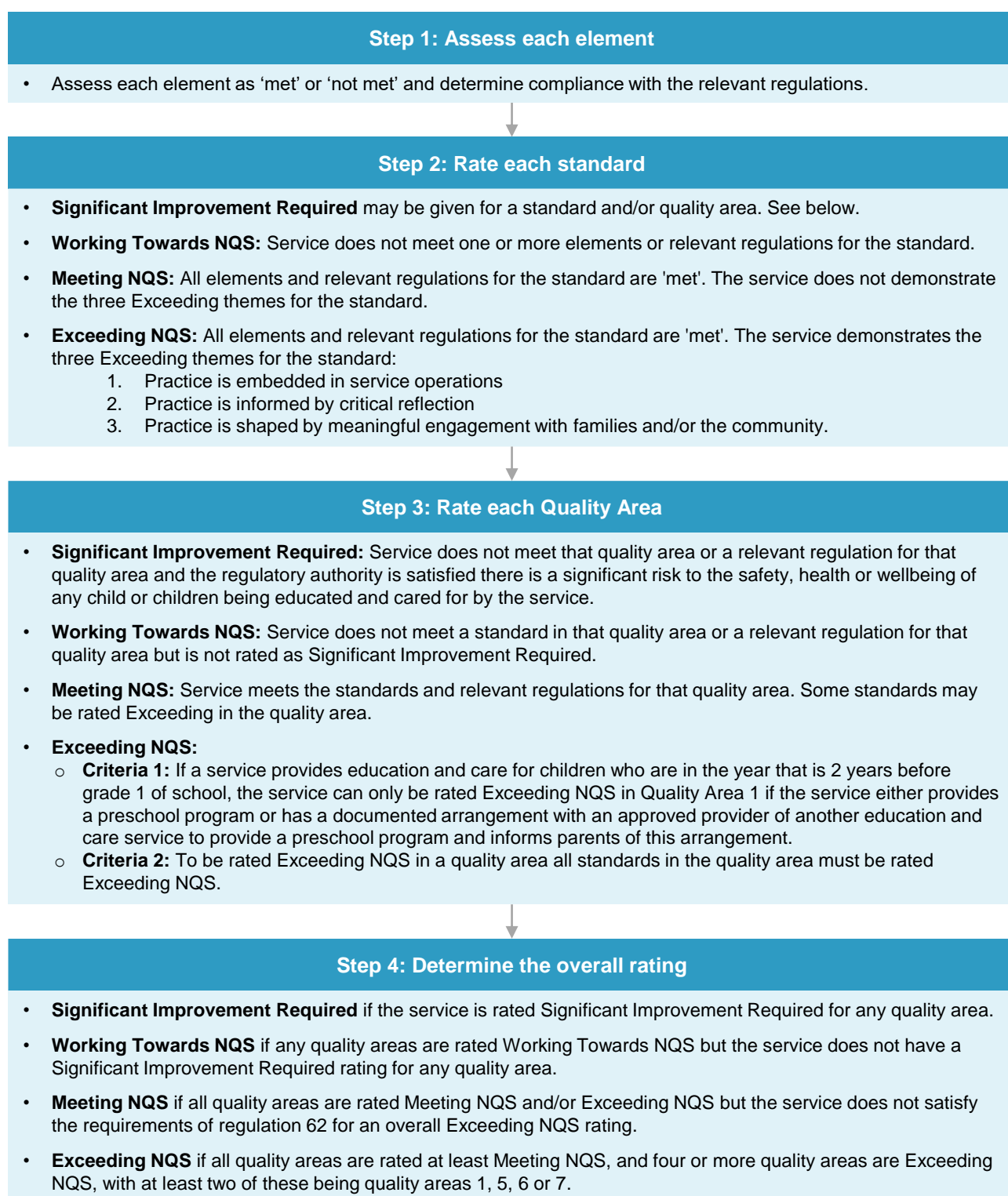- the quality rating of a service when previously assessed

- changes in service attributes that might affect the service's quality – for example, changes in provider or service management
- changes in ratings over time
- events occurring at the service, such as serious incidents, complaints or non-compliance with the National Law
- indicators that a service is failing to notify the regulatory authority of complaints or incidents
- if the quality rating of the service conflicts with recent compliance history
- the length of time since the last monitoring or assessment visit
- size of the service – given larger services can have an impact on more children (ACECQA 2023d, pp. 355–356).

Across the board, the NQF delivers a form of 'earned autonomy', whereby lower-rated centres are reassessed more often, and higher-rated centres experience fewer reassessments. However, a number of factors combine at the local level resulting in different reassessment timeframes between states and territories, including different resourcing of regulatory authorities (paper 8).

Figure C.8 – Assessment timeline

Week 1 - Notification
Approved provider is generally notified the assessment and rating visit (or conversation) will occur within 1–5 days.

Weeks 1 and 2 – The visit	
Authorised officer: • conducts visit and records observations • arranges for collection of additional materials	• prepares a draft report with proposed ratings • addresses any urgent issues with the service.

3–5 weeks after the visit – Draft report
• The approved provider is issued the draft report and invited to give feedback on factual inaccuracies. • The draft report becomes the final report if no feedback is received within 10 working days. • The regulatory authority considers feedback received from the approved provider.

Approximately 8 weeks after the visit – Final report
• Notice of final rating is issued to provider and invites review, should the provider feel this is necessary. • The provider has 14 days to apply for review.

Source: ACECQA (2023d, pp. 353–354).

Figure C.9 – How quality rating levels are determined[a]

Step 1: Assess each element

- Assess each element as 'met' or 'not met' and determine compliance with the relevant regulations.

Step 2: Rate each standard

- **Significant Improvement Required** may be given for a standard and/or quality area. See below.

- **Working Towards NQS:** Service does not meet one or more elements or relevant regulations for the standard.

- **Meeting NQS:** All elements and relevant regulations for the standard are 'met'. The service does not demonstrate the three Exceeding themes for the standard.

- **Exceeding NQS:** All elements and relevant regulations for the standard are 'met'. The service demonstrates the three Exceeding themes for the standard:
    1. Practice is embedded in service operations
    2. Practice is informed by critical reflection
    3. Practice is shaped by meaningful engagement with families and/or the community.

Step 3: Rate each Quality Area

- **Significant Improvement Required:** Service does not meet that quality area or a relevant regulation for that quality area and the regulatory authority is satisfied there is a significant risk to the safety, health or wellbeing of any child or children being educated and cared for by the service.

- **Working Towards NQS:** Service does not meet a standard in that quality area or a relevant regulation for that quality area but is not rated as Significant Improvement Required.

- **Meeting NQS:** Service meets the standards and relevant regulations for that quality area. Some standards may be rated Exceeding in the quality area.

- **Exceeding NQS:**
    o **Criteria 1:** If a service provides education and care for children who are in the year that is 2 years before grade 1 of school, the service can only be rated Exceeding NQS in Quality Area 1 if the service either provides a preschool program or has a documented arrangement with an approved provider of another education and care service to provide a preschool program and informs parents of this arrangement.
    o **Criteria 2:** To be rated Exceeding NQS in a quality area all standards in the quality area must be rated Exceeding NQS.

Step 4: Determine the overall rating

- **Significant Improvement Required** if the service is rated Significant Improvement Required for any quality area.

- **Working Towards NQS** if any quality areas are rated Working Towards NQS but the service does not have a Significant Improvement Required rating for any quality area.

- **Meeting NQS** if all quality areas are rated Meeting NQS and/or Exceeding NQS but the service does not satisfy the requirements of regulation 62 for an overall Exceeding NQS rating.

- **Exceeding NQS** if all quality areas are rated at least Meeting NQS, and four or more quality areas are Exceeding NQS, with at least two of these being quality areas 1, 5, 6 or 7.

a. This figure outlines the ratings awarded by state and territory regulatory authorities. Services rated Exceeding NQS in all seven quality areas can apply to ACECQA for an Excellent rating.

Source: ACECQA (2023d, pp. 359–360).

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D. The Child Care Subsidy system

As the 2024-25 Education Portfolio Budget Statement states:

> the Child Care Subsidy (CCS) aims to improve access to quality early childhood education and care by providing assistance to meet the cost of early childhood education and care for families engaged in work, training, study or other recognised activity (DoE 2024a, p. 32).

This appendix explains different features of the CCS system such as: how eligibility and subsidy amounts are determined for families (for both CCS and Additional CCS (ACCS)) (section D.1); the evolution of the CCS (section D.2); and how the system is administered (section D.3). It also includes information on government spending on CCS (section D.4) and some distributional analysis of children using CCS-approved services (section D.5). This appendix provides background information for the discussion of early childhood education and care (ECEC) affordability in paper 6.

D.1 Eligibility and subsidy amounts

To receive CCS, a child must be attending a CCS-approved[1] ECEC service, which can be a centre-based day care (CBDC), family day care (FDC), outside school hours care (OSHC) or In Home Care (IHC) service (Services Australia 2023g). These service types are discussed in more detail later in this section.

The child must also not be attending secondary school[2] and the parent or guardian applying for CCS must care for them at least two nights per fortnight (or have a 14% share of care). Residence rules[3] and child immunisation requirements also apply (Services Australia 2023g).

The subsidy amount that families are eligible for is a function of:

- the activity test
- the hourly fee charged by the service, as well as whether that fee is above or below the hourly rate cap
- a family's adjusted taxable income[4]

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[1] A provider running a service that offers CCS must have two types of approval (appendix C). One, granted by the relevant state or territory government, deems the service suitable to ensure the health, safety, wellbeing and educational outcomes of children (National Law or state regulatory approval). The second, granted by the Australian Government, deems the service suitable to administer CCS (CCS or Family Assistance Law approval), and cannot be granted until state or territory government approval has been granted. Both approvals can be applied for at the same time (DoE 2023a).

[2] Exemptions may apply if the child is 13 years old or under, or 14 to 18 with a disability (Services Australia 2023h).

[3] On the day the individual claims, they or their partner must be living in Australia and have Australian citizenship, a permanent visa, a Special Category visa, or a Partner Provisional or Temporary Protection type visa. Alternatively they may be in hardship, experiencing other special circumstances or they or their partner may be a student from overseas and receiving financial assistance from the Australian Government to study in Australia (Services Australia 2023d).

[4] For the remainder of this appendix, adjusted taxable income, which determines CCS and HCCS rates, will be referred to as income.

• whether the family has more than one child aged five or younger in ECEC
• whether the family is eligible for further targeted assistance, such as through the ACCS.

These elements are explained below.

The activity test

The activity test determines the number of hours of subsidised care a family is eligible for per child given the parent's or guardian's activity type and level. Hours of different activity types can be combined to produce an overall activity level (Services Australia 2022a).

Recognised activity types include:

• employment related activity

– paid work, including being self employed
– unpaid work in a family business
– unpaid work experience or unpaid internship
– actively setting up a business
– actively looking for work

• other forms of activity

– paid or unpaid leave, including paid or unpaid parental or maternity leave
– doing an approved course of education or study
– doing training to improve work skills or employment prospects
– volunteering
– other activities on a case by case basis (Services Australia 2022d).

For some activity types, only a certain amount of time is recognised, such as:

• periods of unpaid leave for up to six months (this does not apply to unpaid parental leave)
• setting up a business for six months out of every 12 months
• 16 hours per fortnight if the only activity is volunteering or actively looking for work (Services Australia 2022d). For example, if a parent or guardian only undertakes volunteering as their activity and completes 20 hours in a fortnight, then only 16 of those hours would be recognised and they would be eligible for 36 hours of subsidised care for that fortnight.

Generally, though, the number of eligible subsidised care hours increases as the activity level increases (table D.1).

Table D.1 – Hours of subsidised care increase with the level of activity[a]

Activity level each fortnight	Hours of subsidised care each fortnight
Less than eight hours	Zero hours if earning more than $80,000 per year[b]
	24 hours if earning $80,000 or below per year[b]
Eight to 16 hours	36 hours
More than 16 to 48 hours	72 hours
More than 48 hours	100 hours

a. Does not apply to IHC (being eligible for IHC entitles families to receive up to 50 hours of care each week). **b.** $80,000 is the 2023-24 threshold.

Source: Services Australia (2022a).

Exemptions to the activity test provide an entitlement of a certain number of hours of subsidised care per fortnight per child for:

- families who earn $80,000 or less per year (2023-24 income threshold) (24 hours)
- families eligible for ACCS (eligible subsidised hours vary, table D.4 provides further details)
- families with a parent or guardian in receipt of JobSeeker, Youth Allowance, Parenting Payment or Special Benefit who have mutual obligation requirements (36 hours) or who do not have mutual obligation requirements (100 hours)
- Aboriginal and Torres Strait Islander children (36 hours)
- children attending a preschool program at a CBDC in the year before school (36 hours) (DSS 2023b, 2023a)
- grandparents or great-grandparents who are primary carers (100 hours)
- parents or guardians who have a disability or medical condition that stops them from participating in recognised activity, or who would be unable to adequately care for their child if the child did not attend ECEC (100 hours)
- parents or guardians who provide constant care for a child or adult with a disability or medical condition (100 hours)
- Carer Payment recipients (100 hours)
- Carer Allowance recipients (72 hours)[5]
- parents or guardians who are temporarily outside Australia for up to a maximum of six weeks (100 hours)
- parents or guardians who are in prison or psychiatric confinement because they have been charged with or convicted of an offence (100 hours) (DSS 2023b, 2023a).

If there is more than one parent or guardian, the parent or guardian with the lowest activity result (in other words, the level of activity that results in a lower number of subsidised hours) determines the number of eligible subsidised care hours (Services Australia 2022a). This applies where one parent or guardian has an activity test exemption and the other does not (box D.1).

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[5] Carer Allowance recipients reporting more than 48 hours of activity per fortnight (either hours of caring or combined with hours of other recognised activities) will have an activity test result of 100 hours of subsidised care per fortnight. If the recipient also receives Carer Payment, the higher number of eligible subsidised hours applies (that is, 100 hours).

> **Box D.1 – Exemptions may or may not affect a family's activity test result**
>
> Sunghun and Lia have two children and collectively earn less than $80,000 per year. Sunghun does not undertake any recognised activity, while Lia studies 50 hours each fortnight. Generally, based on Sunghun's lower activity test result, Sunghun and Lia's children would not be entitled to any subsidised care. However, as the family's annual income is less than $80,000, the children are entitled to 24 hours of subsidised care per fortnight each, regardless of Sunghun and Lia's activity levels.
>
> Simon and Daniil have one child. Simon works for 40 hours per fortnight and Daniil receives Carer Payment. Although Daniil is entitled to an activity test exemption of 100 hours per fortnight, because Simon works between 16 and 48 hours per fortnight, their child is eligible for 72 hours of subsidised care per fortnight (the lower of Simon and Daniil's respective activity test results).
>
> Source: DoE (pers. comm., 3 May 2024).

The CCS hourly rate cap

The CCS hourly rate cap sets the maximum hourly rate to which the subsidy applies. When the CCS hourly rate cap was introduced, it reflected the 'projected mean price at the time of implementation plus 17.5% for Long Day Care and OSHC and 5.75% for FDC' (Abbott and Morrison 2015).[6]

If the hourly fee charged by a service provider is below the hourly rate cap, then the subsidy rate is applied to the hourly fee. However, if the hourly fee charged is at or above the CCS hourly rate cap, the subsidy rate is applied to the CCS hourly rate cap and any fee above it is unsubsidised (Services Australia 2023f).[7] The 2023-24 CCS hourly rate caps are presented in table D.2.

Hourly rate caps are indexed annually to the CPI (DSS 2023c).

Table D.2 – Hourly rate caps vary by type of service and age of the child

Hourly rate caps, 2023-24

	Hourly rate cap (children below school age)	Hourly rate cap (school aged children)
CBDC	$13.73	$12.02
OSHC	$13.73	$12.02
FDC	$12.72	$12.72
IHC (per family)	$37.34	$37.34

Source: Services Australia (2023f).

Some services charge above the hourly rate cap (figure D.1). For example, in the December 2023 quarter, 24% of CBDC services charged above the CCS hourly rate cap. And about one in five children had average

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[6] With the introduction of the CCS in 2018, long day care and occasional care were combined and are now collectively called CBDC.

[7] The exception to this is when a child is eligible for ACCS (table D.4).

hourly fees across the December 2023 quarter that were above the cap, with this situation being considerably more common among families with higher incomes (figure D.2).

Figure D.1 – The proportion of services that charge above the hourly rate cap differs by service type[a,b]

Proportion of services charging above the hourly rate cap, December quarter 2023
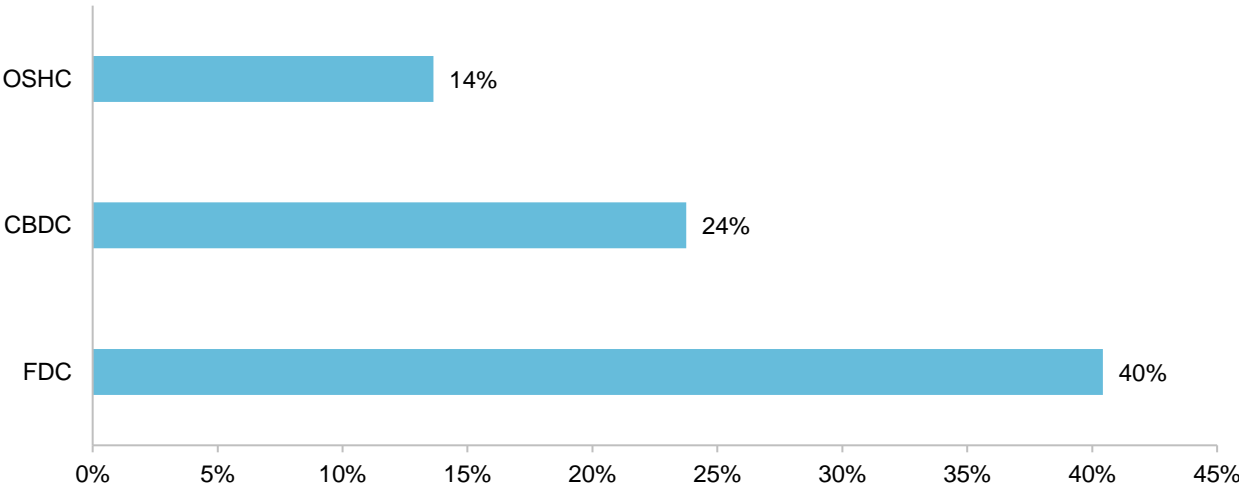
a. Data excludes IHC. There are 35 IHC services, representing less than 1% of CCS-approved services. **b.** An average hourly fee (which may differ from the actual fee charged by a service) is calculated to determine whether a service is under or above the cap. Families may be charged on a sessional basis, not an hourly basis – when services offer multiple sessions and use sessional charging, the hourly fee paid by families can vary across sessions.

Source: DoE (2024b, table 3.4).

Figure D.2 – Towards the end of 2023, families of more than one in five children were charged fees above the CCS hourly rate cap[a]

Proportion of children for whom fees charged were above the hourly rate cap by income decile, December quarter 2023
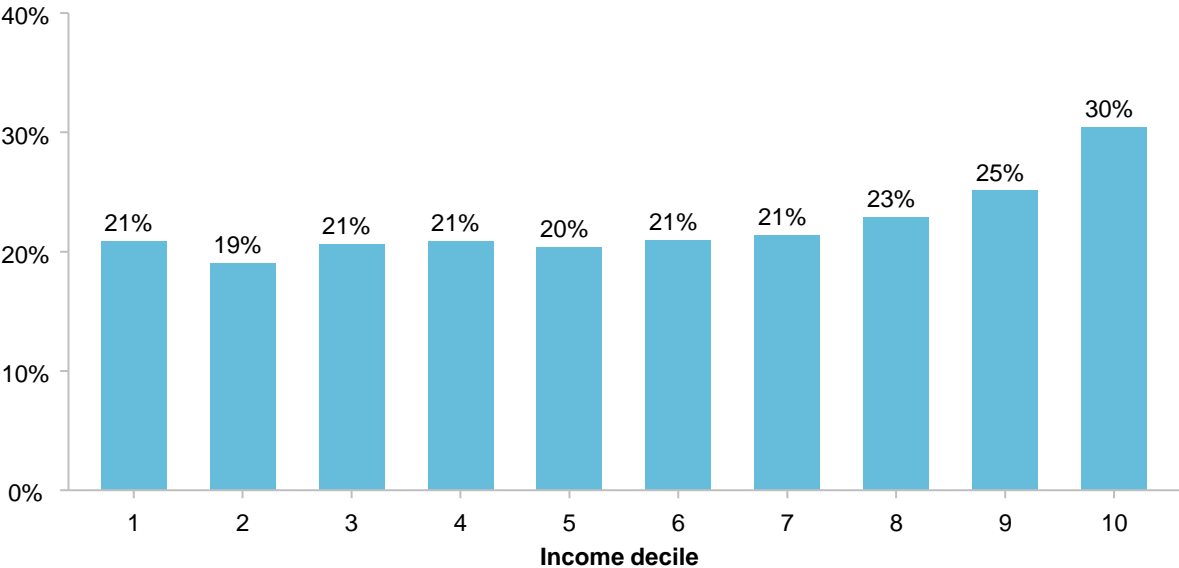
a. The percentages in this chart represent the proportion of children who faced weighted average hourly fees across the quarter that were above the CCS hourly rate cap. Income deciles have been calculated based on family income and at the family level, among those using CCS-approved services.

Source: Productivity Commission estimates using DoE administrative data (unpublished).

A family's income, number of children and personal circumstances determine the subsidy rate they receive

The subsidy rate is specific to each child within a family and depends on the family's income, number of children aged five or younger within the family that attend ECEC and the family's personal circumstances. Subsidy rates are usually applied to the ECEC hourly fee up to the CCS hourly rate cap. For the first child attending ECEC, the CCS rate is 90% if their family's annual income is up to $80,000 in 2023-24, with the CCS rate tapering by 1% for every $5,000 a family earns above $80,000 (figure D.3). Families with more than one child aged five or younger attending ECEC may be eligible for a higher CCS rate for their second and subsequent children. For families with an annual income up to $138,118 in 2023-24, a subsidy rate of 95% applies, tapering down as income increases (figure D.3). Income thresholds are indexed annually to the CPI. The ACCS provides higher subsidy rates for children from families with certain personal circumstances. Higher subsidy rates for multiple children and ACCS are explained in more detail below.

Figure D.3 – CCS rates and higher CCS rates decrease as family income rises[a]

CCS rates and higher CCS rates for multiple children, 2023-24
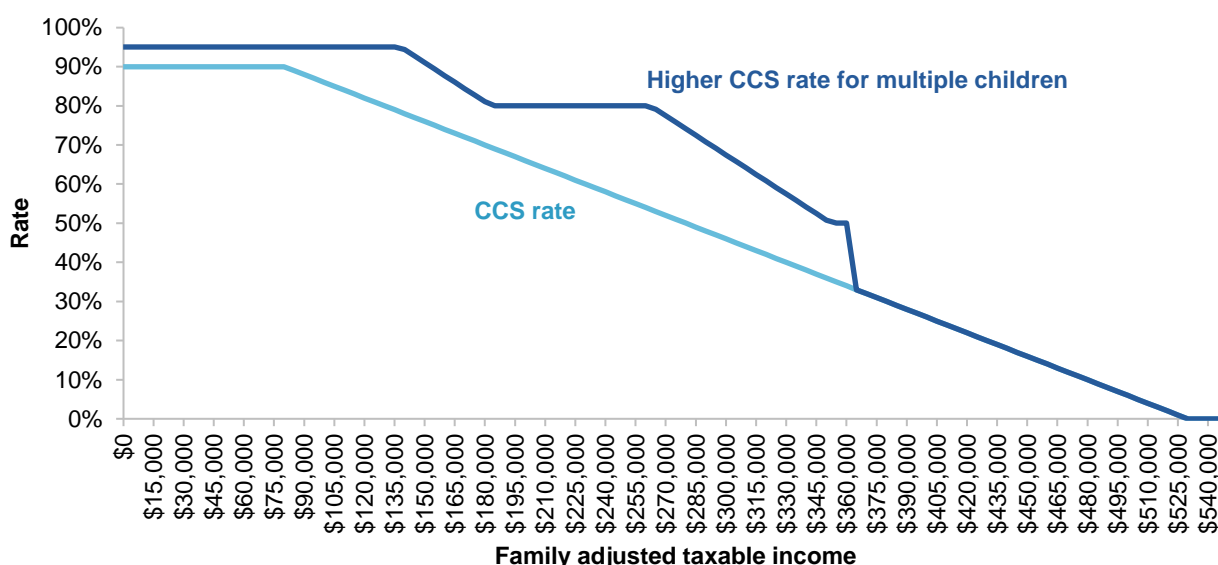
a. Income thresholds are indexed annually to the CPI.

Source: Services Australia (2023h, 2023i).

Higher CCS rates for more than one child attending ECEC

Table D.3 sets out the relevant subsidy rates and income thresholds for families with more than one child aged five or younger attending ECEC. These rates are represented graphically in figure D.3. When the higher CCS (HCCS) was first introduced, it was determined as a family's CCS rate plus 30 percentage points, up to a maximum of 95% for CCS eligible families (DoE 2021). However, this relationship between CCS and HCCS ended when the 2023 Cheaper Child Care changes were introduced – the CCS was

streamlined but the structure of the HCCS rates and thresholds broadly remained unchanged.[8] In 2022-23, 41% of families who used CCS-approved services had more than one child attending for at least part of the financial year (Productivity Commission estimates using DoE administrative data (unpublished)).

For combined families where both members of a couple received CCS for different children in their family, the combined family is assessed as a whole to determine the eligibility for higher CCS rates. This includes all CCS-eligible children aged five or younger attending ECEC in the care of both members of the couple (Services Australia 2023i).

Table D.3 – HCCS rates for families with more than one child aged five or younger attending ECEC[a]

2023-24

Annual family income	HCCS rate
$0 to $138,118	95%
More than $138,118 to below $183,118	Between 95% and 80% The percentage goes down by 1% for every $3,000 of family income.
$183,118 to below $262,408	80%
$262,408 to below $352,408	Between 80% and 50% The percentage goes down by 1% for every $3,000 of family income.
$352,408 to below $362,408	50%
$362,408 or more	HCCS rates no longer apply, all children in the family attract the standard CCS rate.

a. Income thresholds are indexed annually to the CPI.

Source: Services Australia (2023i).

The ACCS

For families in certain circumstances, higher subsidy rates are available through the ACCS. To receive ACCS, families must also be eligible for CCS. There are four categories of ACCS.

- ACCS (Child Wellbeing) is for families caring for a child who is vulnerable or considered to be at risk of harm, abuse or neglect – this includes a child in formal foster care or formal kinship placement; or in the care of the state, territory or the Minister (Services Australia 2021).
- ACCS (Grandparent) is for grandparents or great-grandparents on income support who are the principal carers of their grandchild(ren) (that is, they provide 65% or more care of the child; and make day-to-day decisions about the child's care, welfare and development) (Services Australia 2022f).
- ACCS (Temporary Financial Hardship) is for families experiencing temporary financial hardship due to an event that happened in the preceding six months (Services Australia 2023d).
- ACCS (Transition to Work) is for families transitioning to work from income support. To be eligible, the parent or guardian must:

  - be studying, looking for a job, working or training
  - have a family income of less than $80,000 per year (2023-24 income threshold)

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[8] The 2023 Cheaper Child Care changes also resulted in higher-income families being eligible for CCS where previously they were not. While these families remain ineligible to receive HCCS for any second and subsequent children they have, they can now receive the standard CCS rate for all their children (Services Australia 2023j).

– have a Job Plan (unless receiving Austudy, ABSTUDY or Disability Support Pension) or Participation Plan (if receiving the Disability Support Pension)

– receive one of the following payments: Parenting Payment, JobSeeker Payment, Disability Support Pension, Youth Allowance, Carer Payment, Special Benefit (if ineligible for JobSeeker Payment or Parenting Payment), Austudy, Farm Household Allowance, a means tested ABSTUDY payment (Services Australia 2023e).

In addition to a higher subsidy rate, families eligible for ACCS can receive more subsidised hours a fortnight than if they were only eligible for CCS (except for families transitioning from income support) (table D.4). Depending on the ACCS type, families may only be eligible to receive ACCS for a limited time.

Between the December 2018 and December 2023 quarters, the number of children accessing ACCS rose from 27,180 to 37,780 (DoE 2019, 2024b). This increase may reflect a delay in children transferring to ACCS from previous programs that provided additional support to families (section D.2). Bray et al. (2021, pp. 329–330) identified that the transition to ACCS was 'challenging' for services and that the number of children accessing ACCS increased once '[transitional] issues were resolved and understanding of eligibility and processes improved'.

Of the 37,780 children accessing ACCS in the December 2023 quarter, about three quarters did so through Child Wellbeing. The number of children accessing ACCS via Transition to Work has fallen by about 15% in the past year (figure D.4). Further information on government spending on ACCS is in section D.4.

In the December 2023 quarter, 16% of children at a weekly level who received ACCS faced out-of-pocket expenses.[9] For the weeks in which those children faced out-of-pocket expenses, the average out-of-pocket expense was about $42 a week (Productivity Commission estimates using DoE (unpublished)).

Table D.4 – ACCS provides higher subsidy rates and subsidised hours

ACCS category	Subsidy percentage	Hours of assistance per fortnight	Length of eligibility
Child Wellbeing	i) 100% of the fee if below or equal to the rate cap, or ii) up to 120% of the rate cap if the fee is above the rate cap	100 hours	Six weeks. After the initial six weeks, the ECEC service can assess if the applicant needs to keep receiving the subsidy. If so, the service can apply for longer periods of up to 13 weeks[a]
Grandparent	i) 100% of the fee if below or equal to the rate cap, or ii) up to 120% of the rate cap if the fee is above the rate cap	100 hours	No time limit
Temporary Financial Hardship	i) 100% of the fee if below or equal to the rate cap, or ii) up to 120% of the rate cap if the fee is above the rate cap	100 hours	13 weeks per event
Transition to Work	i) 95% of the fee if below or equal to the rate cap, or	Depends on activity level	Depends on type of activity

[9] Calculated as a share of weekly-level child observations. Children who received ACCS in multiple weeks are included multiple times in the denominator.

| ACCS category	Subsidy percentage	Hours of assistance per fortnight	Length of eligibility
	ii) up to 95% of the rate cap if fee is above the rate cap		

a. The service can apply for up to 52 weeks if the child is on a long-term protection order, in formal foster care or in a formal kinship arrangement.

Source: Services Australia (2022b, 2022c, 2022e, 2022g).

In the December 2023 quarter, the 37,780 children accessing the ACCS represented about 3% of all children using CCS-approved services. The rate at which children using CCS-approved services accessed ACCS rose throughout 2018 and 2019 before peaking in the December 2020 quarter (figure D.5).

Figure D.4 – The number of children accessing ACCS increased in the 18 months following September 2018, but has fallen since 2020ᵃ

Number of children accessing ACCS, September 2018 to December 2023
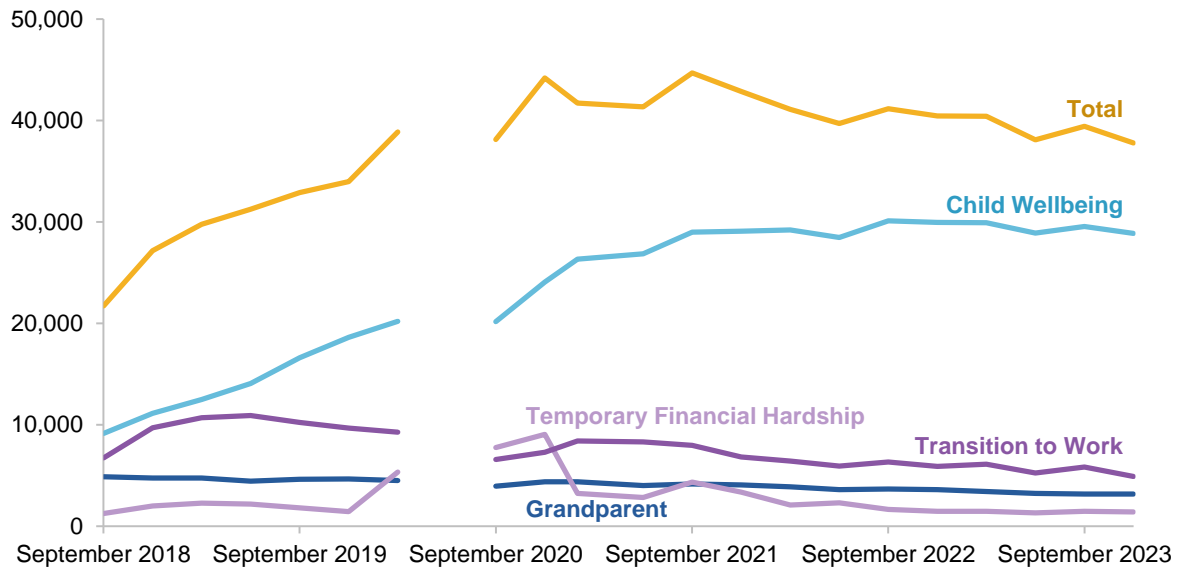
a. Data for June quarter 2020 is unavailable due to temporary measures implemented in response to COVID-19.

Source: DoE (2024b, table 7.1) (and previous quarters).

Figure D.5 – The proportion of children using CCS-approved services accessing ACCS peaked during COVID-19[a]

Proportion of children using CCS-approved services accessing ACCS, September 2018 to December 2023
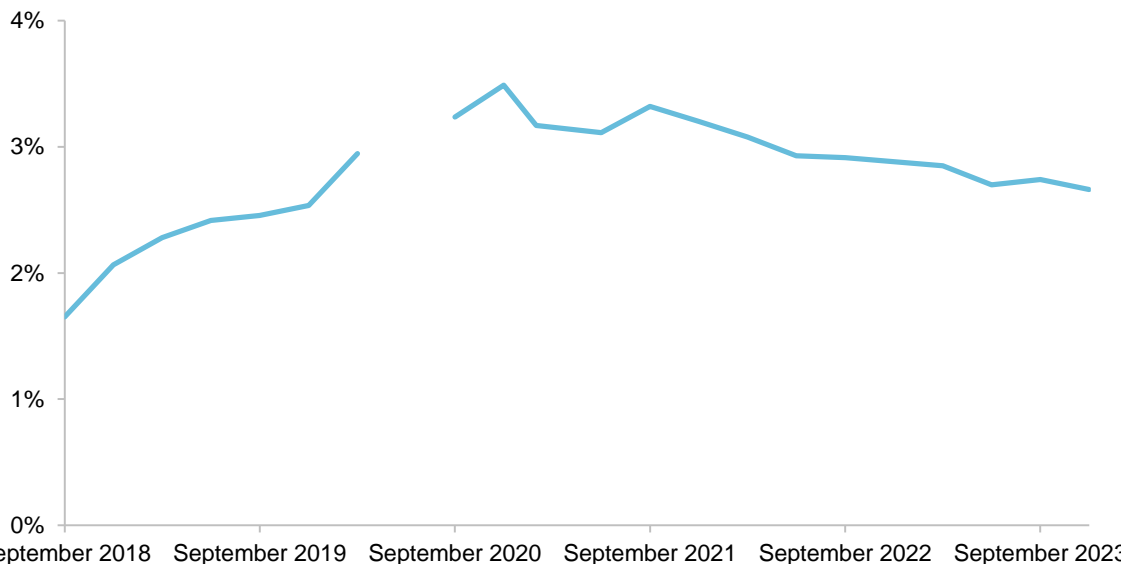
a. Data for June quarter 2020 is unavailable due to temporary measures implemented in response to COVID-19.

Source: Productivity Commission estimates using DoE (2024b, tables 1.1 and 7.1) (and previous quarters).

Box D.2 provides examples of how the CCS and ACCS, coupled with fees charged by services and family characteristics, affect families' out-of-pocket expenses.

Box D.2 – The relationship between fees, subsidies and out-of-pocket expenses

Scenarios for a family eligible for Child Care Subsidy (CCS)

Consider a family with an annual income of $100,000 and one three-year-old child who attends centre-based day care (CBDC) for ten hours a day, three days a week. Given their income, the family is eligible for a CCS rate of 86%. The amount of subsidy this family receives and, therefore, their out-of-pocket ECEC expenses are a function of the fees charged by the CBDC and the hourly rate cap.

Hourly fees affect out-of-pocket expenses and CCS amounts[a,b]

2023-24 CCS rates and thresholds, weekly expenses

a. This example assumes an annual family income of $100,000 and one child in CBDC for three ten-hour days a week. b. Scenario 1 assumes an hourly fee equal to the CCS hourly rate cap, $13.73. Scenario 2 assumes an hourly fee of $12 and scenario 3 assumes an hourly fee of $16.

Source: Productivity Commission estimates using Services Australia (2023h).

The figure above illustrates three scenarios.

- Scenario 1: the hourly fee charged by the CBDC ($13.73) is equal to the CCS hourly rate cap. Without CCS, ECEC would cost the family $412 a week. With CCS, the family receives a weekly subsidy of $354 (86% of $412) and has an out-of-pocket expense of $58.
- Scenario 2: the hourly fee charged ($12.00) is below the hourly rate cap. Total fees are $360 for the week and, as under scenario 1, their subsidy equates to 86% of this figure. The family's out-of-pocket expenses for the week are $50.
- Scenario 3: the hourly fee charged ($16.00) is above the CCS hourly rate cap. Total fees are $480 for the week, but the subsidy is not 86% of this amount. Because the CCS rate applies to the minimum of the CCS hourly rate cap and the hourly fee, the subsidy amount is the same as under scenario 1. In this scenario, therefore, the subsidy amounts to 74% of the family's total fees and the out-of-pocket expense is $126, $68 higher than under scenario 1.

Scenarios for a family eligible for Additional Child Care Subsidy (ACCS)

Most ACCS recipients receive a 100% subsidy, and where a service charges above the CCS hourly rate cap, ACCS recipients are eligible to receive up to 120% of the CCS hourly rate cap (ACCS (Transition to Work) recipients receive a 95% subsidy). Essentially this means ACCS recipients would have 100% of their ECEC expenses subsidised if their hourly fee is up to or at 120% of the CCS hourly rate cap. ACCS recipients that are charged an hourly fee above 120% of the CCS hourly rate cap would be eligible to receive a subsidy of 120% of the CCS hourly rate cap only.

Consider a family with an annual income of $60,000 and one three-year-old child who attends CBDC for ten hours a day, three days a week. This family is eligible for the ACCS (Child Wellbeing).

Families with children eligible for ACCS can have fees subsidised up to 120% of the hourly rate cap[a]

ACCS (Child Wellbeing), 2023-24 CCS rates and thresholds, weekly expenses
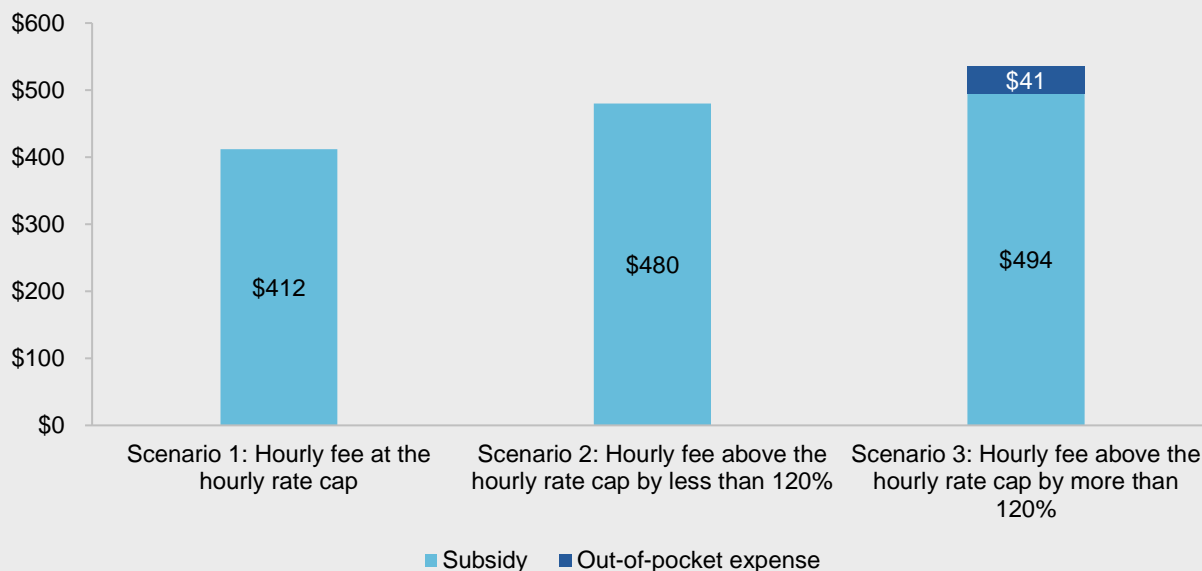
a. This example assumes an annual family income of $60,000 and one child in CBDC for three ten-hour days per week. The scenario 1 hourly fee is assumed to be at the CCS hourly rate cap of $13.73, the scenario 2 hourly fee is assumed to be $16 and the scenario 3 hourly fee is assumed to be $17.85.

Source: Productivity Commission estimates using Services Australia (2022b).

The figure above illustrates three scenarios.

- Scenario 1: the hourly fee charged by the CBDC ($13.73) is equal to the CCS hourly rate cap. Without ACCS, ECEC would cost the family $412 a week. With ACCS, the ECEC is fully subsidised.
- Scenario 2: the hourly fee ($16.00) is above the hourly rate cap, but it is less than 120% of the cap. Again, the family's total fees for the week ($480) are fully subsidised.
- Scenario 3: the hourly fee ($17.85) is more than 120% of the hourly rate cap. The family faces an out-of-pocket expense of about $41 (total weekly fees of about $535 less the maximum subsidy of $494).

Scenarios for families with different incomes

As described above, the subsidy rate received by a family depends on their income. This means that out-of-pocket expenses may change as a family's income changes (and otherwise identical families will face different out-of-pocket expenses).

Consider again a family with one three-year-old child who attends CBDC for ten hours a day, three days a week. The centre charges an hourly fee of $12, so absent any subsidy the family faces total weekly fees of $360. The family is eligible for CCS.

- Scenario 1: the family has an annual income of $100,000 meaning they are eligible for a CCS rate of 86%.
- Scenario 2: the family has an annual income of $120,000 meaning they are eligible for a slightly lower CCS rate of 82%. The family's out-of-pocket expense is $15 higher than under scenario 1.

Box D.2 – The relationship between fees, subsidies and out-of-pocket expenses

Family incomes affect out-of-pocket expenses and subsidy amounts[a]
2023-24 CCS rates and thresholds, weekly expenses
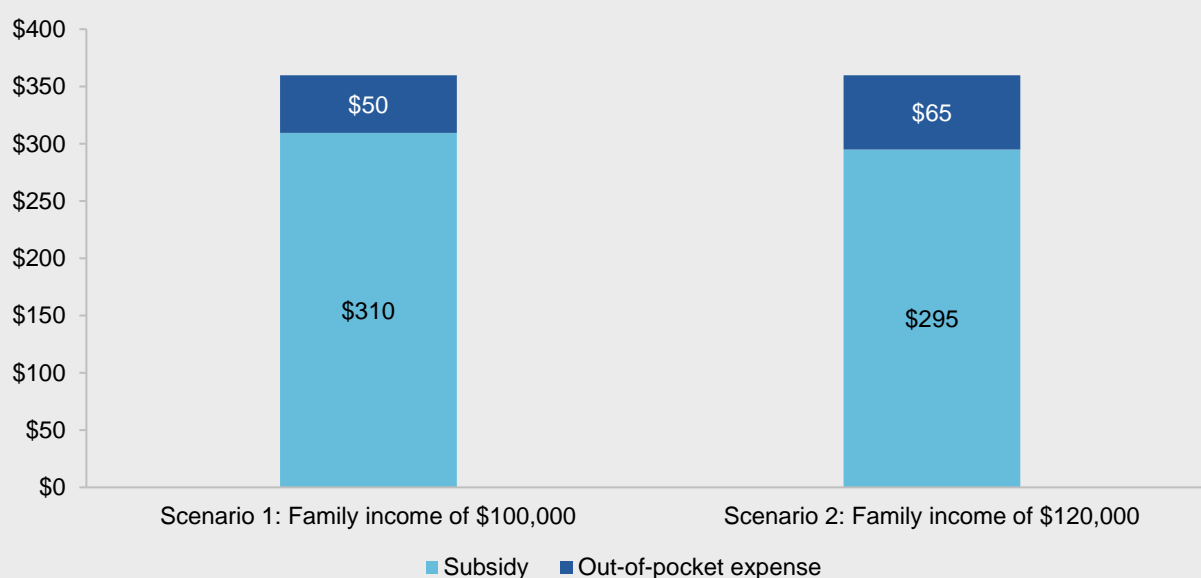
a. This example assumes one child in CBDC for three three-hour days per week and an hourly fee of $12.

Source: Productivity Commission estimates using Services Australia (2023h).

When a parent or guardian increases their labour force participation, their family's income will rise. This has potential implications not only for the amount of CCS they receive, but for other government support payments too. Box D.3 provides examples of how Parenting Payment and Family Tax Benefit payments change when family income changes.

Box D.3 – Changes to a family's income impact eligibility for Parenting Payment and Family Tax Benefit

Three simple examples are discussed in this box which show the impact of changes in income on Parenting Payment and Family Tax Benefit (FTB) transfers.

Parenting Payment

Parenting Payment is the main income support payment for principal carers of young children (Services Australia 2023a, p. 12). The payment rate differs depending on whether the parent is single or partnered and is assessed fortnightly (so depends on fortnightly income).[1] Eligible parents can earn some income before their payment begins to reduce.[2] The following two examples illustrate this.

Box D.3 – Changes to a family's income impact eligibility for Parenting Payment and Family Tax Benefit

Sole parent (Andrew)
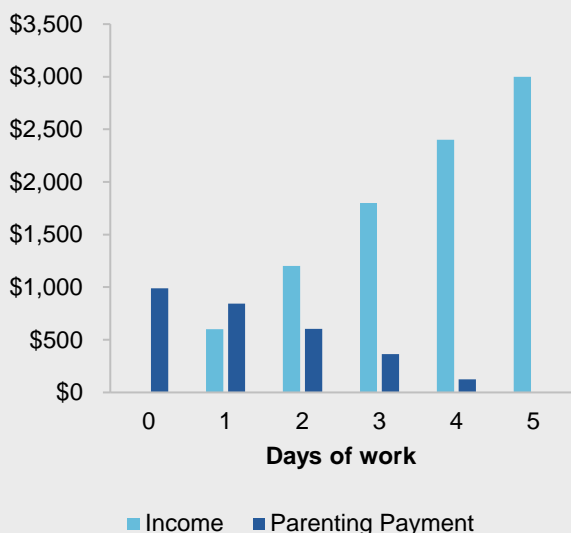
Partnered parent (Rachelle)
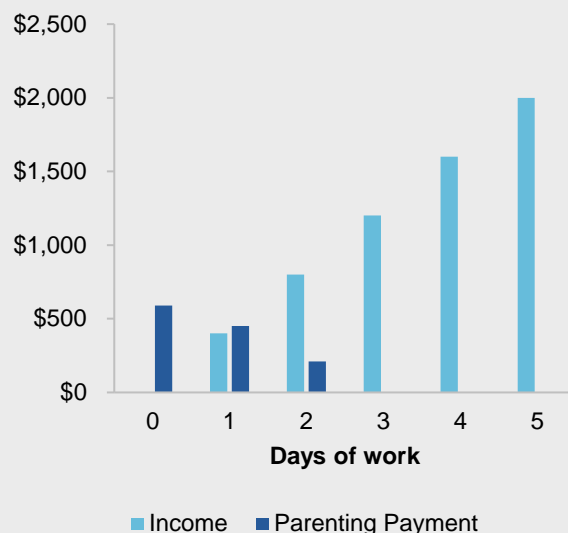
a. The examples assume that Andrew receives the Energy Supplement, basic Pension Supplement and the Pharmaceutical Allowance as part of his Parenting Payment and that Rachelle receives the Energy Supplement (partnered parents are generally not eligible for the basic Pension Supplement and Pharmaceutical Allowance). **b.** Income and payment amounts are fortnightly. **c.** The amount of Parenting Payment received by partnered parents does not depend on the number of children they have.

Source: Productivity Commission estimates.

Andrew is a sole parent with two children under the age of five. If Andrew did not work (and was not receiving income from other sources), he would be eligible to receive $988.80 in Parenting Payment per fortnight. If Andrew worked one day per week, earning $600 per fortnight, his Parenting Payment would reduce to $844 per fortnight. Further increases in the number of days worked would lead to a further fall in his Parenting Payment, with Andrew's eligibility for Parenting Payment ceasing at five days of work per week (figure above).

Rachelle and Ji Mun are parents to a child under the age of five. Ji Mun works full-time and earns $1,500 per fortnight. If Rachelle did not work (and was not receiving income from other sources), she would be eligible to receive $589 of Parenting Payment per fortnight. If Rachelle worked one day per week and earned $400 per fortnight for that work, her Parenting Payment would reduce to $450 per fortnight. Further increases in the number of days worked would lead to a further fall in her Parenting Payment, with Rachelle's eligibility for Parenting Payment ceasing at the third day of work (figure above).

Family Tax Benefit

FTB is a two-part payment that helps families with the cost of raising children.[3] FTB is comprised of FTB Part A and FTB Part B, which have differing eligibility requirements. Families can receive FTB fortnightly but the amount they are eligible for depends on the family's annual adjusted taxable income. The below analysis is therefore based on a family's annual income. Usually, a family's FTB will start to decrease once their annual income reaches $62,634 (as at 20 September 2023).

Box D.3 – Changes to a family's income impact eligibility for Parenting Payment and Family Tax Benefit

As an example, Ivy is a sole parent with two children aged under five. If she did not work (and was not receiving income from other sources) she would be eligible to receive an annual FTB amount of $18,046. Her FTB would not start to decrease until she works four days a week, at which point her annual income is $80,000. This example does not take into account that Ivy may also be eligible to receive Parenting Payment and assumes the only source of income Ivy receives is from employment.
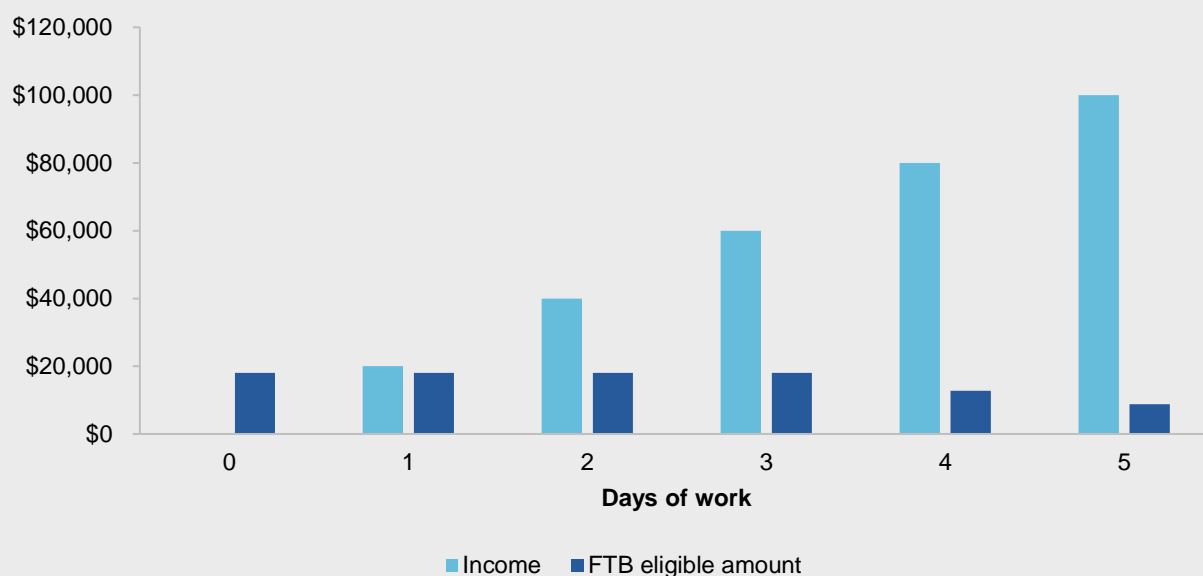
a. This example assumes that Ivy has an adjusted taxable income of $20,000 per year per day worked in a week. It also assumes that Ivy does not receive Rent Assistance or Energy Supplement. **b.** Income and payment amounts are annual.

Source: Productivity Commission estimates.

[1] The amount of Parenting Payment received depends on a person and, if relevant, their partner's assessable income. This assessable income is before tax or any other deductions. From 20 September 2023, a typical total fortnightly rate for eligible sole parents is $988.80 and for eligible partnered parents (where their partner earns less than $1,325 per fortnight), $693.90.

[2] From 20 September 2023, the earned income threshold at which Parenting Payment began to be reduced was $214.60 per fortnight for a sole parent with one dependent child, with $24.60 for each subsequent dependent child. For partnered parents, the threshold was $150 per fortnight.

[3] In order to receive FTB, a family must include a dependent child or a full-time secondary student aged 16 to 19 who is not getting a pension payment or benefit.

CBDCs are the predominant CCS-approved services

63% of CCS-approved services are CBDCs, while OSHC services represent 34% of all services (figure D.6). These two service types make up more than 95% of CCS-approved services in all jurisdictions (figure D.7). While the number of FDC services is small compared to other service types, they make up a larger proportion of services in outer regional Australia (figure D.8).

CBDCs that offer preschool services are eligible for CCS. Dedicated preschools, however, are not.

Figure D.6 – The majority of CCS-approved services are CBDCs[a]

Proportion of CCS-approved services by service type, December quarter 2023
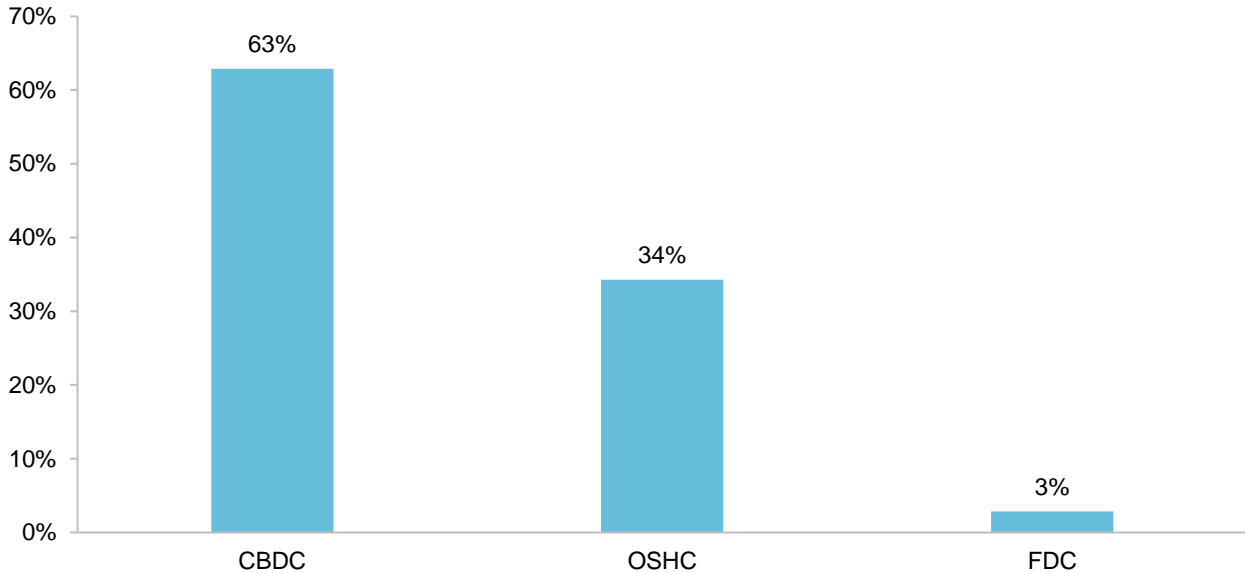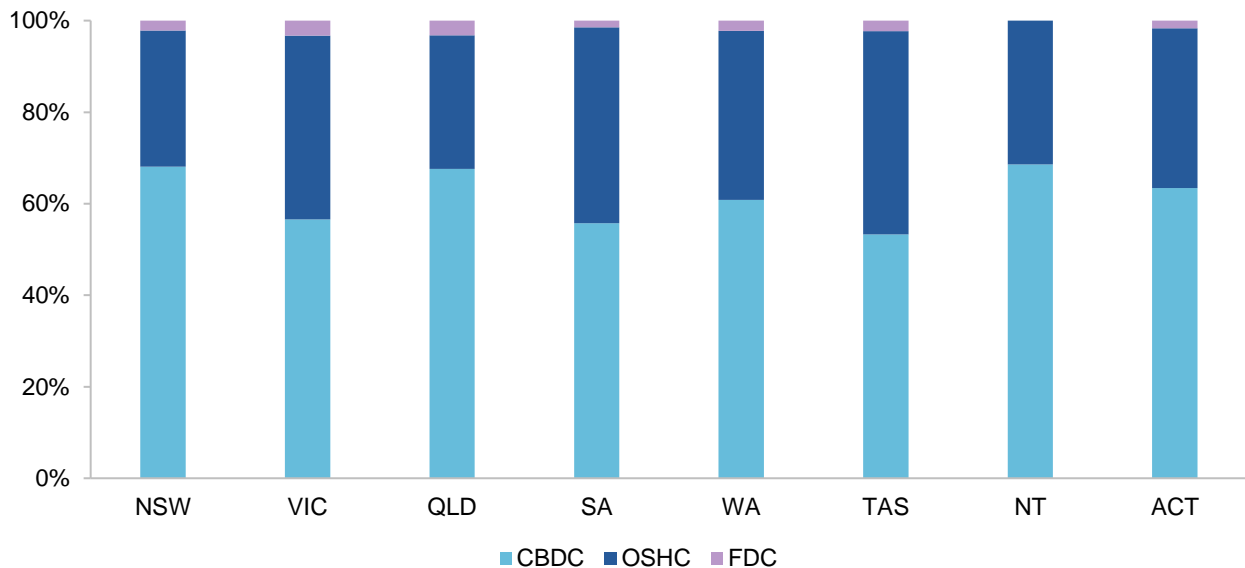

a. Data excludes IHC. IHC services represent less than 1% of approved services.

Source: DoE (2024b, table 3.2).

## Figure D.7 – Most CCS-approved services are CBDC or OSHC services[a,b]

Proportion of CCS-approved services by service type and jurisdiction, December quarter 2023

a. Data excludes IHC. IHC services represent less than 1% of approved services. **b.** Data on FDC in the Northern Territory is censored due to the small number of services.

Source: DoE (2024b, table 3.2).

Figure D.8 – FDC services are a larger proportion of services in outer regional areas[a,b]

Proportion of CCS-approved services by service type and remoteness, December quarter 2023
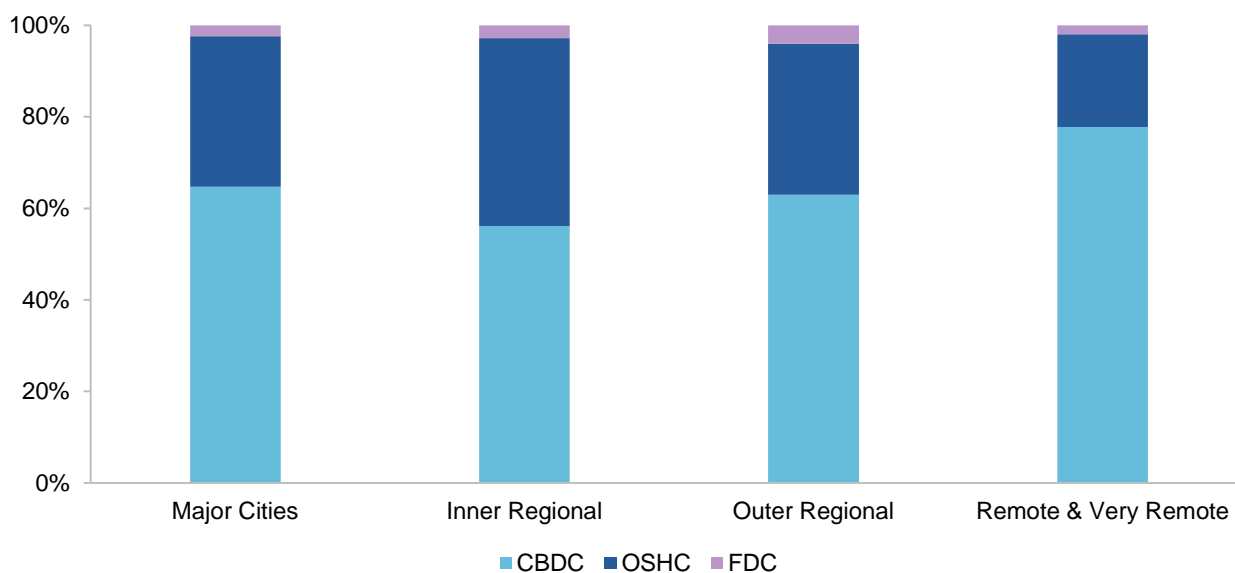
a. As per figure D.7 note a. **b.** Region is based on the ABS Accessibility/Remoteness Index of Australia.

Source: DoE (2024b, table 3.3).

Types of care that are not eligible for CCS include:

- informal care provided through personal arrangements (for example, grandparents providing ad hoc care to their grandchildren, or nannies caring for children)[10]
- services primarily providing a disability or early intervention service
- services primarily providing instruction in an activity (such as sport or music)
- services that provide care, but in which the parent retains responsibility for the child while the service is provided (such as play groups)
- services primarily providing short-term, irregular care at premises in which the parent is a visitor or guest, and the parent is readily available (such as at a gym)
- services that primarily provide early education in the year that is two years before grade one of school such as a preschool or kindergarten (Australian Government Department of Education, sub. 90, p. 12, DoE 2023c).

D.2 The evolution of the CCS

The CCS was introduced on 2 July 2018 as part of the *Jobs for Families Child Care Package*, replacing the Child Care Benefit (CCB) and Child Care Rebate (CCR) (box D.4). The ACCS was introduced at the same time, replacing a number of payments including Special Child Care Benefit, Grandparent Child Care Benefit

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[10] Nannies were subsidised temporarily under the Nanny Pilot Program, which was introduced in early 2016. The program was intended to run for two years but was discontinued in December 2016 due to low take-up. It provided a means and activity-tested subsidy for nanny care for families who worked non-standard hours or lived in regional or remote areas (Australian Government 2016, p. 145; DSS 2015, pp. 1–2).

and the Jobs, Education and Training Child Care Fee Assistance payment (Bray et al. 2021, p. 1; Parliamentary Library 2019).

Bray et al. (2021, p. vii) estimated that the introduction of the CCS reduced out-of-pocket expenses for about 60% of families, increased out-of-pocket expenses for about 30% and had minimal effect on out-of-pocket expenses for the remaining 10%. Expense reductions tended to be larger for low-income families, families with a higher number of children using ECEC, families using ECEC for longer periods and families using for-profit FDC services.

Box D.4 – Child Care Benefit and Child Care Rebate were the predecessors to the CCS

The Child Care Benefit (CCB) was a means and activity tested benefit targeted towards low- and middle-income families. It subsidised the use of both approved and registered care.[a] The amount of CCB a family received depended on the number of subsidised hours they could access and their subsidy amount per hour (CCB rate). The number of subsidised hours was based on whether families met the work, training, study test. The test could be satisfied through work, study, job seeking or volunteering activities. Families could access up to 100 hours of subsidised ECEC per child per fortnight if they participated in approved activities for 30 hours per fortnight (for approved care) or any hours per week (for registered care). Families that did not satisfy the test could access up to 48 hours of approved care per fortnight. A family's CCB rate differed with income, the number of children using ECEC, whether the children were at or below school age and the type of service attended, up to a maximum hourly rate of $4.30 for a non-school age child and 85% of that rate for a school age child.

The Child Care Rebate (CCR) was a non-means tested payment that provided additional assistance for families using approved care. CCR subsidised up to 50% of a family's out-of-pocket expenses after any other fee assistance (such as CCB) was deducted, up to a maximum of $7,613 per child per year. To be eligible for CCR, families had to undertake a test-approved activity at some point during the week. In contrast to the Child Care Subsidy – which subsidises fees up to an hourly rate cap – the amount of CCR received was based on the actual fees charged by services, up to the annual per child cap.

a. 'Approved care' included the current CCS approved service types: CBDC (including occasional care), FDC, OSHC and IHC. 'Registered care' included relatives, friends, neighbours, nannies or babysitters and some ECEC facilities that were registered as carers with the Department of Human Services (PC 2014, p. 75).

Source: Bray et al. (2021, p. 8); DoE (2015, pp. 1–2); PC (2014, p. 4).

On 10 December 2021, the annual CCS cap – which precluded families earning more than $190,015 from receiving more than $10,655 in subsidies per child each financial year – was removed (DoE 2021). On 7 March 2022, the higher subsidy rate for families with more than one child aged five or younger was introduced (DoE 2021).

On 10 July 2023, base CCS rates for a family's first child were increased under the Plan for Cheaper Child Care (box D.5) (Australian Government 2023, p. 93; Services Australia 2023b). The maximum base subsidy percentage was increased from 85% to 90%, with the subsidy rate tapering more slowly with increases in household income. Additionally, Aboriginal and Torres Strait Islander families became eligible to receive 36 hours of subsidised ECEC per fortnight, regardless of their activity level (Services Australia 2023b).

Box D.5 – Illustration of the effects of 2023 Child Care Subsidy reforms

Child Care Subsidy (CCS) reforms introduced in July 2023 reduced out-of-pocket expenses for families. Consider a family with a family income of $60,000 and two children, Anh (aged three) and Johnathan (aged two). Both children attend a centre-based day care (CBDC) for three days a week. The parents meet the activity test and thus all hours attended at the CBDC are subsidised. CCS rates would apply for Anh and the higher Child Care Subsidy (HCCS) rates would apply for Johnathan. The CCS reform would reduce this family's out-of-pocket expenses from $76 to $57 per week (figure below) if fees remained unchanged.

Families receive higher amounts of CCS from 10 July 2023[a]

Family with $60,000 annual income and two children in CBDC, 2022-23 and 2023-24 subsidy rates, weekly expenses
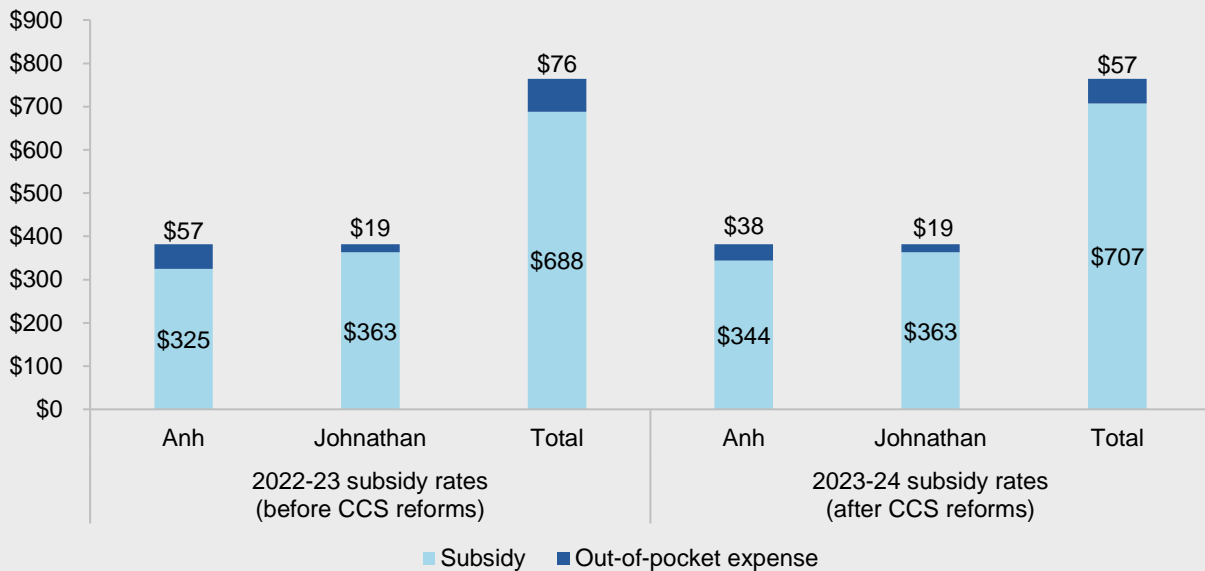
a. These hypothetical scenarios assume an annual family adjusted taxable income of $60,000 and that the two children attend CBDC for three 10-hour days each week. Johnathan is assumed to be the second child that received the HCCS. The hourly fee is assumed to be at the 2022-23 CCS hourly cap rate of $12.74.

Source: Productivity Commission estimates.

D.3 Administration of the CCS

CCS is administered by Services Australia. To access CCS, families must have a myGov account linked to Centrelink. Before CCS can be paid, families must confirm their child's enrolment by asking their ECEC provider to send their child's enrolment details to Services Australia, then the family needs to confirm the details through their Centrelink account. CCS is only back paid for a maximum of 28 days (DoE 2023d, pp. 25–31).

Families must report their estimated income and activity levels when applying for CCS and at the start of each financial year, and the CCS amount they receive is based on this information (DoE 2023b). No

documentation on activity levels is required at the point of application or when updating activity information. The Productivity Commission understands that families' activity levels are not actively audited (DoE, pers. comm., 6 November 2023).

Families whose hours of paid work vary unpredictably from fortnight to fortnight (such as those in casual employment) can estimate the highest number of hours they expect to work in a single fortnight over a three-month period and use this number to determine their hours of subsidised care each fortnight. Families can also update their activity levels and income at any time if their circumstances change (DSS 2023a).

Balancing and debt

A family's reported and actual income may differ at the end of the financial year and this can impact the amount of CCS they are eligible to receive for that year. A balancing process occurs after the end of the financial year once families have confirmed their income either by lodging a tax return or informing Services Australia that they do not need to lodge a tax return (even if they have already notified the Australian Taxation Office) (DoE 2023b).

Families risk incurring a debt when:

- they update Services Australia due to a change of circumstances which affects their CCS eligibility or entitlement
- at the end of the financial year their actual income is bigger than their reported income
- they do not confirm their income (DSS 2023d).

To reduce the potential for CCS debt, 5% of a family's CCS entitlement for each week is withheld until the end of the financial year (this withholding percentage can be changed by families up to two times a year). This measure is to provide some protection for families from a potential CCS debt if they underestimate their annual income or overestimate their activity hours. The withheld amount is used to either pay any CCS debts that arise during reconciliation of estimated and actual incomes or is refunded to families if there is no CCS debt. Families are also expected to notify Services Australia if their income or activity levels change to avoid the potential of being overpaid their CCS entitlement and therefore incurring a CCS debt (DoE 2023b).

Smaller debts raised during the year will not have any recovery action taken until the end of the financial year when balancing occurs. Smaller debts may arise due to families reporting a change in circumstances such as changes in income or activity levels. Families can repay or enter into a repayment arrangement earlier if they wish. Larger debts, however, will be raised as they arise and families have 28 days to respond (either by repaying or entering an arrangement to repay the debt). If families do not respond, debt may automatically be recovered via offsetting from future CCS payments (the default is 20% of CCS payments) and/or interest being applied (DSS 2023d).

Families have up to one year after the end of the financial year to confirm their income, otherwise their CCS will stop. This is called the 'first deadline'. After the first deadline, families have to pay full fees for ECEC. ACCS also stops unless families are receiving ACCS (Child Wellbeing). Once families confirm their income, CCS and ACCS payments restart (DoE 2023b).

If families have not confirmed their income two years after the end of a financial year (the 'second deadline'), they may have to repay any CCS they received for that financial year. Their CCS and ACCS, including ACCS (Child Wellbeing), will also be cancelled. Families need to reapply to receive CCS and ACCS again, which can only occur once they have confirmed their income and repaid any outstanding debt or entered into a payment arrangement. Backdated CCS cannot be paid for the period before income is confirmed (DoE 2023b).

Absences

If a child is absent from ECEC, CCS may continue to be paid if the family has been charged by the service. Families are allowed 42 absence days per child, per financial year. Absences can be taken for any reason, such as illness or a family holiday (Services Australia 2023c).

If a service is closed on public holidays and charges fees, children who would usually attend the service on these days can count them as absences. If a service does not charge fees on public holidays though, no CCS is payable, and a child's non-attendance is not considered an absence. When a service closes on days they would normally be open that are not public holidays – for example, an extended shutdown during late December and early January – CCS is not paid and the days are therefore not counted as absences (DoE 2023a, 2023d, pp. 41–42).

After a child's 42 absences have been used, CCS can be continued to be paid if a suitable reason exists (for which families need to provide evidence – for example, by providing a medical certificate) (Services Australia 2023c).

D.4 Government expenditure on CCS and ACCS

Total expenditure on the CCS program (including the ACCS) was $10.6 billion in 2022-23, up from $9.8 billion in 2021-22. The estimated outlay for 2023-24 is $12.7 billion (Australian Government Department of Education, sub. 90, p. 17).

Per child expenditure on CCS (including HCCS) and its predecessors, CCB and CCR, has risen over time – in particular, it increased markedly throughout 2023, including following the July 2023 Cheaper Child Care reforms (figure D.9).

Figure D.9 – Per child spending on CCS has increased over time[a,b,c,d,e]

Real per child quarterly government expenditure on CCS (including HCCS), CCB and CCR, September 2010 to December 2023 (December 2023 dollars)
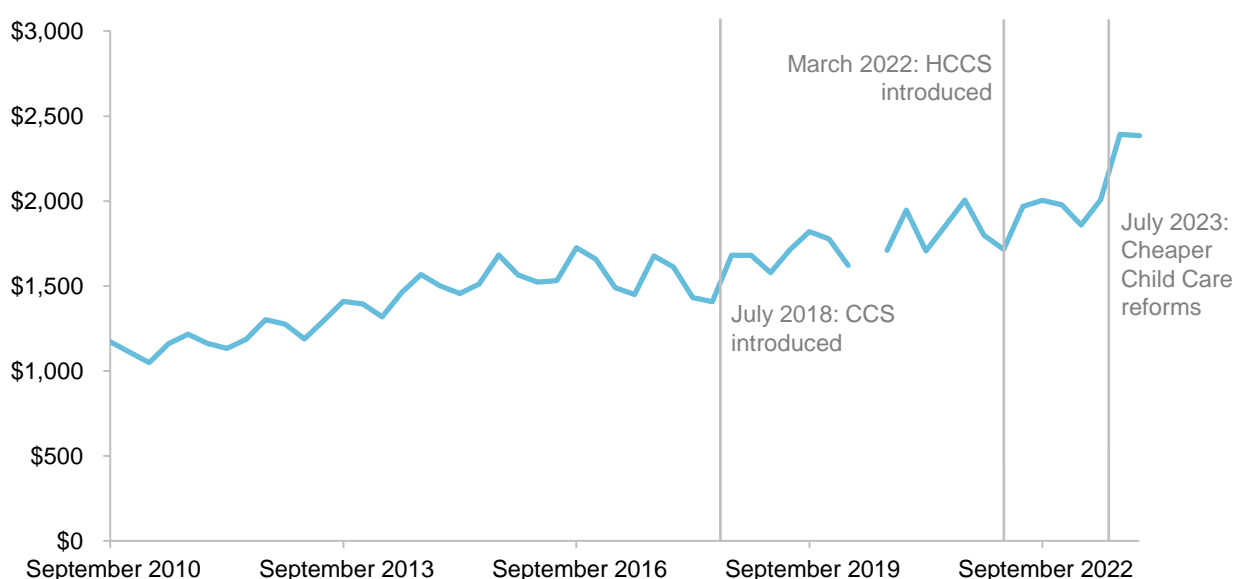
a. CCS was introduced in the September 2018 quarter, replacing CCB and CCR. **b.** Expenditure for September 2010 quarter is calculated as a residual from the 2010-11 financial year report as the quarterly report is not available online. **c.** CCS expenditure from September 2018 to June 2019 contains ACCS expenditure as disaggregated figures are not available in quarterly reports. **d.** Data for June quarter 2020 is unavailable due to temporary measures implemented in response to COVID-19. **e.** Data is adjusted to December 2023 dollars (December 2023=100) using the GDP implicit price deflator (general government – national; final consumption expenditure; non-defence).

Source: Productivity Commission estimates using DoE (2024b, table 4.1) (and previous quarters) and ABS (December 2023) 'Table 5. Expenditure on Gross Domestic Product (GDP), Implicit price deflators, series A2303936X' [time series spreadsheet], *Australian National Accounts: National Income, Expenditure and Product*, accessed 28 March 2024.

Total per child spending on ACCS has increased in recent years (figure D.10). This increase has been driven by changes in per child spending on ACCS (Child Wellbeing) – the largest ACCS category (figures D.4 and D.10).

Figure D.10 – Per child spending on ACCS has increased in recent years[a,b]

Real per child quarterly ACCS amount by category, September 2021 to December 2023 (December 2023 dollars)
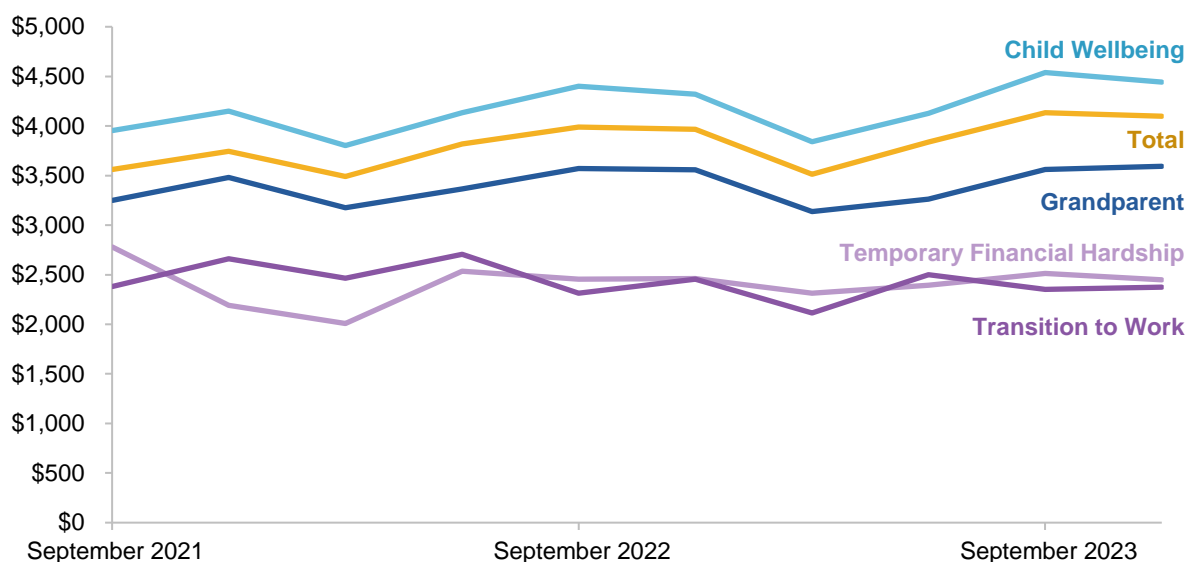

a. Data is from September quarter 2021 (2021-22 financial year) onwards. ACCS subsidy amounts from this quarter onwards are not comparable with previous quarters due to a change in appropriation arrangements which took effect on 12 July 2021. **b.** Data is adjusted to December 2023 dollars (December 2023=100) using the GDP implicit price deflator (general government – national; final consumption expenditure; non-defence).

Source: Productivity Commission estimates using DoE (2024b, table 4.3) (and previous quarters) and ABS (December 2023) 'Table 5. Expenditure on Gross Domestic Product (GDP), Implicit price deflators, series A2303936X' [time series spreadsheet], *Australian National Accounts: National Income, Expenditure and Product*, accessed 28 March 2024.
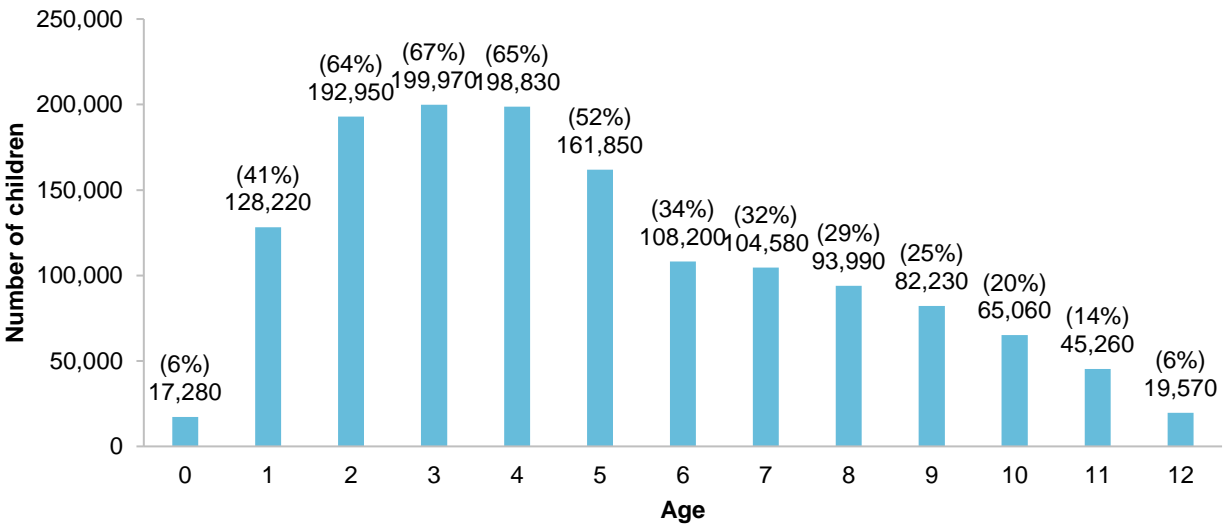
D.5 Children using CCS-approved services

More than 1.4 million children used CCS-approved ECEC services in the December quarter of 2023 (DoE 2024b, table 1.1). A relatively large proportion of children using CCS-approved services (60%) attended CBDCs (figure D.11). Use of CCS-approved services peaks at the age of three with noticeable drops at age five and six as children start school (figure D.12). Consistent with these attendance patterns, families with before school age children spend a larger share of their disposable income on ECEC compared to families with school age children (figure D.13).

Figure D.11 – CBDCs account for the largest share of children using CCS-approved services[a,b]

Proportion of children using CCS-approved services by service type, December quarter 2023
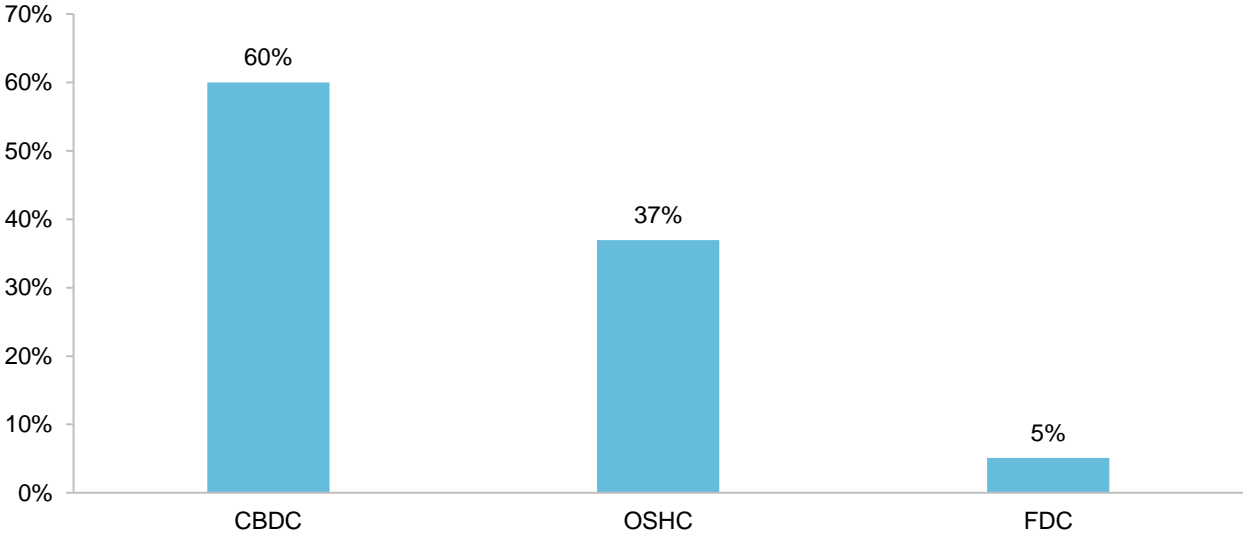
a. About 2000 children are in IHC, representing less than 1% of all at CCS-approved services. **b.** As children may use more than one service, and due to rounding, the sum of proportions exceeds 100%.

Source: DoE (2024b, table 1.2).

Figure D.12 – The number and proportion of children using CCS-approved services peaks when children are three years old[a,b]

Number and proportion of children in each age group using CCS-approved services, December quarter 2023

a. Labels in parentheses represent the proportion of children in each age group using CCS-approved services. **b.** Data excludes 1,380 children aged 13 and older using CCS-approved services.

Source: DoE (2024b, table 1.7).

Figure D.13 – Families with before school aged children spend a larger share of their disposable income on ECEC[a,b,c]

Out-of-pocket expenses as a share of family after-tax income, by age of youngest child in ECEC and family income decile, fortnight to 26 Nov 2023
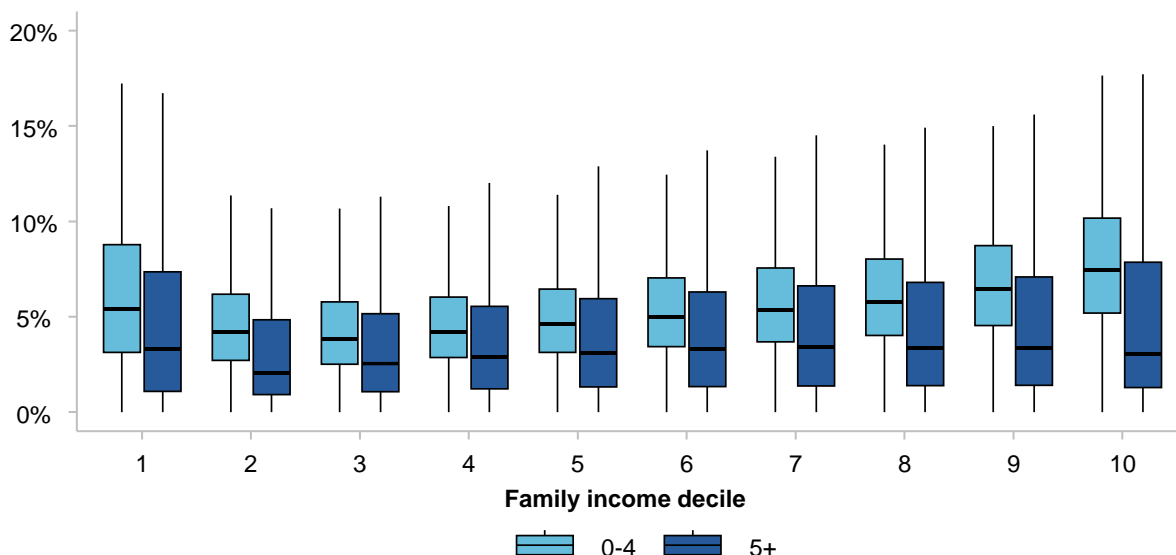

a. Out-of-pocket expenses for each family were calculated as charged fees less CCS and ACCS. This accounts for any fees paid above the hourly rate cap. Family after-tax income is estimated by applying income tax rates to adjusted taxable income (ATI) as reported by parents and guardians, and adding estimated Family Tax Benefit. These income estimates may not be a precise reflection of families' actual financial resources, for example due to: the exclusion of wealth as a resource and income sources excluded from ATI (such as rent assistance); differences between definitions of ATI and taxable income that mean that income tax estimates are overstated; and limitations in estimating Family Tax Benefit from data only on children who access Child Care Subsidy. **b.** These box and whisker plots show the median (black horizontal line), two hinges at the 25th and 75th percentiles (top and bottom box edges), and two whiskers extending to the values no further than 1.5 times the interquartile range from the hinges. Outliers are omitted. **c.** Excludes In Home Care services.

Source: Productivity Commission estimates using DoE administrative data (unpublished).

The jurisdictions with the overall lowest average hours of attendance at CCS-approved services are South Australia and Tasmania (figure D.14). This likely reflects the relatively large share of children attending dedicated preschools (that are not eligible to receive CCS) in these jurisdictions. The Northern Territory has the highest average hours of attendance (figure D.14). Comparing by remoteness, total average hours attended per child are similar across Australia (figure D.15).

Figure D.14 – Average hours of attendance differ by jurisdiction

Average weekly hours of attendance per child at CCS-approved services by service type and jurisdiction, December quarter 2023
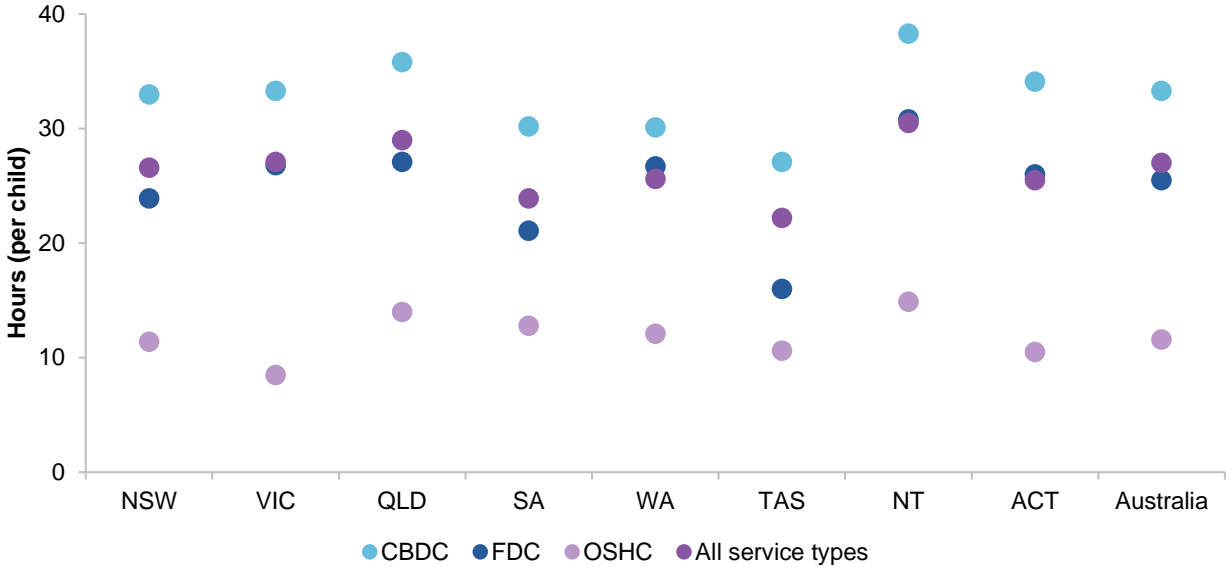
Source: DoE (2024b, table 6.2)

Figure D.15 – Average hours of attendance also differ by remoteness

Average weekly hours of attendance per child at CCS-approved services by service type and remoteness, December quarter 2023
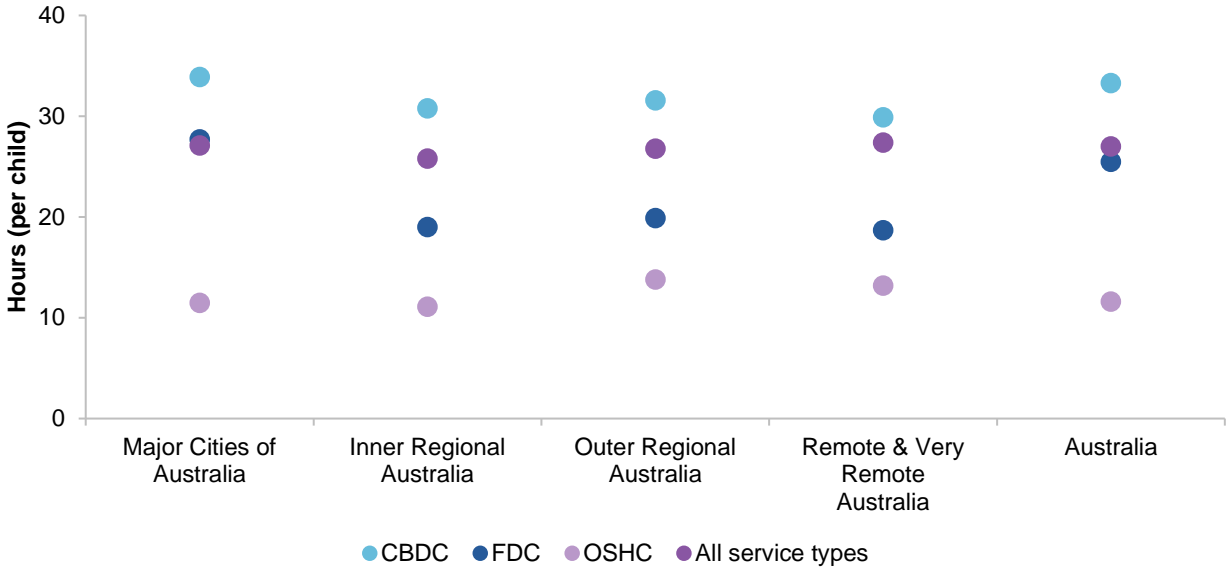

Source: DoE (2024b, table 6.3).

In all service types except IHC, the majority of children attend CCS-approved services for three or fewer days each week. FDC and IHC have larger shares of children who attend for five or more days (figure D.16).

Figure D.16 – The majority of children attend CCS-approved services for three or fewer days each week[a]

Weekly days attended by service type, December quarter 2023
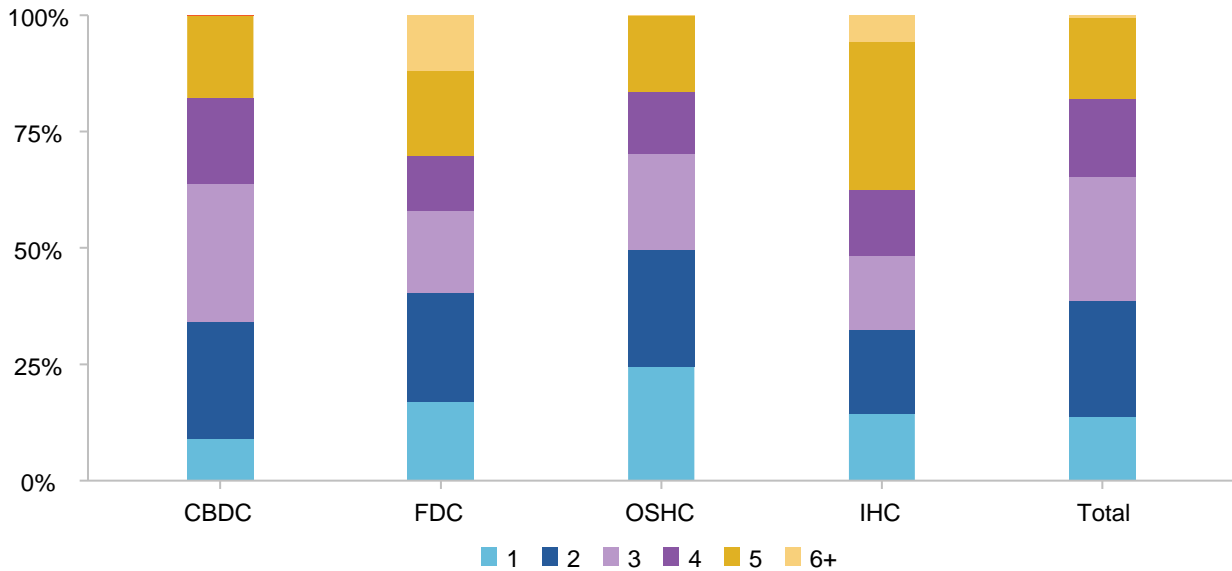
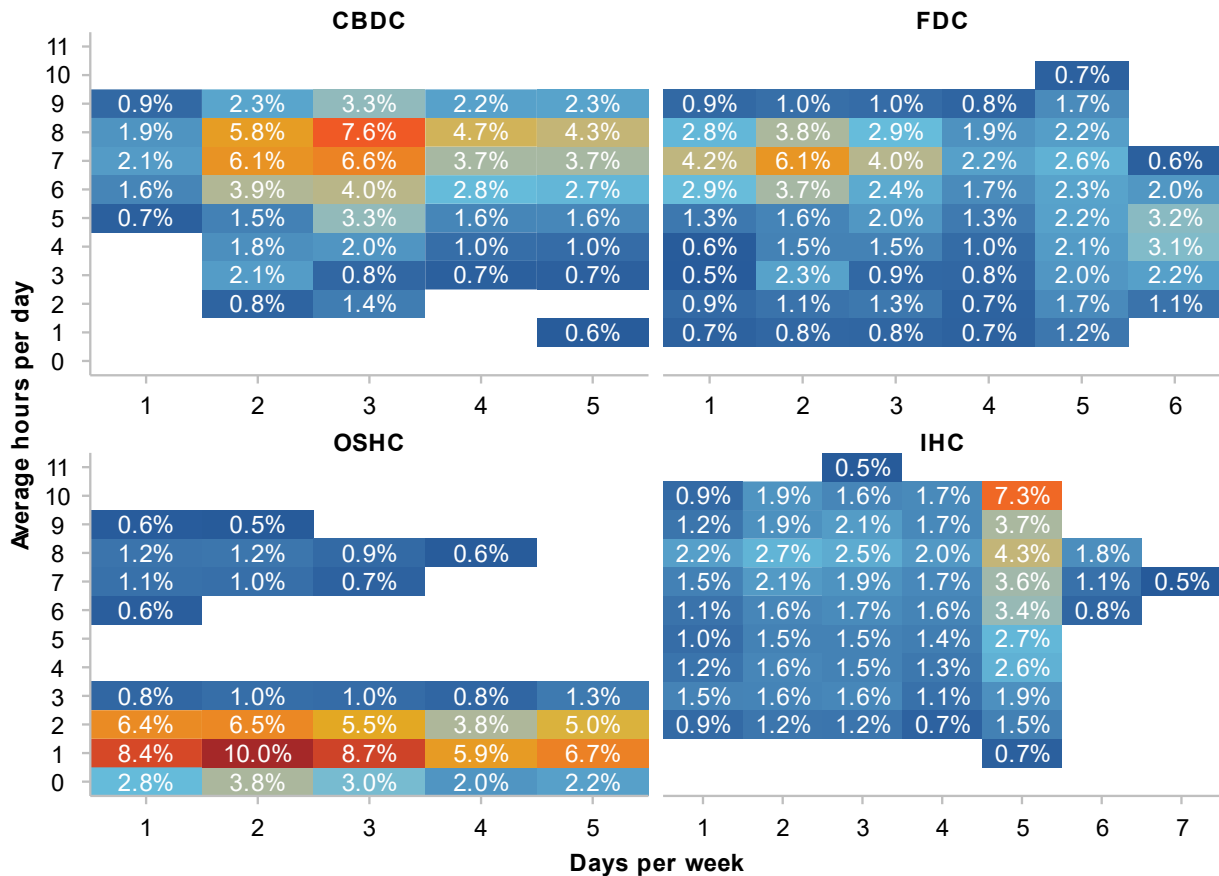**a.** Calculated as a percentage of child-week-service type combinations in the quarter.

Source: Productivity Commission estimates using DoE administrative data (unpublished).

Attending two or three days a week for an average of seven to eight hours is most common for children attending CBDC. Two days a week with an average of six to eight hours is most common in FDC. However, attendance patterns vary greatly (figure D.17).

Figure D.17 – There is a lot of variation in attendance patterns[a,b]

Attendance by days and hours, by service type, 2022-23

a. Numbers refer to percentage of child–week–service type combinations in the financial year. Combinations for which children did not attend any sessions are omitted. Redder areas indicate more common occurrences. **b.** Attended hours per day are rounded down to the nearest hour. This means that '0' refers to less than one hour attended. Data points that comprise 0.5% or less observations have been excluded from the chart.

Source: Productivity Commission estimates using DoE administrative data (unpublished).

The total number of children attending ECEC tends to fall during school holiday periods (figure D.18). Average hours attended during the year varies across service types, with hours at CBDCs typically dropping during Christmas and other school holiday periods, but hours at FDC, OSHC (which includes vacation care) and IHC typically rise during these periods (figure D.19).

Figure D.18 – The number of children attending CCS-approved services fluctuates during the year[a,b]

Number of children attended per week by service type, 2019–23
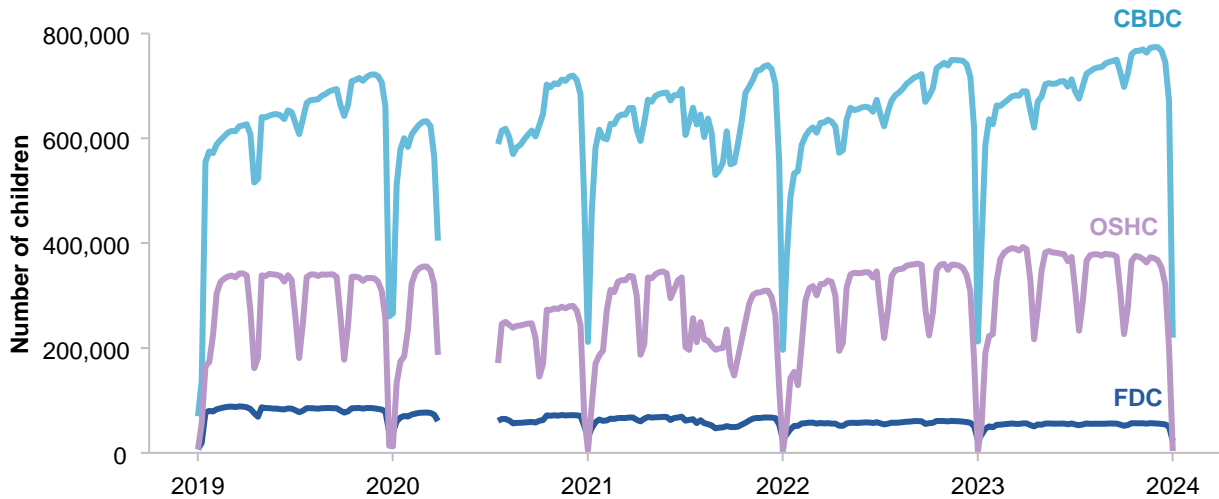
a. Data excludes IHC due to the small number of children attending IHC services. **b.** Excludes children with missing records on hours attended.

Source: Productivity Commission estimates using DoE administrative data (unpublished).

Figure D.19 – Attendance patterns change through the year[a]

Average hours attended per week by service type, 2019–23
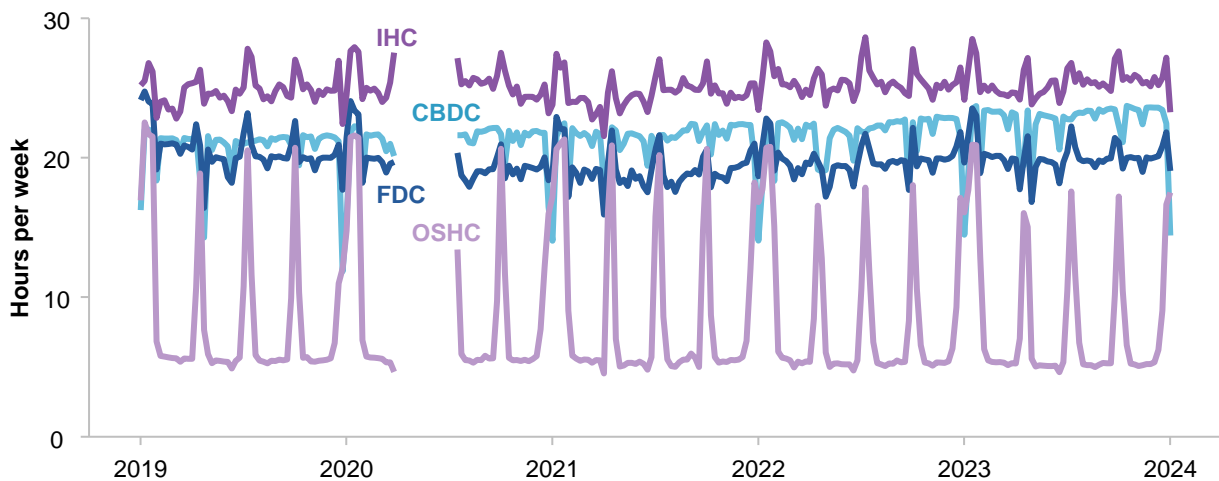
a. Excludes children with missing records on hours attended.

Source: Productivity Commission estimates using DoE administrative data (unpublished).

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E. Preschool funding and reforms

E.1 Introduction

This appendix supplements the discussion of preschool funding and reforms in the main papers by providing an outline of current preschool funding arrangements, including state and territory funding, the Preschool Reform Agreement and the Child Care Subsidy (CCS). It also outlines recent state and territory reforms that will lead to changes in preschool funding and access in the future.

Definition of a preschool program

A preschool program is a structured, play-based learning program, delivered by a degree qualified teacher, aimed primarily at children in the year or two before they commence full-time schooling (ABS 2024b). The Australian Government's preschool policy focuses on children in the year before full-time school (YBFS). Under the Preschool Reform Agreement, every child is entitled to 600 hours of preschool in the year before they start school, provided at a cost that does not present a barrier to participation.

Age cut-offs for the YBFS differ across states and territories (table E.1). Several state and territory governments are expanding preschool eligibility within their jurisdictions to include children in the two years before full-time school. For simplicity, this appendix uses the terms 'four-year-old preschool' and 'three-year-old preschool' when referring to preschool programs for children in the YBFS and the year before that, respectively.

Preschool programs are named 'preschool' or 'kindergarten' depending on the state or territory (table E.1). This appendix uses the term 'preschool' for consistency, unless referring to the names of specific state funding policies or reforms (for example, Victoria's Free Kinder program).

Table E.1 – Preschool age cutoffs (YBFS) and program names vary by state and territory

Preschool program name and age of entry in a preschool program for children in the YBFS, by jurisdiction, 2023

|	Program name	Age of entry in preschool program (YBFS)
New South Wales	Preschool	Generally aged 4 and 5
Victoria	Kindergarten	4 by 30 April
Queensland	Kindergarten	4 by 30 June
Western Australia	Kindergarten	4 by 30 June
South Australia	Preschool	4 by 1 May (Term 1); 4 by 31 October (Term 3)[a]
Tasmania	Kindergarten	4 by 1 January
Australian Capital Territory	Preschool	4 by 30 April
Northern Territory	Preschool	4 by 30 June

a. South Australia has introduced a mid-year intake into preschools from 2023.

Source: SCRGSP (2024a).

E.2 Children attend preschool in different settings across Australia

Children attend preschool programs in different settings around the country (figure E.1). For example, preschool children in Victoria, New South Wales and Queensland are mainly enrolled in centre-based day care services (CBDC) and non-government dedicated preschools, with a smaller proportion enrolled in government-run dedicated preschools. In contrast, preschool children in the other states and territories are enrolled in government-run dedicated preschools in much higher proportions.

Figure E.1 – Children attend preschool in different settings around the country[a,b,c,d]

Proportion of children enrolled in a preschool program in the YBFS, by setting, by jurisdiction, 2023
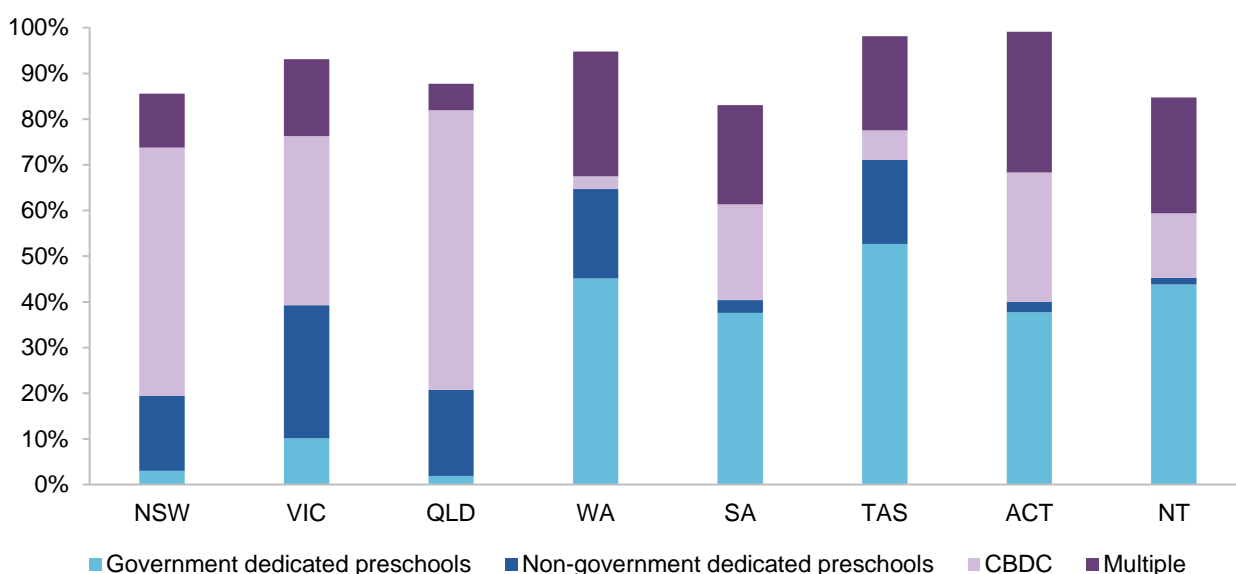
a. Data relates to children enrolled in a preschool program in the state-specific YBFS. This means certain cohorts of children, such as those attending three-year-old preschool, are not captured. **b.** Dedicated preschools include standalone preschools and preschools attached to schools. **c.** The multiple category shows children enrolled in multiple dedicated preschools or children enrolled in a dedicated preschool and a CBDC service. **d.** Children who are in the YBFS and attend CBDC services are assumed to be enrolled in a preschool program.

Source: Productivity Commission estimates based on ABS (2024) *Preschool Education 2023*, accessed 5 April 2024.

Preschool programs are required to be delivered by an early childhood teacher (ECT) under the Preschool Reform Agreement. However, in practice, for the purposes of performance measurement, the agreement accepts preschool programs that align with the National Quality Framework (NQF), which requires services to engage or have access to an ECT based on the number of children in attendance (but does not necessarily guarantee they deliver the preschool program) (ACECQA 2023).[1] As such, all children in the YBFS who attend a CBDC service are counted as enrolled in a preschool program for the purposes of the Preschool Reform Agreement.[2] This stems from data collection limitations for preschool delivered in CBDC services. The Australian Government collects data on CBDCs through the Child Care Subsidy System (CCSS). The CCSS captures data on services that are compliant with the NQF but does not collect data on preschool programs per se, including whether they are being delivered by an ECT. A consequence of the data limitations is that it is not clear how many hours of preschool children in CBDC settings receive directly from an ECT.

Dedicated preschools include standalone preschools and preschools attached to schools. They provide programs that typically offer shorter or sessional hours during the school term. Preschool children in dedicated settings usually receive their 600-hour Preschool Reform Agreement entitlement as 15 hours per week over 40 weeks. In practice, delivery of this entitlement can vary for families in terms of the number of hours per day and number of days per week. The term 'sessional preschool' is sometimes used to describe dedicated preschools.

E.3   Current preschool funding arrangements

Preschool programs are funded from a range of sources (figure E.2).

State and territory governments are responsible for ensuring all children have access to preschool in the YBFS as part of their commitments under the Preschool Reform Agreement. They are supported in meeting this commitment by funding contributions from the Australian Government. State and territory governments also contribute funding to preschool programs for younger children and some are working to extend the hours available to children in the YBFS (relevant reforms are discussed in section E.4).

Recurrent preschool funding across all states and territories totalled $2.47 billion (2022-23 dollars) in the 2022-23 financial year (SCRGSP 2024b) (details are discussed below). This includes Australian Government funding provided to state and territory governments under the Preschool Reform Agreement. The Australian Government contributed $455.3 million (2022-23 dollars) in total funding to all states and territories under the Preschool Reform Agreement in the 2022-23 financial year.

The Australian Government also subsidises preschool fees for families with children attending preschool in CBDC services through the CCS. Families may contribute to the costs of preschool through fees, which can vary based on the setting (box E.1).

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[1] Services with fewer than 25 children in attendance at any one time must have access to an ECT for at least 20% of the time the service is operating (including through ICT solutions). If there are 25 or more children in attendance, services must employ or engage a full-time or full-time equivalent ECT (or have one in attendance for a prescribed amount of time based on the weekly operating hours of the service). Services with 60 or more children in attendance must employ a second ECT or suitably qualified person in attendance for a prescribed amount of time.

[2] Some state and territory governments operate their own systems of identifying whether services have a preschool program delivered by an ECT, such as the Victorian Government's Kinder Tick.

Figure E.2 – A range of sources fund delivery of preschool for children in the YBFS[a]

Australian, state and territory governments and families fund preschool programs
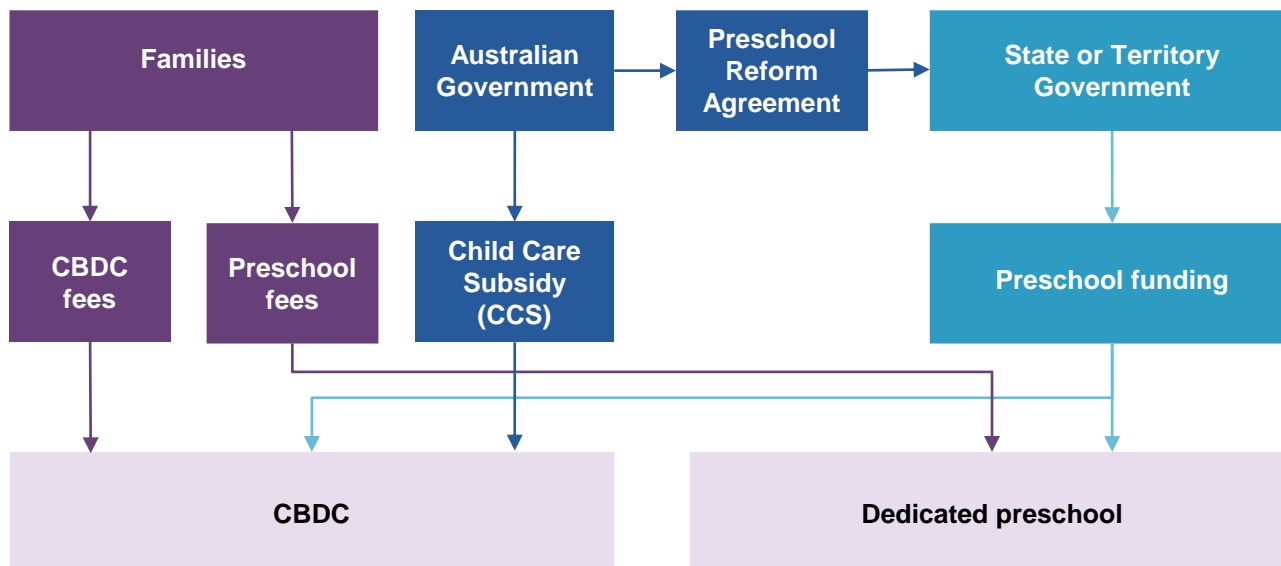
a. Dedicated preschool includes standalone preschools and preschools attached to schools.

Box E.1 – Preschool out-of-pocket expenses for families depend on the program setting and are difficult to compare

Preschool out-of-pocket expenses for families can vary based on the setting that their children attend.

Hourly out-of-pocket expenses for families with children in dedicated preschools are mostly zero or between $1-$4 per hour across the states and territories (ABS 2024a). However, dedicated preschools typically have shorter operating hours, which may not align with families' working arrangements.

In CBDC, families will often have to purchase a full day of ECEC, even if the 'preschool' component runs for a shorter period of time. If eligible, families can access the Child Care Subsidy to subsidise the cost of the full day and state and territory governments may also offer fee relief or program payments to services delivering a preschool program.

It is difficult to accurately determine out-of-pocket expenses for families whose children attend preschool in CBDC services. Data on preschool out-of-pocket expenses is published through the ABS Preschool Education data collection. The Australian Government Department of Education provides data to the ABS on CBDC out-of-pocket expenses for this purpose. This data covers all hours of enrolment in the CBDC service during the reference period, not just the 'preschool' component. Additionally, although the data reflects the out-of-pocket expense after CCS and ACCS (if relevant) are applied, it does not capture any state-based fee relief that is applied after the CCS, such as the Victorian Government's Free Kinder program.

As a result of these data limitations, it is difficult to compare preschool out-of-pocket expenses for dedicated preschools and CBDC services.

State and territory funding arrangements

State and territory governments fund and deliver preschool in various ways, including:

- government-run dedicated preschools that are delivered and funded by the states and territories
- funding provided to non-government service providers, including CBDC services, community preschools, mobile preschools and non-government schools that deliver preschool
- additional funding to improve access and outcomes for Aboriginal and Torres Strait Islander children, children who are experiencing vulnerability and disadvantage and children in rural and remote areas.

State and territory funding arrangements are determined by the main preschool delivery methods within each jurisdiction. For example, in Victoria, New South Wales and Queensland, where preschool is mainly delivered through CBDC services and non-government dedicated preschools, various subsidy programs allocate funding to private service providers (table E.2). In contrast, states like Western Australia and Tasmania predominantly fund and deliver preschool directly through their school systems.

State and territory funding arrangements aimed at providing fee relief for families may be applied in conjunction with the CCS. If these state and territory payments are classified as prescribed third-party payments, the CCS is applied to families' fees first, with fees then further reduced by state-based fee relief. Further discussion of this is provided in the CCS section of this appendix.

In addition, many state and territory governments have announced or are undertaking preschool reforms within their jurisdictions. These are discussed in section E.4 of this appendix.

Table E.2 – Funding arrangements vary across the states and territories[a,b]

Recurrent expenditure on preschool (2022-23 financial year) and key funding arrangements by jurisdiction

	Recurrent expenditure (2022-23 financial year)	Key funding arrangements as at May 2024[c]
NSW	$577,765,000	The NSW Government's Start Strong program provides funding to CBDC services and community preschools as two components – program funding and fee relief. Program funding must be spent on costs associated with running a preschool program, whilst fee relief must be passed on to families as a reduction to their enrolment fees (after the CCS has been applied). Both program funding and fee relief are provided on a per enrolment basis for eligible children. Children are eligible if they attend four-year-old preschool in CBDC services or three-year-old preschool and above for community preschools. A trial that provides program funding and fee relief for three-year-old preschool in CBDC services is also underway (further details are discussed in section E.4). In addition, the NSW Department of Education operates 101 preschools, which provide 600 hours per year of free preschool for children in four-year-old preschool. These preschools aim to cater for specific cohorts of children, including Aboriginal children and children experiencing vulnerability and disadvantage.

	Recurrent expenditure (2022-23 financial year)	Key funding arrangements as at May 2024[c]
Vic	$912,793,000	Kindergarten per capita funding is provided to dedicated preschools and CBDC services as a contribution toward the cost of running a preschool program. The funding is available to all service providers, but funding rates vary based on the location of the service, the service setting and the type of industrial award or agreement that educators are employed under. Service providers receive a per enrolment amount for eligible children. Children in both four-year-old and three-year-old preschool are eligible for funding but have different requirements regarding hours of enrolment. Children in four-year-old preschool must be enrolled for 15 hours per week whilst children in three-year-old preschool currently only need to be enrolled for 5-15 hours per week. Additionally, the Free Kinder program allocates funding to provide fee relief for families with preschool children. The funding is provided to dedicated preschools and CBDC services who choose to opt into the program. Service providers who opt into the program and receive funding must meet specific conditions. For instance, dedicated preschools must deliver a free 15 hour per week preschool program for children in four-year-old preschool and a free 5-15 hour per week program for children in three-year-old preschool. Services may offer programs with greater hours and can charge families for those additional hours. CBDC services are not required to provide a free preschool program but must simply offset the full funding amount they receive from families' preschool fees (after the CCS has been applied). As such, some families may still face out-of-pocket expenses depending on the fees they are charged by CBDC services. Service providers may receive both funding from the Free Kinder program and kindergarten per capita funding.
Qld	$256,862,000	The Queensland Government funds four-year-old preschool in CBDC services and dedicated preschools through various subsidies and grants. The gap fee / free kindy subsidy is provided for service providers that opt into the Free Kindy program. This subsidy covers any remaining preschool fees for families (after CCS has been applied) for 600 hours per year. For services that opt in to Free Kindy, a base subsidy is provided to cover the cost of delivering a preschool program, provided as a per enrolment amount. Services opting in to Free Kindy are also eligible for a service location subsidy, which is provided for each eligible child from a regional or remote area. Alternative per capita funding is provided for service providers that do not opt into the Free Kindy program. Additionally, targeted subsidies are provided to service providers including: • Kindy Uplift – provided to respond to children's learning and developmental needs • inclusion ready subsidy – to support inclusion of children from diverse backgrounds and with additional needs. The Queensland Government also funds 136 state delivered preschool programs in 118 remote state schools or their campuses, including 31 programs in certain Aboriginal and Torres Strait Islander remote communities.

	Recurrent expenditure (2022-23 financial year)	Key funding arrangements as at May 2024[c]
WA	$376,778,000	Preschool is mainly provided through the school system. Western Australia provides preschool for 600 hours per year in public schools, community preschools, Catholic and Independent schools, with four hours per week funded by the Australian Government.
SA	$217,896,000	The South Australian Government funds 480 hours per year of preschool for children in four-year-old preschool and certain cohorts of children in three-year-old preschool in government-run dedicated preschools. Children in three-year-old preschool that are eligible include Aboriginal children and children in out-of-home care. Preschool provision is increased to 600 hours per year for children in four-year-old preschool through funding from the Australian Government. In addition, CBDC services, non-government schools and non-government dedicated preschools receive funding subsidies on an application basis which can be used to offset the costs of running a preschool program. Non-government services can also access targeted additional subsidies to offset the costs of delivering preschool to children experiencing disadvantage, Aboriginal children and children with disabilities.
Tas	$39,713,000	Preschool in Tasmania is delivered and funded through the school system. The Tasmanian Government funds 10 hours per week of preschool for children in four-year-old preschool in government schools and not-for-profit non-government schools. Additional funding to reach 15 hours per week is provided by the Australian Government. CBDC services must register as non-government schools to deliver preschool in Tasmania. Registering as a non-government school allows these services to be eligible for Australian Government funding through the Preschool Reform Agreement, regardless of profit status. However, for-profit CBDC services delivering preschool are ineligible for state funding under the Tasmanian Education Act 2016. This legislation does not allow state funding to go to for-profit services. There were no CBDC services registered to deliver preschool in Tasmania in 2022 (although ABS data collection assumes preschool-age children in CBDC services are enrolled in a preschool program).
ACT	$46,605,000	The ACT Government is the primary funder of 600 hours per year of preschool for children in four-year-old preschool in government-run dedicated preschools. The ACT Government also provides funding to eligible ECEC services (excludes ACT public preschools) to support the delivery of free three-year old preschool for 300 hours per year. This is provided on a per enrolment basis as two components – program funding and funding that is passed on to families as fee relief (after CCS is applied). In addition, the Koori Preschool program provides Aboriginal and Torres Strait Islander children in three-year-old preschool and above with 600 hours per year of free culturally safe preschool. Children experiencing disadvantage and vulnerability are eligible for two days per week of free three-year-old preschool in ECEC services. As part of its commitments under the Preschool Reform Agreement, the ACT Government agreed to implement funding mechanisms to distribute Preschool Reform Agreement funding to non-government school based preschool sectors and to invest Preschool Reform Agreement funding in quality improvement strategies for the long day care sector.

	Recurrent expenditure (2022-23 financial year)	Key funding arrangements as at May 2024[c]
NT	$39,412,000	The Northern Territory Government funds 490 hours per year of preschool for eligible children in government schools. Children are eligible if they are in four-year-old preschool, or if they are in three-year-old preschool in very remote locations. The remaining funding to reach 600 hours per year is provided by the Australian Government (for four-year-old preschool). The Northern Territory Government also provides funding on a per enrolment basis to remote non-government schools where there is no government preschool provision. As part of its commitments under the Preschool Reform Agreement, the Northern Territory Government will support access to preschool programs regardless of service type, including government and non-government schools and CBDC services.

a. Recurrent expenditure includes state and territory expenditure funded by the Australian Government under the Preschool Reform Agreement. It excludes capital expenditure. Amounts are adjusted to 2022-23 dollars (that is, 2022-23=100) using the General Government Final Consumption Expenditure (GGFCE) chain price deflator (table 2A.26). **b.** The key funding arrangements column shows policies implemented as at May 2024, however the recurrent expenditure figures are from the 2022-23 financial year, which are the latest available. Therefore, the recurrent expenditure figures will not include expenditure for policies implemented after 30 June 2023, such as the Queensland Government's Free Kindy program. Furthermore, the key current funding arrangements do not detail preschool reforms due to be implemented after May 2024, these reforms are discussed in section E.4 of this appendix. **c.** Key funding arrangements include broad-based preschool funding arrangements implemented by each state and territory as at May 2024. Additional funding arrangements not covered in the table include funding for inclusion support programs, playgroups and other programs that cater to the needs of specific cohorts of preschool children.

Source: ACT Education Directorate (2023b, 2024a, 2024b), Australian Capital Territory and Commonwealth of Australia (2023), Northern Territory and Commonwealth of Australia (2023), NSW DoE (2023a, 2023f), Queensland DoE (2024), SA Department for Education (2023), SCRGSP (2024b), State of Queensland and Commonwealth of Australia (2023), State of South Australia and Commonwealth of Australia (2023), State of Tasmania and Commonwealth of Australia (2023), State of Western Australia and Commonwealth of Australia (2023), Victorian DoE (2023).

Australian Government involvement in preschool funding

The Australian Government's role in preschool funding has shifted over time. Funding began in the early 1970s. By the mid-1970s, the Australian Government was providing the majority of preschool funding, with state and territory governments contributing the balance (Elliot 2006, p. 4). This changed in the mid-1980s when funding was rolled into Financial Assistance Grants to state and territory governments, removing direct funding of preschools by the Australian Government (Elliot 2006, p. 11). The Australian Government's role shifted again when it signed the National Partnership Agreement (NPA) on Early Childhood Education (2009–2013) with state and territory governments.

The NPA on Early Childhood Education aimed to ensure children had universal access to a preschool program. Under the agreement, universal access was defined as every child in the YBFS having access to a preschool program for 15 hours per week, for 40 weeks per year. The program was to be delivered by a four-year degree qualified ECT and provided at a cost that did not present a barrier to participation.

Prior to the NPA on Early Childhood Education, when preschool provision was the responsibility of state and territory governments, the level of provision could differ by jurisdiction (Australian National Audit Office 2011, p. 13). A principal aim of the agreement was to introduce nationally consistent universal access (COAG Education Council 2020, p. 18). The Australian Government provided contributions to state and territory governments and they were then responsible for allocating this funding within their jurisdictions to work towards this objective.

Between 2013 and 2021, the NPA on Universal Access to Early Childhood Education (UANP) and its successive extensions maintained funding for universal access, with some changes. The definition of universal access was changed to 600 hours of preschool in the YBFS. The change to an annual hours quota allowed preschool providers more flexibility in the delivery of programs. The UANP also required ECT qualifications to be in line with the NQF as a precondition for funding.

The COAG Education Council commissioned an independent review of the UANP in 2019. The review found that:

- the UANP had increased participation in quality preschool by children in the YBFS but some children, particularly Aboriginal and Torres Strait Islander children and children experiencing vulnerability and disadvantage, were missing out
- the UANP established a national system, while preserving state and territory autonomy to meet local needs
- funding flexibility from the UANP should be retained but variations in state and territory investment warranted further consideration
- Australian Government funding and national coordination should continue
- governments should enter into a new five-year National Partnership from 2021 to 2025 and transition to a National Agreement from 2026 onwards
- a minority of funding under the new National Partnership should be performance-based (COAG Education Council 2020, p. 1).

In 2021, the UANP expired and was superseded by the Preschool Reform Agreement (2022–2025).

Preschool Reform Agreement (2022–2025)

The Preschool Reform Agreement aims to ensure children have universal access (as set out in previous agreements) to a preschool program for 15 hours per week or 600 hours per year, delivered by a degree qualified ECT in the YBFS.

Funding allocations under the Preschool Reform Agreement are calculated by multiplying the annual YBFS populations of the states and territories (based on the latest ABS data projections) by a specified per-child amount. The per-child amount for 2024 is $1,410.90. Over the course of the agreement, the Australian Government will provide an estimated $1.84 billion of funding to state and territory governments.[3]

Key reforms

Australian Government funding follows children at the setting level

The Preschool Reform Agreement requires that funding from the Australian Government is passed on to benefit children in the setting in which they attend preschool. This could be through reduced out-of-pocket expenses for families and/or improvements to quality, such as through the employment of additional ECTs beyond the requirements of the NQF.

However, unlike CCS funding, funding from the Preschool Reform Agreement is only required to follow the child to the type of setting they attend, not the individual service. Funding is not attached to each individual child or family but is calculated at an aggregate level. State and territory governments must identify the total number of children attending preschool in each setting in the YBFS and then allocate funding to each setting type by multiplying these totals by the Australian Government per child contribution. As such, if a child attends a particular service, the service itself will not necessarily receive funding, but funding will be

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[3] Preschool Reform Agreement, Table 1a.

allocated to the setting type. Funding is reconciled at the end of the year to ensure it is accurately allocated to the setting type that children attend.

State and territory governments could previously use Australian Government funding more flexibly to support the provision of universal access. In its 2014 inquiry, the Productivity Commission noted that state and territory governments varied widely on whether they passed on Australian Government funding to CBDC services and non-government dedicated preschools (PC 2014, p. 647). Subsequently, the Commission recommended that the Australian Government require state and territory governments to direct these payments to the approved preschool service nominated by the family. However, Australian Government funding currently follows children to the setting type, as discussed above.

New national preschool enrolment and attendance measures

The Australian, state and territory governments have developed new national preschool enrolment and attendance measures. The new measures underpin a key objective of the Preschool Reform Agreement to improve participation in preschool programs, raising both enrolment and attendance, rather than focusing on enrolment as has previously been the case.

The design of the measures, including data definitions and the implementation approach, was agreed upon by Australian, state and territory government Education Ministers in 2023.[4] Baseline (initial) data for the measures will be provided by the state and territory governments to the ABS in 2024.

State performance will be measured against enrolment and attendance targets, which will be negotiated bilaterally between the Australian and the state or territory government, taking into consideration factors such as differing state circumstances and baseline data. The targets will become applicable from 2025.

New national preschool outcomes measure

As part of the Preschool Reform Agreement, governments agreed to develop a new national preschool outcomes measure. This underpins another key objective of the Preschool Reform Agreement – maximising the benefit of the preschool year by improving outcomes for children.

The measure will include three parts:

- a new national formative assessment tool
- a focus on national learning progressions in two domains: executive function and oral language and literacy
- criteria and processes for aligning existing tools to the learning progressions (DoE 2023a).

Consultation with teachers, educators and other stakeholders was due to be undertaken in 2024. Advice was also provided by an expert advisory group convened by the Australian Government (DoE 2021).

The proposed design of the outcomes measure will be trialled and validated prior to becoming applicable, with a national trial commencing in 2025 (DoE 2023b). Upon completion, the trial will be independently evaluated and outcomes of the evaluation will be used to inform decisions about its potential future implementation.

Child Care Subsidy

As noted above, the Australian Government provides funding through the CCS to reduce out-of-pocket expenses for families attending CCS-approved services (appendix D). The amount that CCS-approved service providers charge to families is the fee less the subsidy. To receive the subsidy, families must have a

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[4] Preschool Reform Agreement, Appendix A.1.

child who attends a CBDC, family day care, outside school hours care (OSHC) or In Home Care service. Families with children attending a preschool program in a CBDC service are eligible to receive the CCS.

Under Family Assistance Law, families are only entitled to the CCS in relation to fees they are charged, meaning any third-party payments must be deducted from fees prior to assessing CCS. However, some third-party payments prescribed under the Child Care Subsidy Minister's Rules 2017 (Cth) do not affect CCS and will reduce fees after CCS has been applied.

Some payments made by state and territory governments are prescribed. Under the Child Care Subsidy Minister's Rules 2017 (Cth) (s. 16A(3D)), these payments include contributions made to reduce session fees for a child attending a preschool program in a CBDC between 1 January 2023 and 31 December 2025. The preschool program must be aimed at children in the two or three years before grade one of school.

In practice, this means that some families may see their preschool fees reduced to zero through a combination of the CCS and fee relief measures provided by state and territory governments. However, this will depend on the fees that families are being charged by service providers, the number of hours per week their children attend preschool and the state or territory they reside in.

The number of subsidised hours that a family is eligible for under the CCS is based on parents' or guardians' hours of recognised activities, measured on a fortnightly basis. Recognised activities include, for instance, paid work and studying an approved course. However, families with preschool children may receive an exemption and be eligible for 36 hours of subsidised care per fortnight without having to meet the test. To be eligible for the exemption, families must have preschool children attending a CBDC service in the YBFS and must be eligible for less than 36 hours per fortnight of subsidised care based on their current activity levels.

E.4 State and territory reforms

Most state and territory governments have announced or are undertaking preschool reforms within their jurisdictions. These reforms vary in terms of focus and scope and include funding commitments for:

- reducing fees or expanding hours of enrolment for four-year-old preschool
- trialling or continuing state-wide rollouts of three-year-old preschool
- investing in preschool workforce and infrastructure
- conducting state-wide reviews of preschool provision with the aim of guiding future policy considerations.

These reforms will impact preschool funding arrangements and the ECEC sector more broadly, in the future.

Some of these reforms will also change entitlements to three- and four-year-old preschool in the long-term (table E.3) (further details provided below).

The below discussion reflects information available publicly as at June 2024.

Table E.3 – State and territory reforms will change preschool entitlements

State and territory commitments to three- and four-year-old preschool

	Four-year-old preschool	Three-year-old preschool
NSW	• 15 hours per week currently available • Up to five days per week by 2030[a]	• 15 hours per week currently available in community and mobile preschools • Two-year trial in CBDC services
Vic	• 15 hours per week currently available • 30 hours per week by 2036, rolled out gradually from 2025	• 15 hours per week by 2029, rolled out from 2020. Currently between 5-15 hours are available, depending on the what the service offers • Children from refugee or asylum seeker backgrounds, Aboriginal and Torres Strait islander children and children from families who have had contact with child protection are currently eligible for 15 hours per week
Qld	• 15 hours per week • Announced up to 30 hours per week will be available for children in certain communities	
WA	• 15 hours per week	
SA	• 15 hours per week, with measures put in place between 2026 and 2032 so that children most at risk of developmental vulnerability can access up to 30 hours per week	• 15 hours per week currently available for Aboriginal children and children in care • 15 hours per week will be available across the state by 2032, rolled out in stages from 2026. • Between 2026 and 2032, the SA Government will put in place measures so that children most at risk of developmental vulnerability can access up to 30 hours per week
Tas	• 15 hours per week	• Committed to three-year-old preschool, currently trialling in five communities
NT	• 15 hours per week	• 490 hours per year currently available for children in very remote areas (must be accompanied until they are 3.5 years) • Conducting a trial in six schools
ACT	• 15 hours per week	• One day per week currently available across the territory, with two days per week available for up to 500 children experiencing disadvantage and vulnerability and up to 100 Aboriginal and Torres Strait Islander children • Aims to make 600 hours per year available

a. Reflects information as at the 2022-23 state budget.

Source: ACT Education Directorate (2023a, 2024a), Australian Capital Territory and Commonwealth of Australia (2023), Gunner (2022), Northern Territory and Commonwealth of Australia (2023), NSW Department of Education (2023f), NSW Government (2022b), Queensland Government (2024), SA Government (2024b), State of New South Wales and Commonwealth of Australia (2023), State of Queensland and Commonwealth of Australia (2023), State of South Australia and Commonwealth of Australia (2023), State of Tasmania and Commonwealth of Australia (2023), State of Victoria and Commonwealth of Australia (2023), State of Western Australia and Commonwealth of Australia (2023), Victorian Government (2023b, 2023a, 2024a).

New South Wales

Universal pre-kindergarten

In the 2022-23 state budget, the NSW Government committed to introducing a 'universal pre-kindergarten year' in the YBFS by 2030 (NSW Government 2022a, pp. 2–4), involving up to five days of preschool a week at low or no cost (NSW Government 2022b, p. 53). $5.7 billion over 10 years was earmarked for this purpose (NSW Government 2022a, pp. 2–4).

As a first step, the 2022-23 state budget provided $40.2 million for planning, consultation and early steps in the implementation of this program (NSW Government 2022a, pp. 2–4).

The 2023-24 state budget maintained $5.7 billion in funding over 10 years for 'universal preschool access' (NSW Government 2023, pp. 1–10). In addition, the NSW Government committed to deliver 100 preschools on NSW public school sites and 50 new or upgraded preschool facilities on non-government school sites (NSW DoE 2023b). All new public primary schools built in New South Wales will have a preschool on their grounds.

Three-year-old preschool

The 2022-23 NSW budget provided funding to trial three-year-old preschool in CBDC services (NSW Government 2022a, p. 2 - 4). The two-year trial commenced in 2023 as part of the broader Start Strong program (discussed in section E.3).

As part of the trial, eligible CBDC services receive funding on a per-child basis for children enrolled in three-year-old preschool (NSW DoE 2023e). Services are eligible if they deliver a three-year-old preschool program and meet the eligibility requirements under the broader Start Strong for Long Day Care program.

In addition, the NSW Government has committed $64 million over two years to provide fee relief for families with children in three-year-old preschool as part of the 2023-24 budget (NSW DoE 2023c). From 2024, families with children attending three-year-old preschool in CBDC services receive $500 of annual fee relief per child.

These changes build on the commitment announced in the 2018-19 NSW budget to provide funding for three-year-old preschool programs in community preschools, which was implemented from 2019 (NSW DoE 2023d).

Victoria

The Victorian Government has committed funding towards the Best Start, Best Life reform package, including expanding the provision of preschool across the state (Victorian Government Department of Education, sub. 146, p. 17). In addition to providing the Free Kinder program for three- and four-year-old preschool at participating services from 2023 (discussed in section E.3), the Best Start, Best Life reform package includes:

- transitioning four-year-old preschool to 'Pre-Prep' by 2036
- rolling out three-year-old preschool across the state by 2029
- establishing government-owned and operated early learning centres
- funding other measures related to preschool infrastructure and workforce.

As part of the 2024-25 state budget, the Victorian Government has committed additional funding for Free Kinder and to continue the statewide rollout of three-year-old preschool (Victorian Government 2024b, p. 9).

Pre-prep

The Victorian Government has committed to introducing a universal 30 hours per week of play-based learning (Pre-Prep) in the YBFS (Victorian Government 2023b). The program will be delivered through dedicated preschools and CBDC services and remain optional for children to participate in.

Four-year-old preschool will begin transitioning to 'Pre-Prep' in stages from 2025. The rollout will initially prioritise preschool in parts of regional Victoria, followed by Aboriginal children and children experiencing vulnerability across the state and then children experiencing disadvantage across the state. The program will expand to all Victorian children by 2036 (Victorian Government 2024a).

Three-year-old preschool rollout

The Victorian Government has committed to funding 15 hours per week of three-year-old preschool for children in dedicated preschools and CBDC services by 2029 (Victorian Government 2023b). The program launched in 2019 and will be rolled out in stages over 10 years. In 2020, funding was provided to support 5-15 hours per week of three-year-old preschool in six regional local government areas, which was expanded to 21 local government areas in 2021 (Victorian Government 2022). In 2022, services across the state received funding to deliver five hours per week of three-year-old preschool, before this was extended to 5-15 hours per week across the state in 2023.

Other measures

Additional funding as part of the Best Start, Best Life reform package includes:

- establishing 50 government-owned and operated early learning centres in areas of greatest need, with the first 30 of these centres expected to be available in 2028 and an additional five opening every year until 2032 (Victorian Government 2024a)
- investing in preschool infrastructure and workforce, including grants to build, expand and maintain kindergarten services and scholarships, incentives, traineeships and career advancement programs for educators (Victorian Government 2023b).

Queensland

The Queensland Government introduced its Free Kindy program from 1 January 2024, which provides free four-year-old preschool for eligible children (Queensland DoE 2023) (details discussed in section E.3). For preschool children in CBDC services, only the preschool component of their attendance will be free, comprising 15 hours per week, 40 weeks per year.

As part of the 2024-25 state budget, the Queensland Government committed $26.2 million to extend Free Kindy up to 30 hours per week for children in four-year-old preschool in certain communities (Queensland Government 2024, p. 42).

South Australia

On 16 October 2022, the South Australian Government established a Royal Commission into Early Childhood Education and Care. The Royal Commission was asked to consider a range of matters, including how universal quality preschool programs for three- and four-year-old children can be delivered.

The Royal Commission's final report was released in August 2023 and made 43 recommendations, including several recommendations and findings in relation to three- and four-year-old preschool (SA Government 2023).

In response to the Royal Commission, the South Australian Government has made a range of commitments, including as part of the 2024-25 state budget. Key commitments are discussed below.

Three-year-old preschool

The South Australian Government has committed $339.7 million over five years to deliver universal three-year-old preschool – which will provide 15 hours per week of three-year-old preschool in CBDC and dedicated settings (SA Government 2024b, p. 11). Participation and hours will increase progressively as part of a staged rollout which will commence in 2026 and be completed by 2032 (SA Government 2024b, p. 13).

Investments to support this commitment will include:

- upgrading and expanding capacity in government dedicated preschools to ensure readiness for three-year-old enrolments
- a grant program to incentivise non-government providers to create additional places
- integrated hubs to be co-designed with local communities (SA Government 2024b, p. 11).

Additional preschool hours for children at risk of developmental vulnerability

The South Australian Government has committed $127.3 million over four years to support increased preschool hours for children at risk of developmental vulnerability (SA Government 2024b, p. 11). Between 2026 and 2032, measures will be put in place so that up to 2,000 three- and four-year-old children who are most at risk of development vulnerability can access up to 30 hours per week of preschool (SA Office for Early Childhood Development 2024).

Other measures

Other commitments in response to the Royal Commission include:

- from 2024, expanding access to three-year-old preschool from 12 to 15 hours per week for Aboriginal and Torres Strait Islander children and children in care in government-run dedicated preschools
- trialling out of hours care at 20 government-run preschools in 2024 (SA Department for Education 2024).

In addition, the South Australian Government will introduce a new preschool model for three- and four-year-old children which will include:

- a teacher led quality preschool program
- support for allied health and other professionals
- early identification of child's developmental needs on site, with organised pathways to interventions
- organised family and community support for those who need it (SA Government 2024a).

Tasmania

In August 2022, the Tasmanian Government announced its intention to provide universal access to early learning for three-year-old children in the year before preschool (Tasmanian Department for Education, Children and Young People, sub. 159, p. 6).

To deliver the first stage of this long-term goal, the 2023-24 state budget provided $6.04 million over four years to establish trial sites for delivery of three-year-old preschool (Tasmanian Department for Education, Children and Young People, sub. 159, p. 6). Trial sites commenced service delivery from 2024, with ECEC services as the preferred provider. Findings of the trials will inform the approach to broader implementation of universal access to preschool for three-year-old children in the future.

Australian Capital Territory

The ACT Government launched *Set up for Success: An Early Childhood Strategy for the ACT* in 2020, a 10-year plan for ECEC reforms in the territory. As part of this initiative, the ACT Government aims to provide 600 hours per year of free preschool for all three-year-old children in the Australian Capital Territory.

As part of the first phase, two days per week of free preschool is available for certain cohorts of children in three-year-old preschool in participating services (ACT Education Directorate 2024a). Up to 500 places are available for children experiencing vulnerability and disadvantage in participating education and care services and up to 100 places are available for Aboriginal and Torres Strait Islander children in government-run Koori Preschools.

In addition, the 2023-24 budget provided $56.1 million over four years to fund three-year-old preschool across the territory from 2024 (ACT Government 2023, p. 61), with children able to access 300 hours of free three-year old preschool per year or one day per week over 40 weeks (ACT Education Directorate 2023a) (details discussed in section E.3).

Northern Territory

The Northern Territory Department of Education commissioned a review of preschool as part of the broader early childhood system in the Northern Territory (Nous Group 2023). The review, which began in October 2022, considered various matters, including effective preschool delivery models for the Northern Territory and measures to expand access, simplify funding and support providers. The final report was due to be delivered to the Northern Territory Government in June 2023. Findings of the review are intended to shape the future of preschool delivery in the Northern Territory.

In addition, as at 2022, six Northern Territory government schools were participating in a trial of three-year-old preschool (Gunner 2022). The trial complements existing policies in the Northern Territory that enable three-year-old children in very remote areas to access preschool in government schools (as discussed in section E.3).

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F. Workforce disincentive rates

A workforce disincentive rate (WDR) measures the proportion of earnings from an extra day of work that goes to the tax and transfer system (via increased income taxes and reduced transfer payments) and to increased out-of-pocket early childhood education and care (ECEC) expenses where a family uses ECEC.

WDRs are similar to effective marginal tax rates (EMTRs). The term WDR was first used in a KPMG (2018) report, *The cost of coming back: achieving a better deal for working mothers*. The WDRs reported included out-of-pocket ECEC expenses (whereas EMTRs historically did not) and measured the effect on additional earnings from an extra day of work (whereas EMTRs historically were based on an additional $1 earned). However, EMTRs have evolved to be a general measure of additional earnings, such as those from an extra day of work, and can also account for out-of-pocket ECEC expenses. The terms EMTRs and WDRs are now sometimes used interchangeably.

F.1 Assumptions for workforce disincentive rate calculations

WDRs are calculated in this appendix for hypothetical families. The hypothetical families analysed differ based on family type (sole earner or coupled earners), family size (one or two children) and earnings.[1]

The 2019-20 Survey of Income and Housing (SIH), which represented an estimated 1.4 million coupled and sole earner families with children aged five or under, highlights that some family compositions are more common than others. About 60% of families were coupled earners with one child aged five or under, while families with more than two children aged five or under were less common (table F.1).

In each scenario, children are aged five or under and attend centre-based day care (CBDC) for 48 weeks per year. Gross CBDC fees are assumed to be $12.80 per hour (the mean hourly CBDC fee in the September 2023 quarter) (DoE 2023). One ten-hour day of CBDC is used for each additional day of work (for example, when a sole earner or secondary earner works for three days, children are enrolled for 30 hours).

For the scenarios modelled in this appendix, sole earner families are assumed to earn $60,000, $80,000 or $100,000 when working full-time (five days per week).[2] Coupled earner families are assumed to either:

- each earn $60,000, $100,000, $120,000 or $140,000 when working full-time
- have a primary earner earning $120,000 when working full-time, and a secondary earner earning $60,000, $80,000 or $100,000 when working full-time.

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[1] Some hypothetical families analysed here reflect those used by the Australian Institute of Family Studies in their Child Care Package evaluation: final report (Bray et al. 2021, p. 279). Other hypothetical families were chosen to represent relatively more common full-time equivalent family income compositions, as identified in section F.3.

[2] These are gross (pre-tax) employee incomes.

For each scenario, five WDRs are calculated – representing the WDR for each additional day worked in a week by sole and secondary earners.[3] WDRs are calculated using the cameo version of the Australian Government Treasury's Comparative Analysis of Personal Income Tax and Transfers in Australia (CAPITA) microsimulation model. CAPITA incorporates a comprehensive suite of Australian personal income taxes and transfer payments – further detail on the model is available in Stevenson et al. (2017).

Table F.1 – Some family compositions are more common than others[a,b]

Weighted proportion of families with children aged five and under by family composition, 2019-20

	One child	Two children	More than two children
Sole earner families	10%	3%	
Coupled earner families	61%	24%	2%

a. Values in the right column (dark grey) are suppressed due to the small number of observations in the corresponding cells. **b.** Income unit weights from the SIH were applied.

Source: Productivity Commission estimates using ABS 2019-20 SIH.

The scenarios do not represent the income positions of all families. As illustrated in section F.3, about 60% of sole earner families (such as those included in figure F.1) have a full-time equivalent (FTE) income within the $60,000 to $100,000 range. Incomes of coupled earner families can vary widely. Some families have similar levels of FTE income for each member of the couple, like the families included in figure F.2. For other families, such as those included in figure F.3, incomes are more asymmetric. About half of coupled earner families with young children are not well-represented by the set of hypothetical families in this analysis (table F.4).

For all the scenarios presented, tax rates and thresholds reflect the 2023-24 personal income tax schedule, and transfer payment rates and associated thresholds reflect the 2023-24 transfer payment system.[4] What differs across the scenarios are the Child Care Subsidy (CCS) rates and associated means testing income thresholds. Some scenarios reflect previous and current policy settings, for example, before and after the July 2023 Cheaper Child Care reforms.

After the Cheaper Child Care reforms, families with an adjusted taxable income[5] up to $80,000 are eligible for a 90% CCS rate for their first child, with the subsidy rate tapering down by 1 percentage point (ppt) for every $5,000 a family earns above $80,000. Previously, the maximum CCS rate for a family's first child was 85%, and taper rates were more complex. Subsidy rates for the higher CCS (HCCS) remained largely unchanged after the Cheaper Child Care reforms. However, for families with incomes above $362,408, HCCS rates increased for second and subsequent children to be the same as the family's CCS rate for their first child. Further detail on CCS rates is provided in appendix D.

Other scenarios represent potential policy reforms considered in paper 6 (table F.2).[6] The differences in subsidy rates and thresholds result in differences in WDRs. Reforms that involve relaxing or abolishing the activity test do not impact WDRs. This is because when calculating WDRs, ECEC use is assumed to increase proportionally as hours of work rise. Therefore, if the activity test were retained or relaxed, the

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[3] For coupled earners, it is assumed that the primary earner is already working full-time.

[4] As the Stage 3 tax cuts take effect on 1 July 2024 (2024-25 financial year), they are not reflected in the scenarios.

[5] Adjusted taxable income is the income measure used to determine a family's CCS and HCCS rates. However, for ease of reading, 'adjusted taxable income' will simply be referred to as 'income' in table F.2.

[6] This inquiry's report refers to options A, B and C – these are equivalent to options one, five, and six respectively.

family's activity test result would be such that for any additional day of work, all hours of ECEC would be subsidised. If the activity test were abolished, all hours of ECEC would also be subsidised.

Table F.2 – Modelled CCS policy options

Options	CCS rate	HCCS rate	Activity test
One / A: Remove the activity test and increase the subsidy rate to 100% for lower-income families	100% for families with an adjusted taxable income of $80,000 and under CCS rate tapers down from 100% by 1ppt for every $5,000 over $80,000	100% for families with an adjusted taxable income of $140,000 and under HCCS rate tapers down from 100% by 1ppt for every $5,000 over $140,000 Families with an adjusted taxable income of $580,000 and above ineligible	Remove so that all families are eligible for 50 subsidised hours of ECEC per week (100 hours per fortnight)
Two: Increase the subsidy rate to 100% for lower-income families	100% for families with an adjusted taxable income of $80,000 and under CCS rate tapers down from 100% by 1ppt for every $5,000 over $80,000	100% for families with an adjusted taxable income of $140,000 and under HCCS rate tapers down from 100% by 1ppt for every $5,000 over $140,000 Families with an adjusted taxable income of $580,000 and above ineligible	No change
Three: Remove the activity test for all families and retain income testing	No change	No change	Remove so that all families are eligible for 50 subsidised hours of ECEC per week (100 hours per fortnight)
Four: Relax the activity test and increase the subsidy rate to 100% for lower-income families	100% for families with an adjusted taxable income of $80,000 and under CCS rate tapers down from 100% by 1ppt for every $5,000 over $80,000	100% for families with an adjusted taxable income of $140,000 and under HCCS rate tapers down from 100% by 1ppt for every $5,000 over $140,000 Families with an adjusted taxable income of $580,000 and above ineligible	None for three days of ECEC per week (72 hours per fortnight), and no change for days four and five
Five / B: 90% subsidy for all families and retain activity test	90% for all families	Families remain receiving the HCCS rate if they are eligible for a rate greater than 90%	No change
Six / C: Flat fee ECEC expense of $10 per day and remove activity test	Remove the CCS and replace with a $10 flat fee out-of-pocket expense per day for each child	Remove	Remove so that all families eligible to receive 50 hours of subsidised ECEC per week

F.2 Main findings

For sole earners and lower-income coupled earners with broadly equal FTE incomes, where WDRs are relatively high it is primarily because of the tax and transfer system, not out-of-pocket ECEC expenses (figures F.1 and F.2). For higher-income coupled earners with equal or unequal FTE incomes, out-of-pocket ECEC expenses make up a larger proportion of WDRs (figures F.2 and F.3). Their average overall WDRs, however, are lower compared to the lower-income coupled earners included in this analysis.

Both before and after the Cheaper Child Care reforms, a sole earner family with two children earning $100,000 FTE faced the highest WDRs (with an average (mean) of single-day increment WDRs of 70%) (figure F.1). Among coupled earners, the highest average WDR (about 70%) was for a family with two children with each individual earning $60,000 FTE (figure F.2).

Comparing across scenarios, the Cheaper Child Care reforms reduced average WDRs for all hypothetical families considered in this analysis. The Productivity Commission's recommended CCS and HCCS reforms would reduce mean WDRs further (figures F.1 to F.3).

Figure F.1 – WDRs for sole earners are high mainly because of the tax and transfer system[a,b]

Mean of single-day increment WDRs
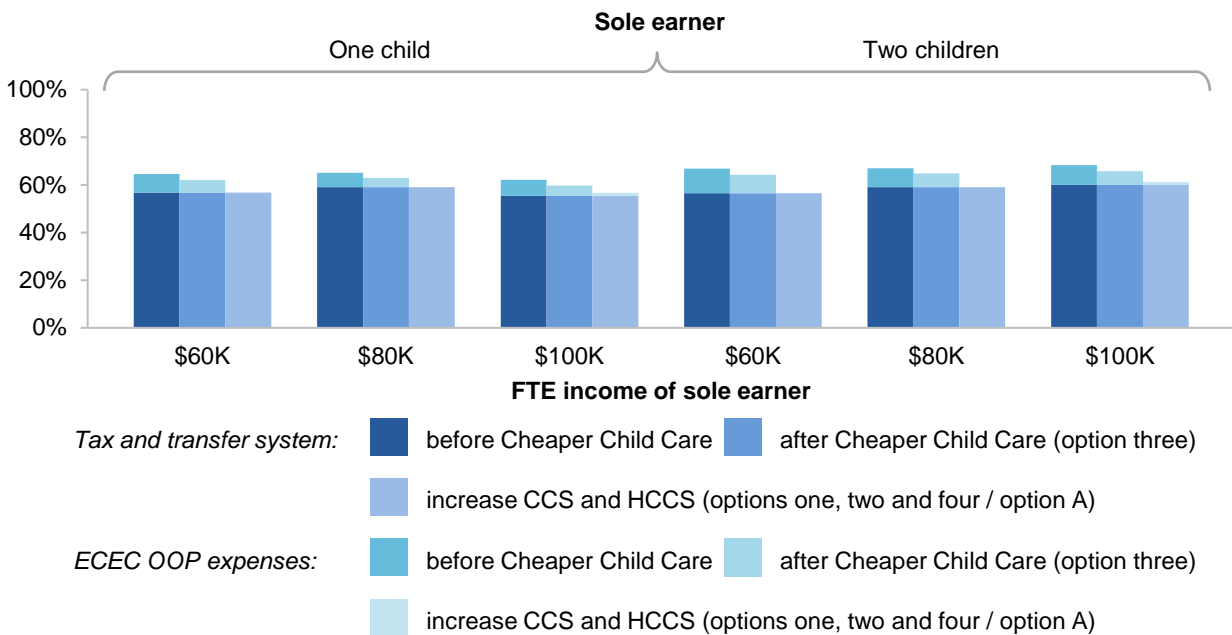
a. The mean of single-day increment WDRs has been calculated by averaging the WDR obtained for each additional day of work. **b.** OOP = out-of-pocket.

Source: Productivity Commission estimates using CAPITA v230518.

Figure F.2 – Where WDRs for coupled earners with equal FTE incomes are relatively high, it is mainly because of the tax and transfer system[a]

Mean of single-day increment WDRs
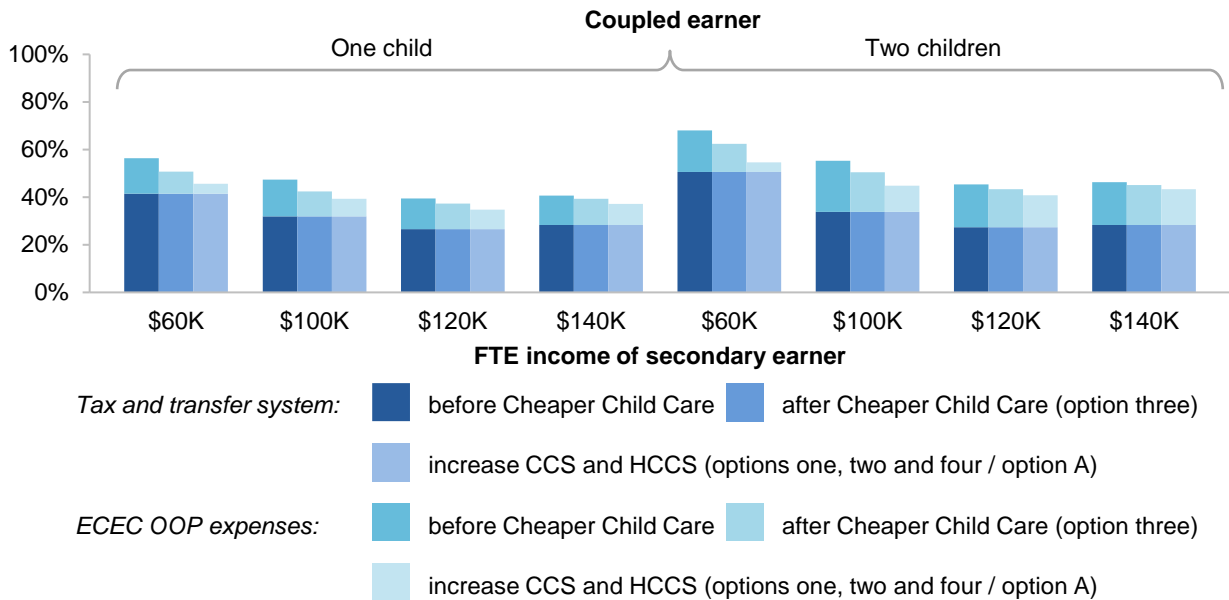
a. The primary earner is assumed to earn a full-time salary at the rate of the scenario, with the secondary earner earning the same annual rate when working full-time (their income increases proportionally with days worked).

Source: Productivity Commission estimates using CAPITA v230518.

Figure F.3 – ECEC expenses make up a larger proportion of WDRs for coupled earners with unequal FTE incomes[a]

Mean of single-day increment WDRs
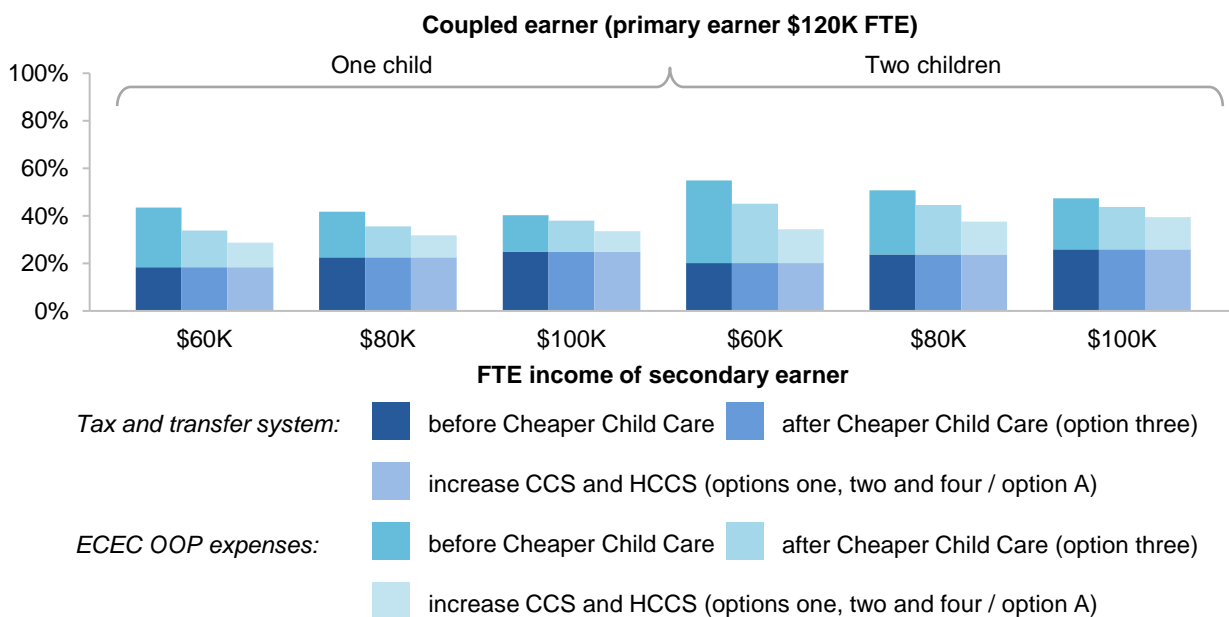
a. The primary earner is assumed to earn a full-time salary of $120,000, with the secondary earner earning their relevant annual rate as per the scenario when working full-time (their income increases proportionally with days worked).

Source: Productivity Commission estimates using CAPITA v230518.

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WDRs presented above are the means of single-day increments for families across five days. Looking at estimates for each day worked, WDRs can vary significantly with the number of days worked (figures F.4 to F.9). Generally, though, WDRs rise as sole or secondary earners increase their days of work (figure F.10).

Comparing across family types, WDRs are high for sole earners, particularly for the second to fifth days of work (figures F.4 and F.5). Likewise, for lower-income couples, WDRs tend to be high and increase with days of work (figure F.6).

WDRs are generally lower for higher-income couple families with equal FTE incomes. However, for these families, a larger proportion of WDRs is attributable to out-of-pocket ECEC expenses (figures F.6 and F.7). While these families are in higher income tax brackets, they are less affected by reduced transfer payments but receive lower CCS rates.

The contribution of out-of-pocket ECEC expenses to WDRs is also significant for higher-income couples with unequal FTE incomes (for example, a primary earner earning $120,000 FTE and a secondary earner earning $60,000 FTE). Additionally, overall WDRs for these families tend to be low for the first few days of work, then increase markedly with days worked (figures F.8 and F.9). This is not surprising. Because of the primary earner's higher income, the family would be receiving limited transfer payments even before the secondary earner's first day of work. They will also face a lower CCS rate and therefore have higher out-of-pocket ECEC expenses. The CCS subsidy rate then declines further as the family's income rises with more days worked by the secondary earner.

Broadly, WDRs are higher when families have a second child (figures F.4 to F.9). One reason for this is that Family Tax Benefit A[7] is higher for families with multiple children, so the dollar value reduction in family payments as the secondary earner's income increases is larger (Wood et al. 2020, p. 27).[8] The out-of-pocket ECEC expenses incurred for additional children also increases WDRs for families with two children.

Comparing the two leftmost columns in figures F.4 to F.9 highlights that the Cheaper Child Care reforms reduced the increase in out-of-pocket ECEC expenses associated with additional days of work, and therefore WDRs on most days, for all hypothetical families analysed.

Under the Commission's recommended CCS and HCCS settings (the middle columns in figures F.4 to F.9), WDRs are further reduced relative to the Cheaper Child Care reforms as increases in families' out-of-pocket ECEC expenses incurred for extra days of work are lower. Furthermore, for days where a family's income is $80,000 or less (meaning they would be eligible for a 100% subsidy rate), the contribution of out-of-pocket ECEC expenses to WDRs is zero. However, some families may experience an increase in WDRs for some days worked (box F.1) because of changes in HCCS subsidy rates.

The results for a 90% universal CCS or $10 flat fee system (the two rightmost columns in figures F.4 to F.9) reveal that higher-income families, who are currently eligible for lower subsidy rates, would experience relatively larger falls in their WDRs if either of these reforms were adopted.

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[7] Family Tax Benefit is a two-part (Part A and Part B) payment that assists with the cost of raising children (Services Australia 2024, pp. 2–4).

[8] More generally, the annual family income limit above which Family Tax Benefit Part A may not be paid differs with the number of children aged 0–12 and 13–19. As of 20 March 2024, the income limits were between $117,348 and $206,858, depending on the number of children. For Family Tax Benefit Part B, income limits differ between family types. For sole earners, Family Tax Benefit Part B may not be paid when an individual's income exceeds $112,578. For coupled earners, Family Tax Benefit Part B may not be paid when the primary earner earns more than $112,578 and the secondary earner earns more than $32,303 (youngest child aged under five) or $25,149 (youngest child aged five to 18) (Services Australia 2024, pp. 2–4).

Box F.1 – Some families would experience an increase in workforce disincentive rates under the Commission's recommended changes to subsidies

Although subsidy rates would increase for almost all families under the Commission's recommended changes to the Child Care Subsidy (CCS) and higher Child Care Subsidy (HCCS) (option one / option A), some families would experience an increase in workforce disincentive rates (WDRs) if these changes were implemented. This is driven by two factors.

- The recommended changes to the HCCS in option one include removing 'flat' sections of the subsidy schedule to create a smooth taper.
- The early childhood education and care (ECEC) component of WDRs is calculated by comparing the *change in out-of-pocket ECEC expenses* from an additional day of work to the *change in earned income* from an additional day of work.

As an example, consider a coupled earner family with two children where both individuals earn $120,000 FTE (figure F.7). When the family's secondary earner moves from four to five days of work, they face a higher WDR under the Commission's recommended changes to the CCS and HCCS than after the Cheaper Child Care reforms, despite receiving higher CCS and HCCS subsidy rates.

The table below highlights that the family's absolute out-of-pocket ECEC expenses are lower under the Commission's recommended changes to the CCS and HCCS (for example, expenses fall from about $19,000 if both individuals work five days a week to about $16,000). WDRs, however, focus on the *change* in tax and transfer payments and out-of-pocket ECEC expenses from an additional day of work.

As shown in the table, after the Cheaper Child Care reforms, the family's income on both the fourth and fifth days of work were in the 'flat' section of HCCS subsidy rate schedule – their HCCS rate was constant at 80% despite the secondary earner moving from four to five days of work. Hence, the family's WDR after the Cheaper Child Care reforms only reflected the need to pay for an additional day of ECEC at the same 80% HCCS rate.

Contribution of ECEC out-of-pocket expenses to WDRs[a,b]

	After Cheaper Child Care (option three)			Increase CCS and HCCS (option one / A)		
	Fourth day of work	**Fifth day of work**	**Change**	**Fourth day of work**	**Fifth day of work**	**Change**
Income (annual)						
Primary earner income	$120,000	$120,000	$0	$120,000	$120,000	$0
Secondary earner income	$96,000	$120,000	**$24,000**	$96,000	$120,000	**$24,000**
Family income[a]	$216,000	$240,000	$24,000	$216,000	$240,000	$24,000
ECEC out-of-pocket expenses (annual)						
Fees charged (child one)[b]	$24,576	$30,720	$6,144	$24,576	$30,720	$6,144

Box F.1 – Some families would experience an increase in workforce disincentive rates under the Commission's recommended changes to subsidies

Fees charged (child two)[b]	$24,576	$30,720	$6,144	$24,576	$30,720	$6,144
Fees charged (total)	$49,152	$61,440	$12,288	$49,152	$61,440	$12,288
CCS rate (child one)	62.8%	58%	-5%	72.8%	68%	-5%
HCCS rate (child two)	80%	80%	0%	85%	80%	-5%
Out-of-pocket expenses (child one)	$9,142	$12,902	$3,760	$6,685	$9,830	$3,145
Out-of-pocket expenses (child two)	$4,915	$6,144	$1,229	$3,686	$6,144	$2,458
Out-of-pocket expenses (total)	$14,057	$19,046	**$4,989**	$10,371	$15,974	**$5,603**
ECEC component of WDR (*change* in out-of-pocket ECEC expenses / *change* in secondary earner's income)						
Contribution of ECEC to WDR	$4,989/$24,000 = **21%**			$5,603/$24,000=**23%**		

a. A family's CCS and HCCS rates are determined by adjusted taxable income (section F.4). Here, for simplicity, the family's adjusted taxable income is assumed to be equal to their employee income. **b.** Fees are calculated as $12.80 per hour x ten hour day x four or five days per week x 48 weeks per year.

Source: Productivity Commission estimates.

However, under the Commission's recommended changes to the CCS and HCCS, the WDR reflects the additional day of out-of-pocket ECEC expenses *and* the fact that, when the secondary earner works a fifth day, the family faces a HCCS rate that is 5% lower for *all* days of ECEC.

Ultimately, although the family's absolute out-of-pocket ECEC expenses are lower under the Commission's recommended changes to the CCS and HCCS compared to after the Cheaper Child Care reforms, the new smooth HCCS taper means that the increase in out-of-pocket ECEC expenses, and therefore the WDR, is relatively larger between the secondary earner's fourth and fifth days of work.

The same principles can be applied to families in figures F.7 and F.9 who experienced an increase in WDRs on some days after the Cheaper Child Care reforms (comparing the two left-most columns). In this case, 'flat' sections of the CCS rate schedule were replaced with a smooth taper down.

Figure F.4 – WDRs are high for lower-income sole earners[a]

Single-day increment WDRs
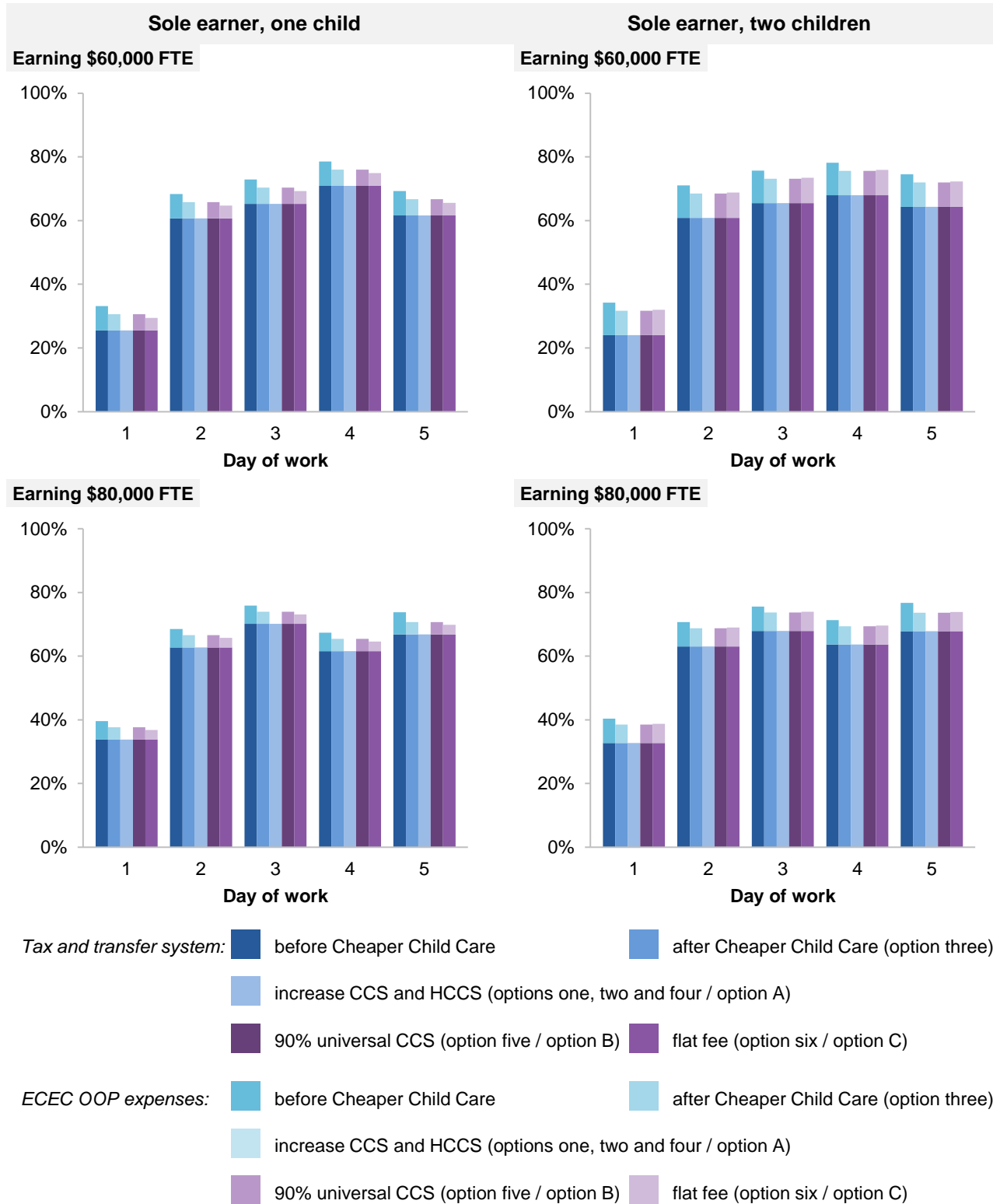
a. OOP = out-of-pocket.

Source: Productivity Commission estimates using CAPITA v230518.

Figure F.5 – WDRs are also high for sole earners with higher incomes

Single-day increment WDRs
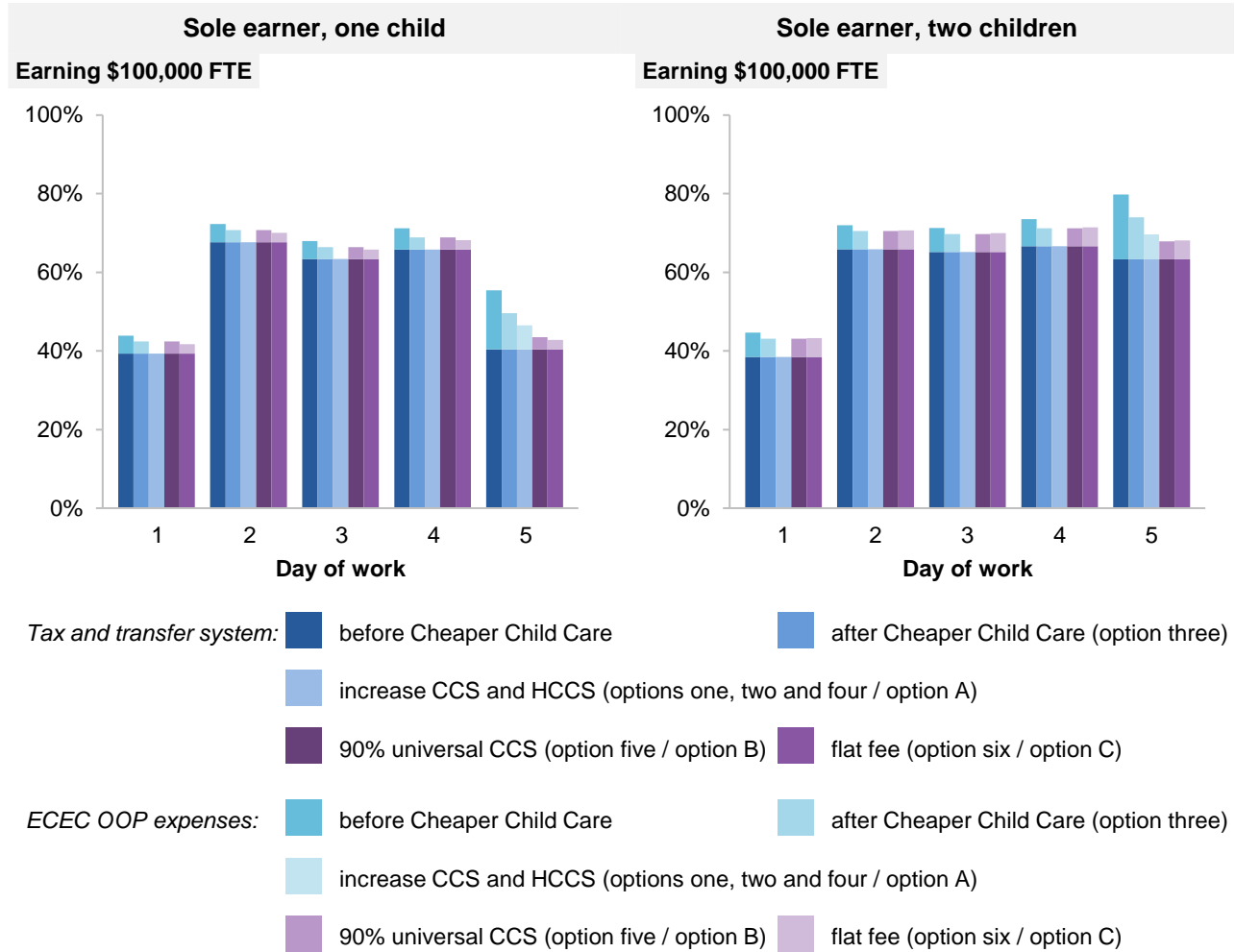
Source: Productivity Commission estimates using CAPITA v230518.

Figure F.6 – WDRs are high for secondary earners in lower-income couples ...

Single-day increment WDRs
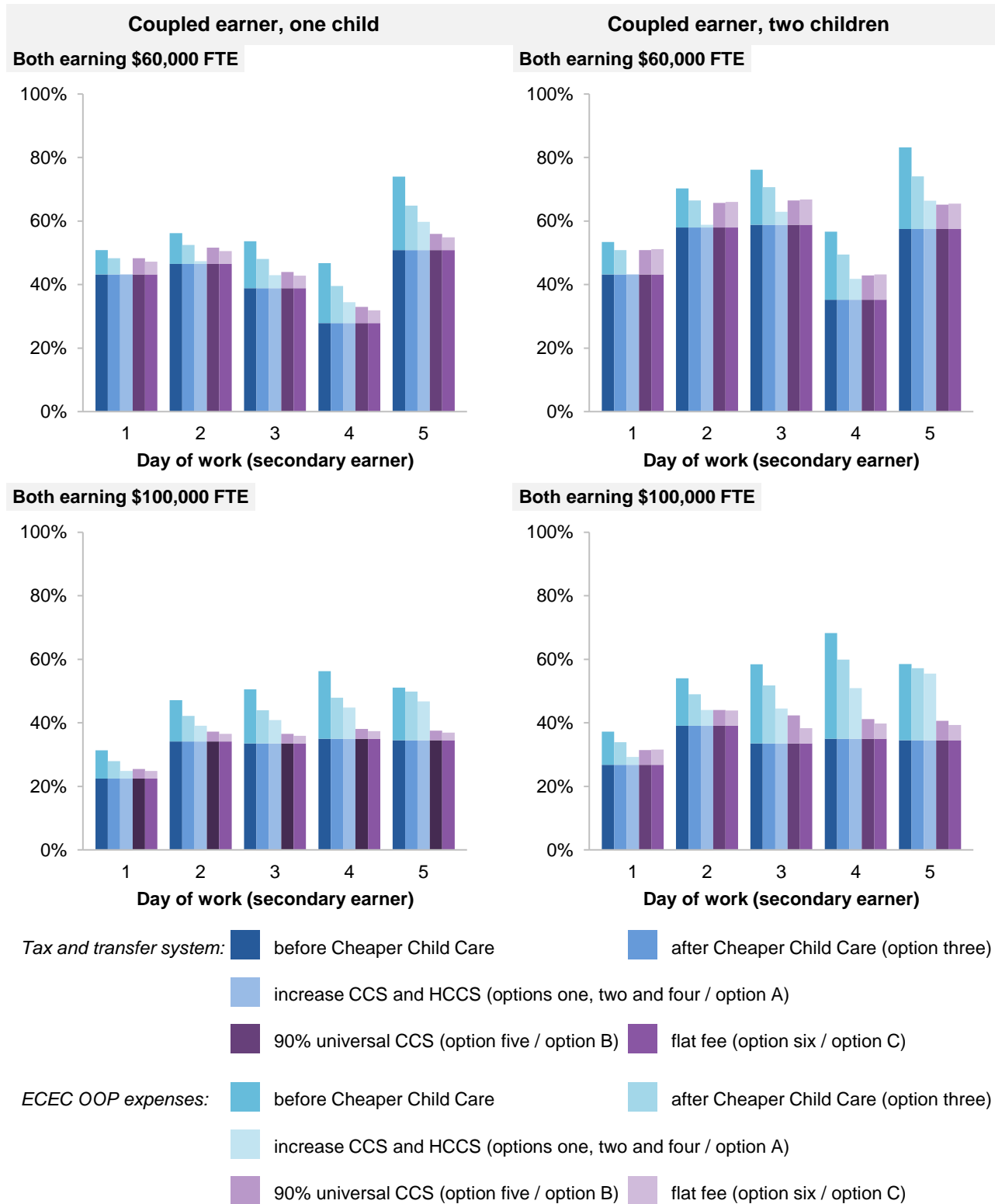
Source: Productivity Commission estimates using CAPITA v230518.

Figure F.7 – ... and WDRs are lower for secondary earners in higher-income couples

Single-day increment WDRs
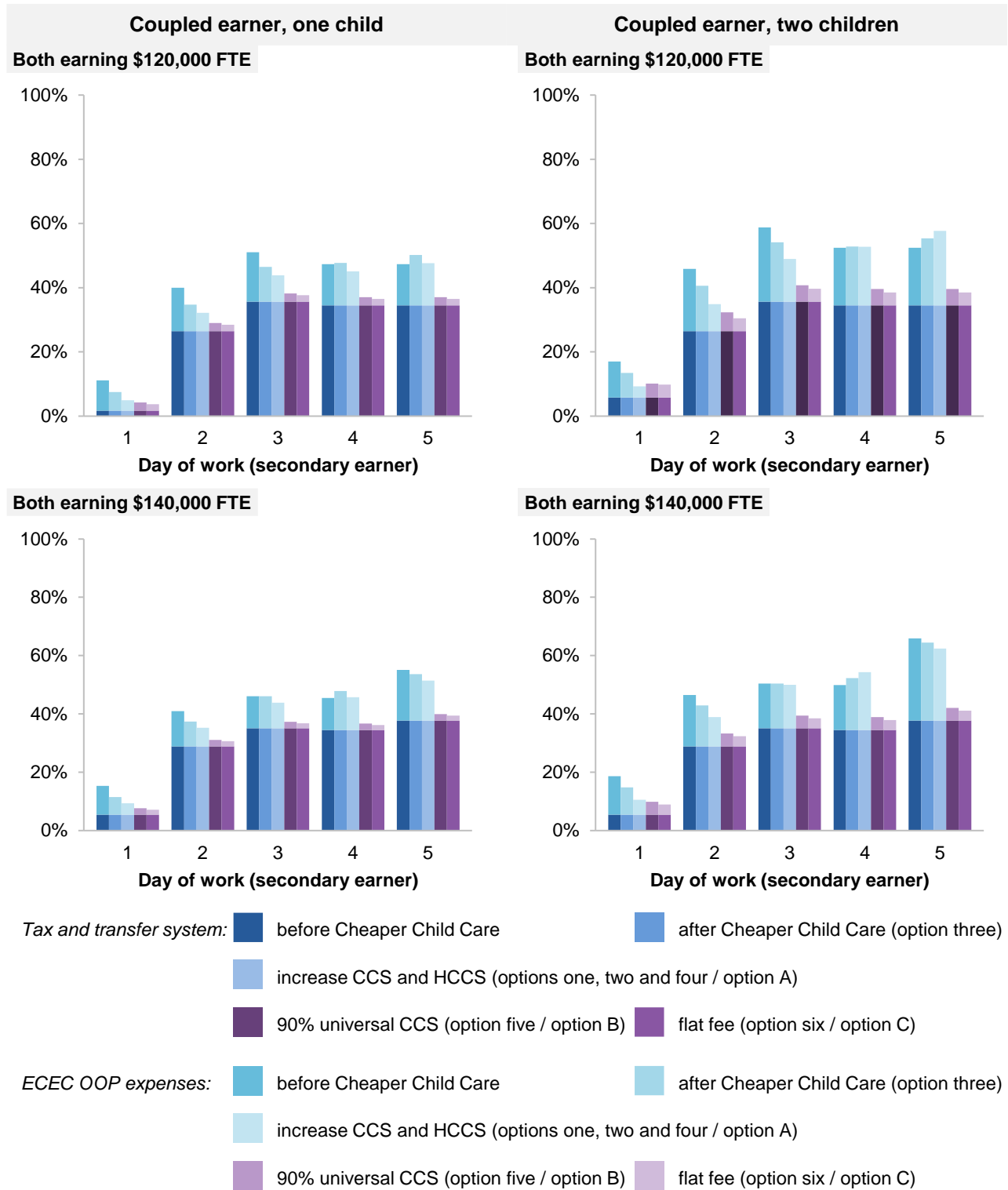
Source: Productivity Commission estimates using CAPITA v230518.

Figure F.8 – Out-of-pocket ECEC expenses make a relatively large contribution to WDRs for secondary earners in higher-income couples with unequal FTE incomes ...

Single-day increment WDRs
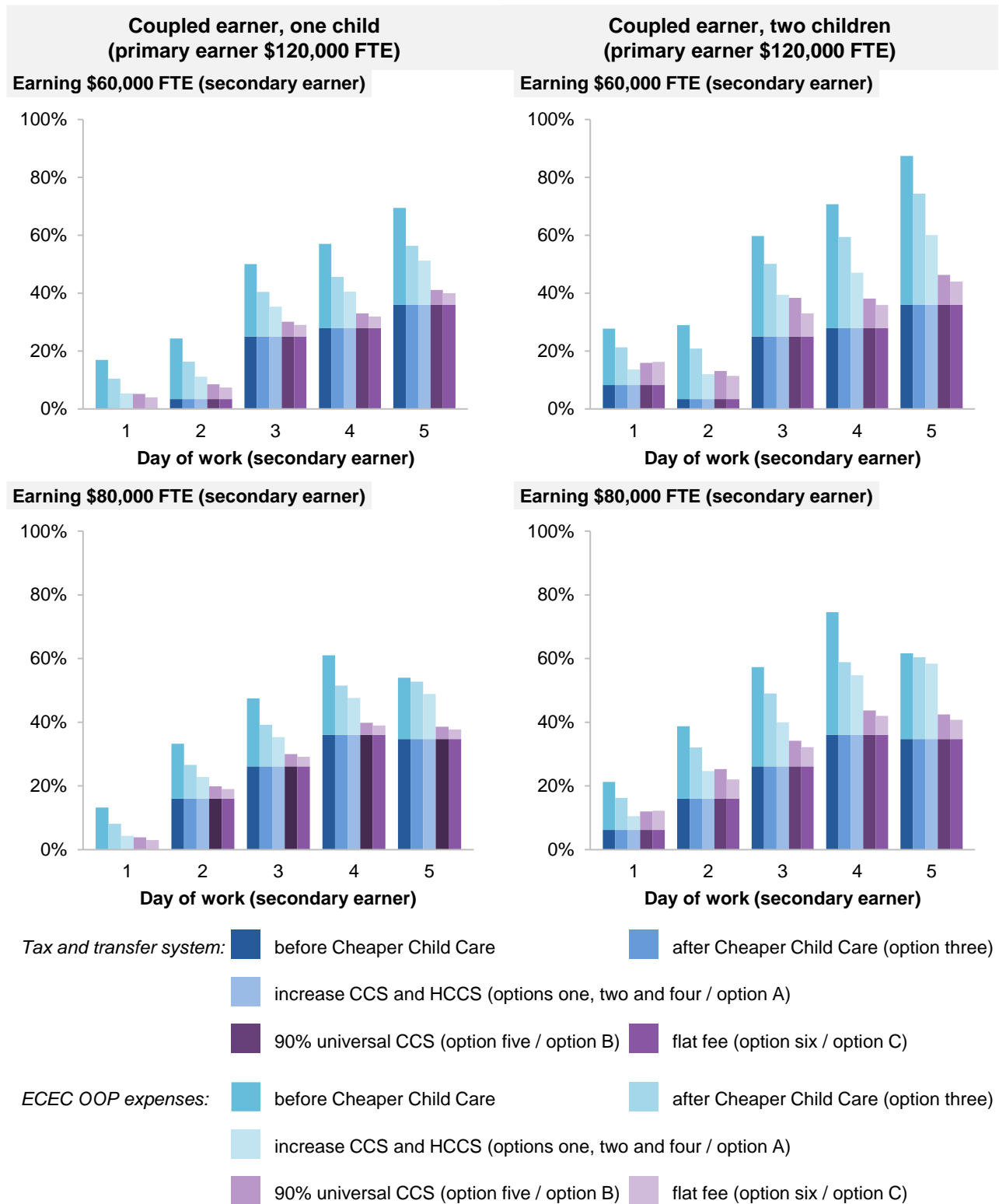
Source: Productivity Commission estimates using CAPITA v230518.

Figure F.9 – ... and WDRs tend to rise markedly with days of work for these families

Single-day increment WDRs

| | Coupled earner, one child (primary earner $120,000 FTE) | Coupled earner, two children (primary earner $120,000 FTE) |

Earning $100,000 FTE (secondary earner)

Tax and transfer system: before Cheaper Child Care — after Cheaper Child Care (option three) — increase CCS and HCCS (options one, two and four / option A) — 90% universal CCS (option five / option B) — flat fee (option six / option C)

ECEC OOP expenses: before Cheaper Child Care — after Cheaper Child Care (option three) — increase CCS and HCCS (options one, two and four / option A) — 90% universal CCS (option five / option B) — flat fee (option six / option C)

Source: Productivity Commission estimates using CAPITA v230518.

Figure F.10 – WDRs tend to be higher for the third day of work and beyond

Single-day increment WDRs and contribution of ECEC expenses to these WDRs
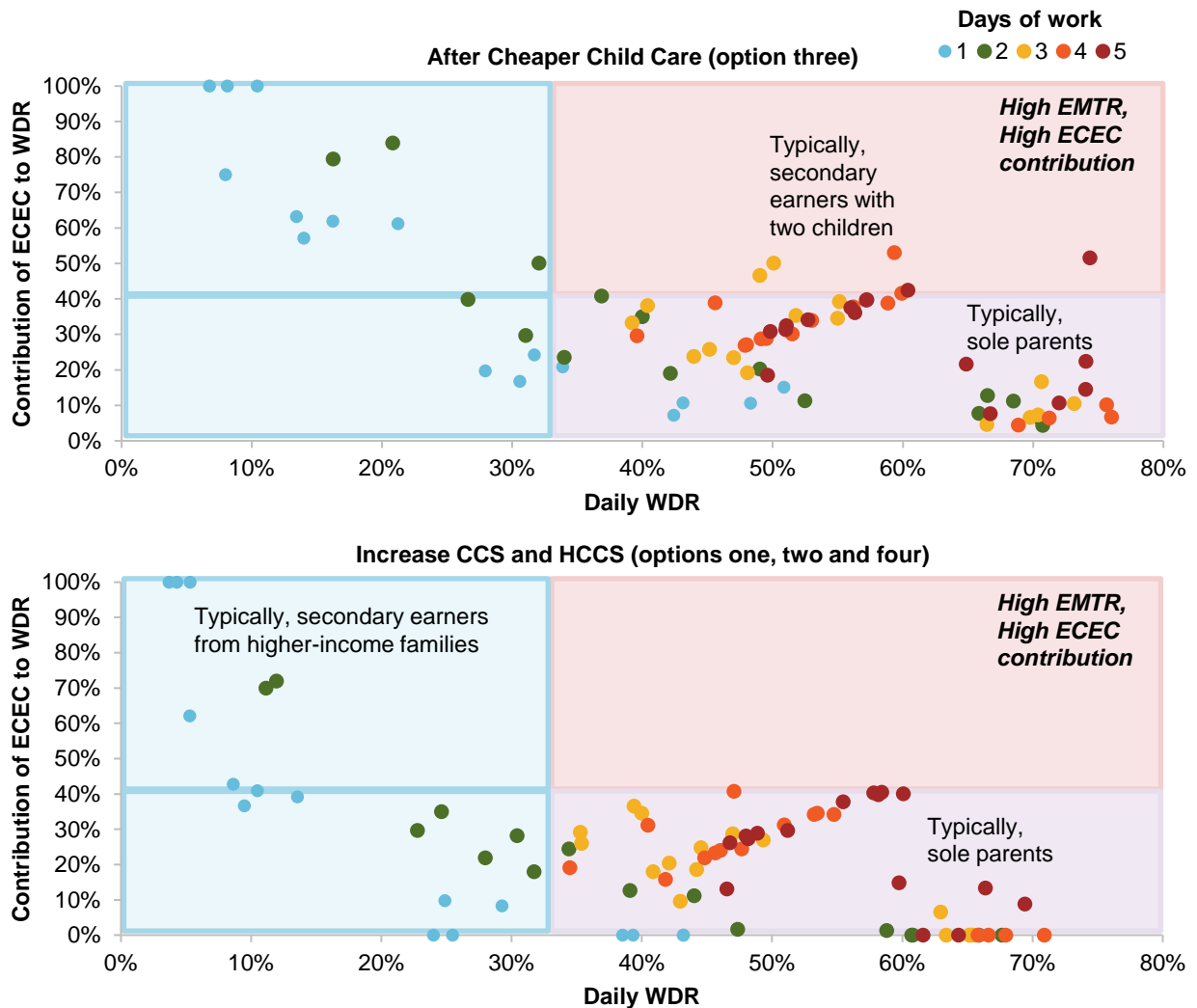
Source: Productivity Commission estimates using CAPITA v230518.

Comparisons to previous work on workforce disincentive rates

Broadly, trends in the WDRs presented above are consistent with those in Bray et al. (2021) and Wood et al. (2020), although the absolute values of WDRs in these publications are generally higher. One explanation for this is that WDRs in both Bray et al. (2021) and Wood et al. (2020) were calculated prior to several ECEC policy reforms that have been incorporated in the above WDRs. These reforms – the removal of the CCS cap (2021), the introduction of the HCCS (2022) and the Cheaper Child Care reforms (2023) – have reduced the contribution of out-of-pocket ECEC expenses to WDRs, as well as reducing WDRs overall (Australian Government 2022, p. 1; Hume 2021).

More specifically, trends in the WDRs above are more similar to those in Bray et al. (2021) than Wood et al. (2020). Similarities with Bray et al. (2021) are expected because Bray et al.'s (2021) WDRs were calculated using PolicyMod, a model that accounts for the same components of the tax and transfer system as CAPITA, which was used to calculate the above WDRs.

In comparison, WDRs in Wood et al. (2020) are in some cases significantly higher than those presented above. In addition to the impact of the ECEC policy reforms referenced above, another reason for these differences is that Wood et al.'s (2020) WDRs include the impact of the withdrawal of Rent Assistance, whereas the above WDRs have been calculated without an assumption that families are renters.[9] Families receiving Rent Assistance would face higher WDRs – but this would reflect an additional contribution of the tax and transfer system, rather than out-of-pocket ECEC expenses, to WDRs.

F.3 Some family income compositions are more common than others

It is helpful to understand what proportion of families live in similar circumstances to the families for which WDRs have been calculated.

In the analysis of family incomes that follows, individuals' full-time equivalent (FTE) employee incomes have been used. Specifically, incomes are based on a variable from the SIH that measures 'total (gross) current employee income'. Other sources of income, such as government payments, are not included. To calculate FTE incomes, where an individual reported a 'working full time' labour force status in the SIH, their reported income was taken as an FTE income. For other individuals, FTE income was estimated by applying a multiplier based on an individual's reported working hours to their reported income.[10,11]

This aligns with how the WDRs have been calculated and presented above, with families categorised based on their FTE employee incomes. This method allows for differentiation between, for example, a sole earner working five days per week for $60,000 ($60,000 FTE income) and a sole earner working three days per week for $60,000 ($100,000 FTE income). There is an insufficient number of observations in the SIH to disaggregate this analysis further – for example, by calculating what proportion of sole earner households earning $100,000 FTE income are currently working one day per week compared to five days.

In August 2023, median yearly earnings from an individual's main job was about $88,000 for Australian men working full-time, $78,000 for Australian women working full time and about $83,000 across all Australians working full-time (Productivity Commission estimates using ABS 2023).

Using the SIH, sole earner family FTE incomes are generally between $40,000 and $100,000 (about 70% earn $80,000 FTE or less[12]) (figure F.11 and table F.3). Coupled earner family FTE incomes tend to be much higher, between $100,000 and $250,000 (figure F.12 and table F.4).

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[9] Rent Assistance is a supplementary payment to help meet the costs of renting in the private rental market or community housing (Services Australia 2024, p. 38). The latest available data from the Australian Institute of Family Studies identifies that about three quarters of coupled earner families and half of sole earner families are not renters (and are therefore ineligible for Rent Assistance). Additionally, not all renters will be eligible for Rent Assistance. WDRs were therefore calculated without an assumption that families are renters (Qu and Warren 2020, p. 4).

[10] For example, an individual who reported working 20 hours per week had their income multiplied by two to provide an estimated FTE (40 hours per week) income.

[11] Individuals who did not report earning an employee income or who reported earning an employee income despite working zero hours have been excluded from the analysis, as an FTE income cannot be calculated for them. 117 unweighted sole earner families with one child, 38 sole earner families with two children, 502 unweighted coupled earner families with one child and 251 coupled earner families with two children have been excluded.

[12] When considering all sole earners with one or two children (including those who report no employee income and are excluded from the below analysis), about 85% earn $80,000 FTE or less. When considering the actual (non-FTE) incomes of sole earners, 90% earn $80,000 or less.

Figure F.11 – The majority of sole earner families earn an FTE income between $40,000 and $100,000[a,b]

FTE income distribution for sole earner families with one or two children
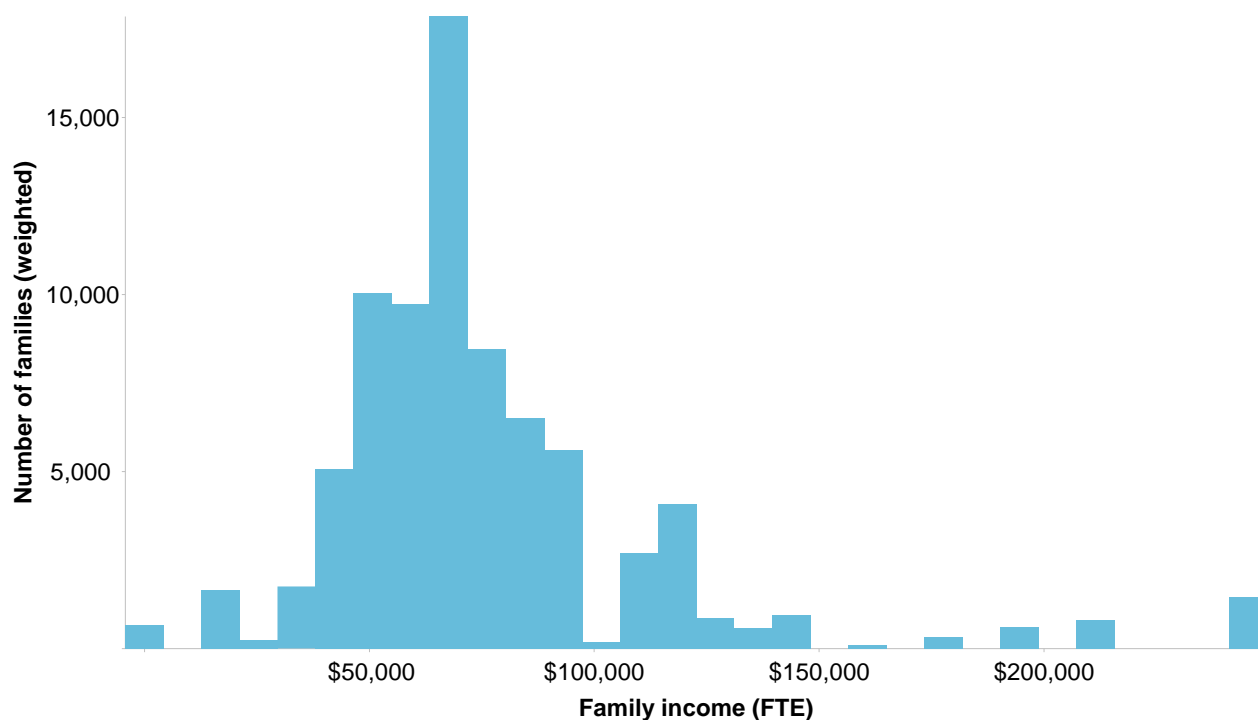
a. Where an individual reported a 'working full-time' labour force status, their reported income was taken as an FTE income. For other individuals, a multiplier based on reported working hours was applied to reported income to estimate FTE income. For example, an individual who reported working 20 hours per week had their income multiplied by two to provide an estimated FTE (40 hours per week) income. **b.** Income unit weights from the SIH were applied.

Source: Productivity Commission estimates using ABS 2019-20 SIH.

Table F.3 – More than three quarters of sole earner families have an FTE income between $40,000 and $100,000[a,b,c,d]

FTE income of sole earners with one or two children

	% of observations (weighted)	Number of observations (weighted)
More than $0 – $40,000	8%	6,177
More than $40,000 – $60,000	20%	16,394
More than $60,000 – $80,000	41%	32,857
More than $80,000 – $100,000	15%	12,286
More than $100,000	15%	12,421

a. Where an individual reported a 'working full-time' labour force status, their reported income was taken as an FTE income. For other individuals, a multiplier based on reported working hours was applied to reported income to estimate FTE income. For example, an individual who reported working 20 hours per week had their income multiplied by two to provide an estimated FTE (40 hours per week) income. **b.** Income unit weights from the SIH were applied. **c.** Only 11 observations underlie the estimates for sole earner families in the $0–$40,000 range, meaning these estimates should be viewed with particular caution. **d.** Due to rounding, proportions may not add to 100%.

Source: Productivity Commission estimates using ABS 2019-20 SIH.

Figure F.12 – Most coupled earner families earn an FTE income between $100,000 and $250,000[a,b]

FTE income distribution for coupled earner families with one or two children
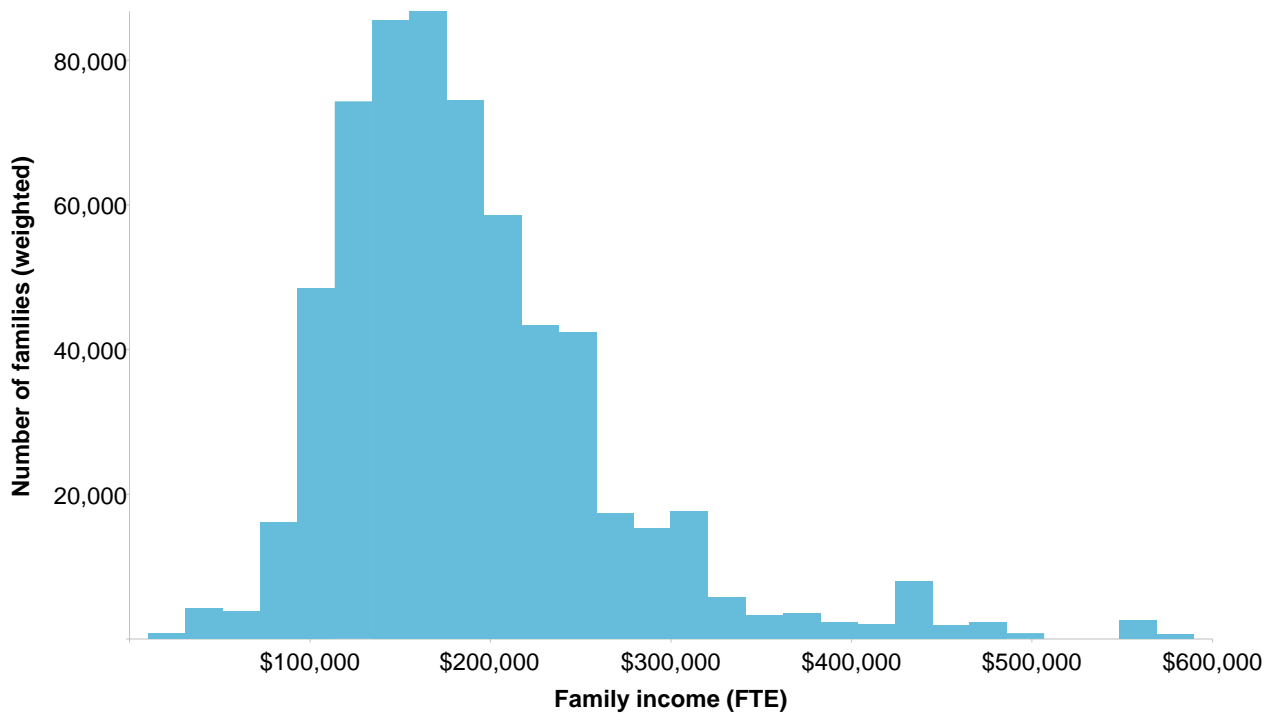
a. As per figure F.11 notes a and b. **b.** Families with an FTE income exceeding $600,000 are excluded from the figure.

Source: Productivity Commission estimates using ABS 2019-20 SIH.

Table F.4 – There is variation in coupled earners' FTE incomes, but some combinations are more common than others[a,b,c,d,e,f]

Weighted proportion of coupled earners with one or two children with each combination of FTE incomes (primary earners in rows, secondary earners in columns)

		Secondary earner FTE income						
		>$0 – $40,000	>$40,000 – $60,000	>$60,000 – $80,000	>$80,000 – $100,000	>$100,000 – $120,000	>$120,000	Total
Primary earner FTE income	**>$0 – $40,000**			3.9%				3.9%
	>$40,000 – $60,000	0.9%	4.4%	2.7%	2.3%	0.4%	1.2%	11.9%
	>$60,000 – $80,000	1.9%	5.7%	6.3%	4.0%	1.9%	2.5%	22.3%
	>$80,000 – $100,000	1.3%	4.6%	3.9%	3.7%	2.9%	2.0%	18.4%
	>$100,000 – $120,000	0.9%	2.8%	3.7%	2.4%	2.0%	2.4%	14.2%
	>$120,000	0.8%	4.0%	7.8%	4.8%	3.4%	8.4%	29.2%
	Total	9.7%[e]	21.5%	24.4%	17.2%	10.6%	16.5%	100%

a. The shaded blue cells represent families with incomes that are approximately represented in the scenarios considered above. **b.** As per table F.3 notes a and b. **c.** For coupled earner families, the primary earner is the individual who reports working the highest number of hours per week. This means that when reported incomes are adjusted to become FTE incomes, secondary earners who have a higher hourly wage than the primary earner will also have a higher FTE income. **d.** Values in the first row (dark grey) are suppressed due to the small number of observations in the corresponding cells. **e.** Includes 3.9% from first row. **f.** Due to rounding, totals may not equal the sum of rows and columns.

Source: Productivity Commission estimates using ABS 2019-20 SIH.

F.4   Families' actual incomes also vary

In the analysis of family incomes that follows, an estimate[13] of **households' actual adjusted taxable income** has been used. Adjusted taxable income differs in two ways to the measure of income considered in section F.3. First, only employee income is used in section F.3 – WDRs are based on a person's earned income and the purpose of section F.3 is to link the distribution of family incomes to the WDRs that have been calculated. Adjusted taxable income, however, includes other sources of income, such as income from select government payments and investment income. Second, as WDRs are based on FTE incomes, families' FTE incomes are estimated in section F.3. In contrast, section F.4 estimates each family's actual adjusted taxable income, as this is what their CCS rate is based on.[14]

Under the Commission's recommended CCS and HCCS settings (option one in paper 6), about one third of families with children aged 12 and under would be eligible to receive a 100% CCS rate and half of families would be eligible to receive a CCS rate of at least 90% (table F.5). Disaggregating by family type, almost all sole earner families would be eligible to receive a subsidy rate of at least 80% under the Commission's recommended CCS and HCCS settings (option one) (table F.5).

Table F.5 – Under the recommended CCS settings, nearly all families would receive a higher subsidy rate[a,b]

CCS rates at selected adjusted taxable income levels and proportion of families with children aged 12 and under eligible for these rates, 2023-24

Household adjusted taxable income	CCS rate (current)	CCS rate (option one)	% of families (sole)	% of families (coupled)	% of families
≤ $80,000	90%	100%	78%	19%	30%
≤ $105,000	85%	95%	86%	29%	40%
≤ $130,000	80%	90%	93%	41%	50%
≤ $155,000	75%	85%	95%	52%	60%
≤ $180,000	70%	80%	97%	62%	68%
≤ $205,000	65%	75%		70%	76%
≤ $230,000	65%	70%		78%	82%

a. The option one scenario is a 100% CCS rate for families with an adjusted taxable income of $80,000 or less, with the current taper rate being retained. **b.** Data in the last two rows is suppressed for sole earner families due to the small number of underlying observations.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

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[13] The analysis presented here in section F.4 uses an estimate of families' adjusted taxable income from CAPITA-B with ECEC, a behavioural microsimulation model. More detail on CAPITA-B with ECEC is in appendix G.

[14] Hence, individuals who report earning no employee income are not excluded from the analysis as they were in section F.3.

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G. Modelling of labour supply and ECEC demand

This appendix details the modelling approach that was used to estimate the effects on labour supply, ECEC demand hours and fiscal costs from changes in the Australian Government's main program that subsidises ECEC, the Child Care Subsidy (CCS), which includes the Higher CCS (HCCS).

The terms of reference for this inquiry explicitly direct the Productivity Commission to consider the effects of a universal 90% CCS rate. Alternative ECEC subsidy settings were also evaluated, including the Commission's recommended reforms and other options described in paper 6.

The Commission determined that behavioural microsimulation modelling was the best approach to evaluate the effects of changes to ECEC subsidies. The Commission and the Department of Employment and Workplace Relations (DEWR) developed such a model by extending DEWR's CAPITA-B microsimulation model to include ECEC. This approach improves on the preliminary modelling undertaken for the Commission's draft inquiry report (released in November 2023), which used a simpler method to estimate the effects of potential CCS policy changes on labour supply, ECEC demand and fiscal costs.

This appendix covers:

- why the Commission used a behavioural microsimulation approach (section G.1)
- details of the modelling approach (section G.2)
- tasks required to build the behavioural microsimulation model, including the wage imputation and utility function approaches (sections G.3 and G.4)
- results of modelled options (section G.5)
- confidence intervals for some modelling results (section G.6)
- further detailed technical background information on CAPITA-B with ECEC (section G.7).

G.1 Why behavioural microsimulation modelling?

Microsimulation models operate at the level of an individual unit, such as a household or business. These models can capture the effects of policy parameters such as tax rates and eligibility rules for benefits and subsidies on the individual unit, for example how changes to personal income tax rates affect an individual or household. *Behavioural* microsimulation allows estimation of how behaviour changes in response to a policy change, for example, effects of policy changes on hours of ECEC demand and labour supply. In contrast, non-behavioural microsimulation assumes that behaviour following a policy change remains the same.

Behavioural microsimulation models can also illustrate the effects of policy changes on different cohorts. For instance, the effects of a policy on lower-income families can be investigated and compared to the effects on higher-income families.

The use of a behavioural microsimulation model enabled the Productivity Commission to estimate the potential effect of ECEC subsidy policy changes, including changes to CCS rates and the activity test. This type of approach has been used for past analysis of ECEC policy changes (for example, Gong and Breunig (2012, 2017); PC (2014b)).

Behavioural responses to changes in ECEC subsidy policies on the labour supply of the primary carer parent in a family and the demand for hours of ECEC were simulated. The resulting impact on ECEC subsidy expenditure, personal income tax revenue, transfer payment expenditure and the overall net fiscal effect were also estimated.

The effects across the distribution of families can be analysed to see how different policy settings impact ECEC demand hours and labour supply hours of primary carer parents.

G.2 CAPITA-B with ECEC

The Commission considered different microsimulation model options and determined that extending CAPITA-B was the best approach for the inquiry. This extended version of CAPITA-B is called 'CAPITA-B with ECEC'.

CAPITA-B is a behavioural microsimulation model of the Australian government's tax and transfer system. The model was developed and is maintained by DEWR, and is an extension of CAPITA, the Australian Department of the Treasury's static tax and transfer microsimulation model. Neither of these versions of microsimulation models could model ECEC.[1]

Given that CAPITA-B is an established and maintained model within the Australian Government, extending it to include ECEC policy was determined to be the most effective and efficient use of time and resources.

To extend CAPITA-B to include ECEC, data on ECEC use was required. The Commission built CAPITA-B with ECEC within the ABS DataLab environment. This allowed the use of a version of the 2019-20 Survey of Income and Housing (SIH) Main Unit Record File (MURF) that had been linked by the ABS to the Department of Education's administrative CCS data. This linked dataset provides information on actual ECEC use in CCS-approved services for the income units[2] in the SIH.

The resulting model, CAPITA-B with ECEC (summarised in figure G.1), models the effect on the primary carer parent's labour supply and ECEC demand from changes in out-of-pocket ECEC expenses and resultant impact on net family income[3] (that is, net of taxes and transfers less out-of-pocket ECEC costs for all children aged 0–12[4]) for families with children aged 0–12. Changes to out-of-pocket ECEC expenses can occur through changes in CCS rates and thresholds or through a different ECEC subsidy structure.[5]

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[1] CAPITA does have the ability to include ECEC policies in hypothetical analysis such as cameos and effective marginal tax rates but does not include the ability to model ECEC policy effects across the full population.

[2] An income unit is '[a] group of two or more related people in the same household assumed to pool their income and savings and to share the benefits deriving from them equitably; or [o]ne person assumed to have sole command over their income, consumption and savings (Australian Bureau of Statistics 2015)'.

[3] Henceforth referred to as net income.

[4] The model includes the structure of the tax and transfer system and therefore the calculation of net income accounts for personal income taxes and transfer payments such as Family Tax Benefit and Parenting Payment in addition to out-of-pocket ECEC expenses.

[5] CAPITA-B with ECEC can also model changes to tax and transfer policies but this was not the focus of the inquiry.

CAPITA-B with ECEC uses a utility maximisation approach to model the effect of changes in ECEC subsidies on the primary carer parent's labour supply and ECEC hours. Families change the primary carer parent's labour supply and ECEC hours in response to changes in ECEC subsidies to maximise their utility. Utility is estimated in the model using coefficients from a utility function (discussed below).

Figure G.1 – Overview of CAPITA-B with ECEC
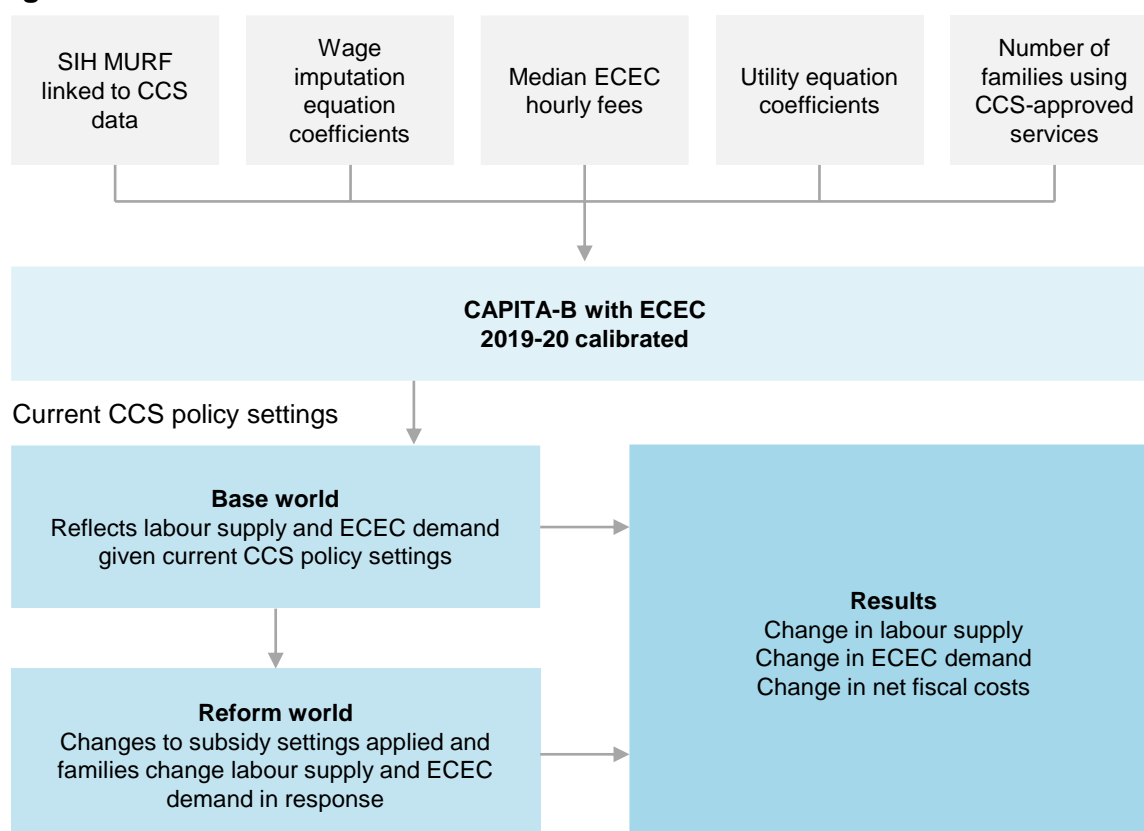
Extending CAPITA-B to include ECEC involved a number of steps, with the most significant detailed in the rest of the appendix:

• including data on ECEC use – this involved using data on ECEC usage from the administrative CCS data and linking it to the SIH MURF[6] – discussed in this section
• including ECEC prices – ECEC fees were imputed using Productivity Commission analysis of administrative CCS data – discussed in this section
• imputing wages for partnered female parents and sole parents[7] – discussed in section G.3
• modifying the model's decision algorithm to include ECEC hours so that parents can adjust their ECEC enrolment to be different from their observed decision – discussed in this section
• updating the utility function – discussed in detail in section G.4
• including benchmarks on the number of families using CCS-approved services – discussed below.

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[6] The SIH asks households whether they used childcare in the four weeks leading up to the interview and the hours usually used. Calculating the average ECEC usage using administrative data provides a comparable number to that collected in the SIH.

[7] Wage imputation involves assigning a predicted wage rate to non-workers, for whom wage information is not observed in the SIH.

Underlying data

The Commission gained permission from the Department of Education and the ABS to access a SIH MURF data product that could be linked to administrative CCS data via the Person Level Integrated Data Asset (PLIDA) 'spine'.[8] This data is accessed through the ABS DataLab environment.

In CAPITA-B with ECEC, the modelled population is limited to sole carer parents and the spouse of partnered parents with children aged 0–12. Further exclusions were applied where it was considered that a different type of modelling would be required to adequately model labour supply for these income units – this is discussed in more detail in section G.7.

To align ECEC hours use from the administrative CCS data with data on working hours and income collected from SIH participants during the families' survey period, the average of hours enrolled in ECEC in the four weeks leading up to the survey date was calculated for each child and then linked to the SIH MURF. This provides a more accurate representation of ECEC hours in CCS-approved services than that reported in the SIH. This was achieved by:

- averaging the number of enrolled hours for each child aged 0–12 in the survey over the four weeks leading up to the survey date
- assigning a type of care for each child. Each child can only have one type of care assigned.

  – For children aged 0–4, the care type assigned was CBDC.[9]
  – For children aged 5 the assigned care type was based on the predominant type used in the administrative CCS data. If the child was not in the administrative data, then OSHC was assigned if they were coded in the SIH as attending school.
  – For children aged 6–12, the care type assigned was OSHC.

- all children who use ECEC are assumed to use ECEC for 50 weeks of the year.

Median hourly fees of ECEC were obtained from Productivity Commission analysis of administrative CCS data provided by DoE as part of the inquiry.[10] Imputation of fees following the approach by Gong and Breunig (2017) 'remove[s] the effect of the household's specific choice of childcare quality from the cost-of-working component of childcare'. Median hourly fees at the SA3 level were imputed by quarter of interview, service type and SA3 of residence onto the SIH. Where the number of observations was low, the greater capital city statistical area (GCCSA) medians were imputed by service type and quarter of interview. Hourly fees were assigned for all income units, including those did not have an administrative record of using ECEC, as an estimate of the fees a family would pay if they start using ECEC under policy changes. Hourly fees were uprated to 2023-24 using projections provided by DoE.

Wage rates for those in the modelled population that were not working and did not have an observed wage rate were imputed using coefficients estimated through a wage equation regression (section G.3).

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[8] Instead of linking datasets one-to-one for individual projects, the ABS links all datasets to the 'spine' once and then allows datasets to be combined via the spine as needed (ABS 2024).

[9] Hours enrolled in family day care services were included in the model. However, due to limitations in obtaining the median hourly fee for family day care services at the SA3 level, income units that used family day care services were re-categorised as CBDCs and the median hourly fee for CBDCs were imputed for these observations. In the December 2023 quarter, there was little difference between the average hourly fee for CBDCs and FDCs. CBDCs had an average hourly fee across Australia of $12.85 compared to the average hourly fee of FDCs of $12.55 (DoE 2024). Between CBDC and FDC, about 7% of families used FDCs with the remaining 93% using CDBCs (DoE 2024).

[10] Fees by SA3 and GCCSA were calculated outside the DataLab environment as geographic information at the SA3 level was not available in the CCS administrative data within the DataLab environment.

Families' labour supply and formal care choice sets

The model is structured so that it determines a utility maximising bundle of primary carer parent labour supply hours and ECEC hours for each family, given the ECEC subsidy settings and the family's individual circumstances. Bundles are chosen from a pre-determined set of primary carer labour supply and ECEC hours combinations.

Care types available

There are three care types available in the model: formal care, informal care and primary carer care.

Formal care refers to ECEC for children in formal settings such as CBDC and OSHC. Formal care does not include preschool attended in dedicated settings – the possible implications of this are described below. The out-of-pocket ECEC expense does not take into account any further subsidies provided by state or territory governments in addition to the CCS for the delivery of preschool in a CBDC.

Primary carer care[11] is provided by the primary carer (the parent who changes their working hours and in partnered families is assumed to be the secondary earner) and informal care is other care provided by family, friends and/or other people as arranged by the family.

It is assumed that the youngest child requires care for 70 hours per week (five days of 24 hours per week less 50 hours of sleep). These 70 hours are allocated amongst the three care types:

- hours of formal care are determined by the formal care choice from the set [0,10,20,30,40,50]
- hours of care provided by the primary carer are determined by the remaining time after their choice of work hours
- hours of informal care are determined by the remaining care time not accounted for by formal and primary carer care.

Though the child's time is assumed to be divided among these three types of care, only the hours of formal care feature prominently in the preferred specification of the utility equation. The hours of primary carer care are omitted from the utility equation, while use of informal care appears only as a binary indicator of whether hours of informal care is positive.

Formal care choice set

Formal care hours in the choice set refer to the hours of care for the youngest child in the family. Formal care hours for other children in the family are determined by the needs of the youngest child. The formal care choice set comprises six choices of 10-hour increments from zero to 50. 10-hour increments were chosen to reflect that 10-hours per day was the most commonly charged session length according to analysis using administrative CCS data (paper 7). An adjustment is made for children of primary school age – they are assumed to use OSHC in increments of four hours rather than 10.

Formal care choice set: [0,10,20,30,40,50]

Labour supply choice set

In determining the labour choice set, evidence was drawn from the 2019-20 SIH on working hour patterns of parents with children aged 0–12 (figure G.2). The same working hour choice set was used for both sole and partnered parents given that the working hour patterns for both these types of parents from the SIH were fairly similar.

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[11] Primary carers have 80 hours of waking time that can be used to provide informal care or to work.

Figure G.2 – Weekly working hours of sole parents and partnered primary carer parents with children aged 0–12[a]

Estimated number of people, weighted, 2019-20
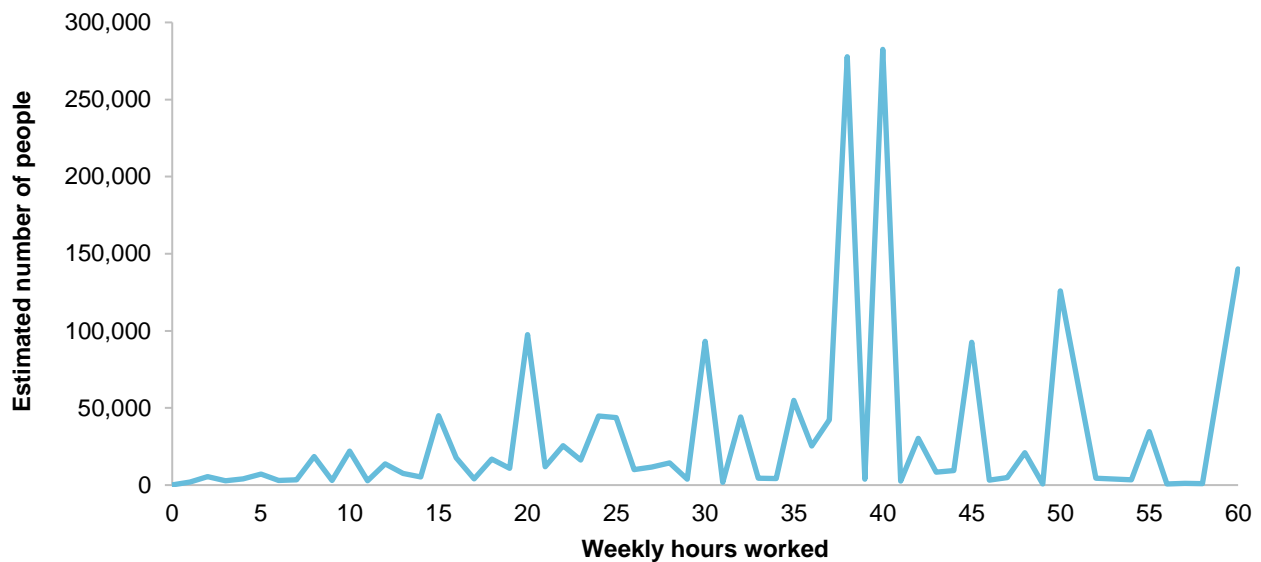
a. Zero hours of work observations were removed. 60 or more hours of work is censored at 60 hours of work.

Source: Productivity Commission estimates using the 2019-20 SIH Confidentialised Unit Record File.

The labour choice set comprises five-hour increments from zero to 60, excluding 55. Both the five-hour and 55-hour increment had a low number of observations however the five-hour increment was kept to accommodate possible modelling scenarios around the activity test. In total there are 12 labour hour choices.

Labour choice set: [0,5,10,15,20,25,30,35,40,45,50,60]

Families' choice set and simulated choices

With a change to ECEC subsidies, the model calculates the change in out-of-pocket ECEC expenses for each labour supply and ECEC demand option a primary carer has, as well as the resultant impact on net income and the utility associated with each discrete option. In the model, the primary carer chooses the labour supply and ECEC hour demand bundle that provides them with the highest utility.

72 combinations of labour supply and formal care demand are calculated for primary carers with children aged 0–12, and a single behavioural decision selected. These 72 options consist of six choices of formal care demand (0, 10, … , 50 normalised[12] hours) and 12 labour supply hour choices of primary carer parents (0, 5, … , 50, 60 hours). The choices include options where formal care hours exceed working hours, and where formal care hours are less than working hours. This allows for the examination of the impacts of the activity test, which limits the number of hours of subsidised care that families can receive based on their work and other eligible activity hours (appendix D).

- For partnered parent income units in the SIH, the primary carer parent is assumed to be the SIH spouse person, consistent with the assumption that the father is the primary earner, and the mother is the primary carer. The primary earner's labour supply is assumed to be constant.

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[12] Children aged 6–12 are assumed to use 40% of the normalised hours, while children aged 0–5 use 100% of the normalised hours.

- The primary carer parent's wage income and CCS activity hours[13] are recalculated based on the simulated hours worked and their wage rate. For primary carers who did not work, wages were imputed using the wage imputation method (section G.3).
- The hours of paid formal care for each child are updated based on the formal care choice.
- Time accounting rules are applied for each choice. These rules apply only to the first child in the income unit and should be considered as normalised hours.

CAPITA's policy modules with some modifications are used to calculate net income for the simulated ECEC usage.

Adjusting CAPITA-B to include ECEC

CAPITA-B's code was adjusted to include formal care hours. There were a number of parts of the model where this had to occur:

- the basefile creation process – this adjusts the raw SIH data into a format necessary to be used in CAPITA-B. Additional variables from the SIH were included and adjusted to be used in CAPITA-B with ECEC
- the policy modules – the policy modules were adjusted so that the gross cost of ECEC, subsidy amount and out-of-pocket ECEC expenses were calculated for each of the labour supply and ECEC demand hours choice bundles. An additional variable of net disposable income plus the out-of-pocket ECEC expense was also created
- the utility function – the application of the utility function had to be adjusted to use new coefficients
- output tables – new output tables were created to specifically demonstrate the impact on labour supply and ECEC demand hours for families with children aged 0–12.

Benchmarking

Within CAPITA and CAPITA-B, benchmarking occurs to account for changes in the population over time. This is achieved by varying weights of observations in the data to ensure aggregates align with selected official government projections. The benchmarking process adjusts the weights to hit total aggregate benchmarks in a way which minimises the change in the weights required to meet those benchmarks and preserves the relativities between families. Benchmarking ensures results are consistent with data and projections of the make-up of the population and the number of recipients of major transfer payments in each year. The CAPITA and CAPITA-B models benchmark to a range of data including demographic and labour force characteristics of the population and the number of people in receipt of Centrelink payments.

An additional benchmark of the number of families using CCS-approved services was included in CAPITA-B with ECEC. This benchmark covers both subsidised and unsubsidised users. For consistency with benchmarks used in CAPITA, this additional benchmark also relates to a population number rather than a benchmark cost figure.

Assumptions and limitations

As with all models, CAPITA-B with ECEC is built on assumptions and has limitations. These reflect the data available for analysis, which may be incomplete, and the choices of different methodologies.

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[13] CCS activity hours refers to the number of hours of eligible activity completed by parents or guardian to access subsidised ECEC under the activity test. CCS activity hours are assumed to be 1.2 times their hours of work. The additional 20% of the time is to account for break times and travel times.

The model assumes that the observed data reflects optimal choices for families given policy settings like subsidy rates and the activity test – but in reality, some families face other constraints when making choices about how much to work or use ECEC. The model accounts for cost and affordability constraints but it does not account for other constraints such as whether there is an actual ECEC place available or accessible on the relevant days for the family, nor does it account for families who are discouraged from trying to use ECEC due to the activity test, or where services are unable to cater for children's needs. In addition, families' choices can be influenced by social norms and expectations, which might be reset by large policy changes.

The effect of these constraints on families' observed choices of work and ECEC hours will be reflected in the estimated utility functions (section G.4) and interpreted by the model as an optimal choice. To the extent that these constraints restrict families' observed choices, results from the model may be underestimated. However, it is also assumed that once ECEC subsidies change, increases in ECEC demand and labour supply are fully accommodated by the ECEC and labour markets, without any changes in ECEC fees or wages or constraints on that choice. This would overestimate the possible impacts.

Further, the model only captures ECEC delivered through CCS-approved services and does not include delivery of ECEC through other settings (for example, dedicated preschools). Preschool attendance in a dedicated setting could have been incorporated by making preschool hours for relevant three and four year old children free or low cost, but this could have led to an underestimation of the impact of policy changes on labour supply and ECEC demand hours. Making formal care cheaper for parents of three and four year olds would encourage and increase both ECEC demand and labour supply hours in the base model scenario, before modelling reforms. However, the model would not have been able to capture whether the preschool hours were conducive to working, as preschool session lengths in dedicated settings vary more than they do in CBDC settings and depend on each individual preschool. For example, some preschools offer three 5-hour sessions a week, others offer two 7.5-hour sessions a week and others offer five 3-hour sessions a week. There was no data available in the SIH that indicate the session structure attended in preschools.

The model also does not estimate what might happen to informal carers' labour supply if children's participation in ECEC increases. Some grandparents, for example, might choose to retire later or to work more hours.

Additional assumptions and limitations of CAPITA-B with ECEC are:

- the model assumes, for partnered parents, the primary earner (or non-primary carer parent) does not change their labour supply in response to ECEC subsidy reforms or any other tax and transfer policies
- only sole and primary carer parent families with children aged 0–12 are modelled
- the model assumes that each income unit's characteristics correspond to an average year for a representative household
- the model does not capture the time it may take for adjustments to occur to labour supply and ECEC demand
- the model, which uses a neoclassical labour supply framework, assumes working hours and care demand are such that they are optimal compared to all other possible choices
- the model assumes that if a family is eligible for income support and/or CCS they receive it (for example in meeting income tests, child age and other criteria)
- the model does not allow for different (normalised) ECEC hour choices to be made for children of different ages
- Additional CCS (ACCS) is not modelled
- 100% benefit take-up – persons who are working zero or low working hours will receive some benefit income if they are eligible. All modelled ECEC is assumed to attract CCS, subject to activity testing and income testing.

G.3 Wage imputation approach

Information about financial returns to work (specifically, each person's wage) is needed to model the impact of policy changes. While this is straightforward for workers, as information about their wage rates is readily available, it is necessary to impute wage rates for non-workers. The imputed wages are an estimate of what a person would earn if they were working.

Wage equations estimated with data from the SIH 2019-20 MURF were used to impute wages for non-workers. Separate equations were estimated for the two cohorts most likely to be affected by ECEC policy changes – partnered female parents and sole parents – because it is reasonable to expect that labour market behaviour and outcomes differ between these cohorts.[14]

Wage equations predict a person's wage based on observed characteristics, such as gender, age and educational qualifications. One issue is that the connection between observed characteristics and wages can only be estimated based on workers' information, *as a wage rate for non-workers is not observed.* If there is selection bias into the labour force – where the unobserved characteristics of workers and non-workers are systematically different, and these characteristics influence wages – predicting wages using a simple regression based only on workers' information will provide biased results. For example, with selection bias, the wage premium from having a university degree may be different for non-workers than workers.

To address this issue, the wage equations were estimated using a sample selection model and maximum likelihood estimation method.[15] The model includes two correlated equations that aim to correct for selection bias. The first equation (*the selection equation*) relates to an individual's selection into being a worker or non-worker, while the second equation (*the wage equation*) estimates wage rates after correcting for any selection bias. This two-equation approach is a common method for estimating wage equations.[16]

Model framework

Selection equation

The selection equation is used to estimate an individual's probability of being a worker or non-worker. The selection equation is defined:

$$E_i = \begin{cases} 1, E_i^* > 0 \\ 0, E_i^* \leq 0 \end{cases}$$

where E_i is an individual's observed employment status ($E_i = 1$ is a worker, $E_i = 0$ is a non-worker). Each individual's observed employment status, E_i, is assumed to be a function of E_i^*, a person's unobserved employability and propensity to participate in the labour market. When E_i^* exceeds 0, an individual will work ($E_i = 1$). If E_i^* does not exceed 0, they will not work ($E_i = 0$).

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[14] For other cohorts in CAPITA-B – single men, single women and partnered male parents – CAPITA-B's preexisting wage equations were used to impute wages. For the ECEC inquiry modelling, these cohorts were excluded from the results. Changes to ECEC subsidies are unlikely to influence the decisions of single men and single women to participate in the labour force. In line with the broader model, it is assumed that the father in a partnered parent family is the primary earner, and the mother is the primary carer. This means that partnered male parents are less likely to have their labour force participation decisions influenced by changes to ECEC subsidises compared to partnered female parents.

[15] The wage equations were estimated in R using the *selection()* function from the *sampleSelection* package.

[16] See, for example, Creedy (2000), Kalb (2002), Mercante and Mok (2014a, 2014b) and DEWR (2017) (technical guide to CAPITA-B).

E_i^* varies with observed personal characteristics, meaning that:

$$E_i^* = z_i'\gamma + u_i$$

where z_i' is the observed values of individual i's personal characteristics, γ is a vector of how these characteristics affect the probability of working (the selection equation coefficients) and u_i is assumed to be an independent and normally distributed error term. As a result, the probability of working can be represented as:

$$\Pr(E_i^* > 0) = \Phi(z_i'\gamma)$$

where Φ is the standard normal cumulative density function. Correspondingly, the probability of not working is:

$$\Pr(E_i^* \leq 0) = 1 - \Phi(z_i'\gamma)$$

From the above, the Inverse Mills Ratio, $\widehat{\lambda_i}$, can be estimated as:

$$\widehat{\lambda_i} = \frac{\phi(z_i'\gamma)}{\Phi(z_i'\gamma)}$$

where ϕ is the standard normal density function. The Inverse Mills Ratio captures the probability that an individual will be a worker over the cumulative probability of their decision to work or not work.

Wage equation

The wage equation connects a person's wage to their observable characteristics, such as gender, age and educational qualifications, as well as the estimated selection bias. The wage equation is defined as:

$$W_i = \begin{cases} W_i, & E_i^* > 0 \\ not\ observed, & E_i^* \leq 0 \end{cases}$$

W_i is observed if a person works, but is unobserved for non-workers. Letting $w_i = \ln(W_i)$ be the natural logarithm of the wage rate,[17] x_i' be the observed values of the personal, human capital and occupation characteristics that influence each individual i's wage rate, and β be a vector of how these characteristics affect wages (the wage equation coefficients), an individual worker's wage rate can then be represented in the form:

$$w_i = x_i'\beta + \varepsilon_i$$

where ε_i captures the unobserved determinants of wage offers. Conditional on a person working, the predicted wage rate is:

$$E(w_i|x_i, E_i = 1) = x_i'\beta + E(\varepsilon_i|x_i, E_i = 1)$$

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[17] If the residuals from a regression using the untransformed wage rate are not normally distributed, taking the natural logarithm of the wage rate may improve model fit by altering the variable's scale and making it more 'normally distributed'.

If there is selection bias, $E(\varepsilon_i|x_i, E_i = 1)$ will not be zero – using the above equation to predict non-workers' wages will not provide accurate results. To eliminate selection bias, the wage equation for the subsample of workers needs to estimate an additional coefficient by including the Inverse Mills Ratio. Assuming that the error terms of the selection and wage equations are correlated and jointly normally distributed, the model is estimated as:

$$E(w_i|x_i, E_i = 1) = x_i'\beta + \rho\sigma_\varepsilon\widehat{\lambda_i}$$

where ρ is the correlation between error terms in the selection and wage equations, and σ_ε is the standard deviation of ε. By including the Inverse Mills Ratio in the wage equation, the part of ε where selection into working influences an individual's wage has been controlled for when estimating coefficients. Ultimately, the log wages of workers and non-workers can be predicted as:

$$E(\widehat{w}_i|x_i, E_i = 1) = x_i'\hat{\beta} + \hat{\rho}\hat{\sigma}_\varepsilon\widehat{\lambda_i}$$

$$E(\widehat{w}_i|x_i, E_i = 0) = x_i'\hat{\beta} - \hat{\rho}\hat{\sigma}_\varepsilon\frac{\phi(z_i'\hat{\gamma})}{1 - \Phi(z_i'\hat{\gamma})}$$

Imputing wages

Wages were imputed for non-workers without the selection term.[18],[19] Thus, the log wages of non-workers were predicted as:

$$E(\widehat{w}_i|x_i, E_i = 0) = x_i'\hat{\beta}$$

Imputing wages without the selection term is based on the findings of Breunig and Mercante (2010), where incorporating the estimated selection term tended to provide poorer predictions of wages relative to predictions that excluded the term. This finding was particularly apparent for individuals who were non-workers because they were not in the labour force, as opposed to being unemployed. The two cohorts for which wages were imputed in the CAPITA-B with ECEC model – partnered female parents and sole parents – were more likely to be non-workers because they were not in the labour force rather than being unemployed, suggesting that imputing wages without the estimated sample selection correction term was appropriate. Additionally, wages were imputed using a deterministic method, meaning that the coefficients were used as estimated to impute wages – no stochastic term was added to the imputed wages.

Choice of instruments for the selection equation

Econometric theory states that to obtain unbiased coefficient estimates in a wage equation, a valid instrument must be included in the selection equation. An instrument is a variable that affects an individual's likelihood of being a worker but does not affect their wage. Whether or not an individual has children, the number of children they have, or both, are often used as instruments when imputing wages. The intuition underlying this is that individuals with children are less likely to work (for example, due to caring responsibilities or preferences) but having children does not affect an individual's hourly wage rate.

In the past decade, though, a growing literature has emerged relating to a 'child penalty', sometimes also referred to as a 'motherhood penalty' due to its disproportionate effect on women. If having children lowers

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[18] Based on feedback at a workshop to discuss the modelling during the course of the inquiry, the selection term was not included when imputing wages.

[19] The observed wage rate was used for workers.

an individual's expected wage rate and this is not controlled for,[20] then the presence or number of children may not be valid instruments.

Ultimately, despite these recent developments, a version of the wage equation that did not attempt to control for the child penalty was used for estimation.[21] Initial estimations indicated that the predictive performance of specifications that did and did not control for the child penalty were similar.[22]

Additionally, recent work by the Australian Government Treasury (2022) found Australia's motherhood penalty was predominantly driven by mothers exiting the labour force and reducing their work hours following the arrival of a child. To a lesser degree, the penalty was also the result of mothers earning lower hourly wages.

Data

The wage equations were estimated using data from the 2019-20 SIH MURF.

The subsamples of partnered female parents and sole parents were generated using the variable *IUTYPE*. The subsamples were also restricted based on the variable *ABSPID* to heads of an income unit or spouses of the head of an income unit (to avoid, for example, classifying an employed teenage child of a sole parent as a sole parent themselves).[23]

Excluded observations

Some people were excluded from the estimation of the wage equations. The largest exclusion group was households interviewed in the June 2020 quarter, representing about one quarter of the 2019-20 SIH sample. These households were removed due to the potential impact of COVID-19 on individuals' labour market experiences.

Research from the Australian Institute of Family Studies (2021) found that many people experienced changes to their employment across 2020: 17% of individuals surveyed said they or their partner had lost their job or been stood down temporarily, while about one quarter said they or their partner had experienced a reduction in their wage rate or salary. Therefore information reported by at least some households interviewed in the June quarter of the 2019-20 SIH is unlikely to represent people's 'typical' employment status and wage rate, which is the type of information which would ideally be used to estimate coefficients.

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[20] The impact of the motherhood penalty could be controlled for to some extent by including information like people's work experience. Work experience information would capture the impact that time out of the labour market has on hourly wage rates, both due to child rearing and other reasons. However, information relating to an individual's work experience is not available in the SIH.

[21] Both the presence of children (using dummy variables for children in different age brackets) and the number of children were used as instruments. A full list of variables is presented below.

[22] It is also important to keep in mind that the goal of CAPITA-B with ECEC's wage equations is to accurately predict wages rather than to obtain unbiased coefficients (although there is undoubtedly some degree of association between these two measures of performance). When the wage equations were initially developed using SIH CURF data, the predictive performance of model specifications that did and did not control for the child penalty was similar (predictive performance was based on in-sample analysis of the proportion of individuals whose predicted wage quintile was the same as the actual wage distribution). Given this result and the similarities between the SIH CURF and SIH MURF data, the same wage equation specification was implemented for the final model using SIH MURF data.

[23] An income unit is one person, or a group of related persons within a household, whose command over income is assumed to be shared.

In addition to people interviewed in the June 2020 quarter, people were removed from the sample when they reported incongruous labour market information, such as:

- earning non-zero income despite reporting that they worked zero hours
- earning wages that were very low (< $4 per hour) or very high (> $125 per hour).

In line with CAPITA-B's approach to labour supply modelling, people were removed from the sample if a different modelling approach would be required to adequately model their labour supply decisions. This included people who:

- were aged over 64 years or reported receiving the Age Pension
- reported receiving Carer Payment or Carer Allowance
- reported being a full-time student[24]
- reported being self-employed
- identified as having a disability or reported receiving a DVA pension.

People were also removed from the sample if they reported unclear education, occupation (workers only) or industry (workers only) information (for example, providing an inadequately described response). Including these people would have affected the estimation and interpretation of education, occupation and industry dummy variables. Ultimately, the wage equations were estimated based on the information of 431 sole parents and 1,942 partnered female parents.

Industry and occupation proportions

An individual's industry and occupation can be a strong predictor of wages. As with data on wages, industry and occupation data is available for workers, but needs to be imputed for non-workers.

In the model, industry and occupation were represented by dummy variables. For workers, these dummy variables took a value of 0 or 1. For example, for a worker employed in the mining industry, the value of the 'Mining' variable was 1, while the value of all other industry variables was 0. For non-workers, industry and occupation was imputed using data from ABS Detailed Labour Force Data. Industry and occupation proportions were calculated using data on the last job reported by unemployed workers (averaged across a year to account for seasonality).[25] It is important to note that there are both unemployed non-workers and other non-workers, such as people who are not looking for work. Ideally, data on the last industry and occupation of all non-workers would be available. However, the ABS only collects this data for unemployed non-workers. This means that the proportions were calculated based on data from unemployed non-workers and applied to all non-workers in the sample.

Tables G.1 and G.2 show the proportions used to impute industry and occupation data for non-workers. For example, the value of the 'Mining' variable is 0.018 for all non-worker males as across the year, and reflects that 1.8% of unemployed males reported last working in the mining industry.

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[24] As an example, for full-time students, considerations other than financial incentives – such as having work hours that suit their class timetable – are often important in making labour supply decisions.

[25] Data is collected quarterly in February, May, August and November. Ideally, data from August 2019 to May 2020 would be used to align with the timing of the 2019-20 SIH. However, data from May 2019 is used in place of May 2020 due to the impact of COVID-19.

Table G.1 – Industry proportions for imputing wages of non-workers[a,b]

Last industry of employment reported by unemployed individuals, May 2019 to February 2020 (mean of four quarters)

	Male	Female
Agriculture, Forestry and Fishing (omitted from wage equation)[a]	3.6%	3.6%
Mining	1.8%	0.1%
Manufacturing	9.0%	6.5%
Electricity, gas, water and waste services	1.9%	0.6%
Construction	18.2%	2.0%
Retail and wholesale trade	14.3%	16.2%
Transport, postal and warehousing	7.6%	4.0%
Information media and telecommunications	2.1%	2.0%
Financial and insurance services	1.8%	1.9%
Other industries[b]	39.6%	63.2%

a. When estimating the wage equations, one industry – in this case, Agriculture, Forestry and Fishing – is not included as a variable. If all industry variables were included, it would be impossible to determine the impact of working in each industry on wages. This is due to the 'dummy variable trap': collectively, the industry variables (of which one variable is equal to one for each person) are equivalent to the constant variable (which is equal to one for every person). By excluding one variable, it becomes the 'base' against which wages for other industries are compared. **b.** 'Other Industries' includes Accommodation and Food Services, Rental, Hiring and Real Estate Services, Professional Scientific and Technical Services, Administrative and Support Services, Public Administration and Safety, Education and Training, Health Care and Social Assistance, Arts and Recreation Services, and Other Services.

Source: Productivity Commission estimates based on ABS (June 2023) 'UQ2a – Unemployed persons by Industry division of last job (ANZSIC)' [time series spreadsheet], Labour Force, Australia, Detailed, accessed 6 September 2023.

Table G.2 – Occupation proportions for imputing wages of non-workers[a,b]

Last occupation classification reported by unemployed individuals, May 2019 to February 2020 (mean of four quarters)

	Male	Female
Labourers (omitted from wage equation)[a]	48.6%	35.6%
Clerical	6.0%	18.7%
Paraprofessionals	24.9%	24.0%
Professionals	20.5%	21.7%

a. As with the industry proportions above, the 'Labourers' variable is excluded and becomes the base against which wages in other occupations are compared. **b.** 'Professionals' variable includes Managers and Professionals, 'Paraprofessionals' variable includes Technicians and Trades Workers and Community and Personal Service Workers, 'Clerical' variable includes Clerical and Administrative Workers, 'Labourers' variable includes Labourers, Machinery Operators and Drivers and Sales Workers.

Source: Productivity Commission estimates based on ABS (June 2023) 'UQ3a – Unemployed persons by Occupation major group of last job (ANZSCO)' [time series spreadsheet], Labour Force, Australia, Detailed, accessed 6 September 2023.

Estimated coefficients

Coefficients from the selection and wage equations are presented in table G.3 and G.4. The estimated coefficients of the selection equation suggest that having more children and speaking a main language other

than English at home are associated with a lower likelihood of working for both sole parents and partnered female parents. Individuals from both cohorts are more likely to work if they have a higher level of educational attainment.

Table G.3 – Selection equation coefficients[a]

	Sole parents	Partnered female parents
DEPENDENT VARIABLE: employment		
INSTRUMENT: number of children aged 14[b] or less	-0.303***	-0.082*
(Child aged 15 to 24)		
INSTRUMENT: child aged 0 to 2	-0.480*	-0.424***
INSTRUMENT: child aged 3 to 4	-0.315	-0.215**
INSTRUMENT: child aged 5 to 9	0.115	-0.277***
INSTRUMENT: child aged 10 to 14	0.220	-0.047
Female	-0.342*	
Age	0.139**	0.197***
Age squared/100	-0.183***	-0.245***
Capital city	0.065	-0.006
(No post-secondary education)		
Vocational education	0.795***	0.484***
Degree or higher	1.088***	0.455***
(English as main language at home)		
Main language other than English at home	-0.678***	-0.511***
Constant	-1.642	-2.908***
Number of observations	431	1,942
* $p<0.1$ / ** $p<0.05$ / *** $p<0.01$		

a. Variables in grey are omitted dummy variables – see the note on table G.1 above for more detail on the reason for their exclusion and how to interpret the remaining variables. **b.** The wage equations are estimated for cohorts of sole parents and partnered female parents with dependent children aged 24 or less, in line with the population categories used in CAPITA-B. The fifth instrument in the selection equation is defined as having a child aged 10 to 14 years (rather than 10 to 12 years as per the broader CAPITA-B with ECEC model) to address convergence issues with the sole parent wage equation.

Source: Productivity Commission estimates based on ABS 2019-20 SIH MURF.

Similarly, for both cohorts, the estimated coefficients of the wage equation suggest that speaking a main language other than English at home is associated with earning a lower expected wage, while having completed a university degree is associated with earning a higher wage. Working in a 'Professional' occupation is associated with higher expected wages compared to working in an occupation classified as a 'Labourer' for both sole parents and partnered female parents. Additionally, partnered female parents working in mining, utilities or financial and insurance services earn higher expected wages relative to those working in agriculture, forestry and fishing.

These results are broadly in line with previous wage equation estimation results in Australia.[26]

Table G.4 – Wage equation coefficients[a]

	Sole parents	Partnered female parents
DEPENDENT VARIABLE: log hourly wage rate		
Female	-0.199***	
Age	0.035*	0.038***
Age squared/100	-0.036	-0.041***
Capital city	0.069	0.011
(No post-secondary education)		
Vocational education	0.075	0.083***
Degree or higher	0.198***	0.229***
(English as main language at home)		
Main language other than English at home	-0.227***	-0.118***
(New South Wales)		
Victoria	-0.044	-0.030
Queensland	-0.146**	-0.057
South Australia	-0.086	-0.059*
Western Australia	-0.134*	-0.035
Tasmania	-0.121	-0.045
ACT	0.022	0.157***
Northern Territory	-0.089	-0.011
(Labourers)		
Professional	0.309***	0.267***
Paraprofessional	0.049	-0.045
Clerical	0.124*	0.066*
(Agriculture)		
Mining	0.503	0.451***
Manufacturing	0.278	0.074
Electricity, gas, water and waste services	0.717*	0.342***
Construction	0.099	0.086
Wholesale and retail trade	0.181	0.040
Transport, postal and warehousing	0.172	0.141
Information media and telecommunications	0.125	0.023

[26] See, for example Kalb (2002, pp. 10–12) and the Commission's ECEC inquiry (2014a) (technical supplement to the final report, pp. 50-51).

	Sole parents	Partnered female parents
Financial and insurance services	0.114	0.327***
Other industries	0.188	0.129
Constant	2.392***	2.269***
Sigma	0.361***	0.392***
Rho	0.467***	0.232**
Log likelihood	-315.115	-1,685.941
Number of observations	431	1,942
* p<0.1 / ** p<0.05 / *** p<0.01		

a. Variables in grey are omitted dummy variables – see the note on table G.1 above for more detail on the reason for their exclusion and how to interpret the remaining variables.

Source: Productivity Commission estimates based on ABS 2019-20 SIH MURF.

G.4   Labour supply and formal care modelling approach

Behavioural microsimulation modelling requires a method to determine how individuals change their behaviour in response to policy changes. For this model, the behavioural decision families make involve the labour supply of the primary carer and the demand for ECEC, influenced by changes in their net income due to policies affecting their out-of-pocket ECEC expenses. Similar to Gong and Breunig (2012, 2017) and the Commission's 2014 ECEC inquiry (PC 2014a), which also used behavioural microsimulation models of ECEC, a utility[27] maximisation approach is taken for the behavioural decision for families. Families are assumed to choose from a discrete set of primary carer's hours worked and hours of formal care choices (as discussed above) and the combination with the highest utility is chosen by the family in the model. For partnered parent families, it is assumed that the primary earner's labour supply is fixed. Utility equations (or preference equations) have been separately estimated for sole parents and partnered primary carer parents.

The utility equation specification drew on the Commission's 2014 ECEC inquiry model as a starting point. In the utility equation specification, households derive utility (or disutility) from:

- net family income (that is, net of taxes and transfers less out-of-pocket ECEC costs for all children in the household)
- the labour supply of the primary carer
- the number of hours of formal care of the youngest child.

Unlike the Commission's 2014 inquiry, informal care and care by the primary carer are not explicitly included in the utility equation whereas formal care is. The reasoning behind this was that primary carer care, informal care and formal care are strongly related (as explained below) and including terms which are highly correlated would result in multicollinearity, potentially reducing the ability of coefficients to be interpreted and also overfitting. Similar to the 2014 ECEC inquiry approach, the model uses a quadratic utility function which includes linear, squared terms and interaction terms. Heterogeneity of preferences is included in the model by making linear terms dependent on household and individual level characteristics (such as age of the

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[27] Utility measures the value, happiness or satisfaction a person or family gets from the consumption of goods and services and from the different ways a person spends their time (for example, through working or leisure).

youngest child, the number of children and educational attainment of the primary carer). These heterogeneity terms appear as 'interaction terms' in the utility function below.

Fixed cost of working parameters are also included to prevent the model from over-predicting participation in part-time work hours. In preference equations, the fixed cost refers to the disutility of working and to both financial and non-financial costs. Fixed cost of working parameters could be thought of as taking into account the costs, financial and non-financial, associated with finding and maintaining a job. An additional fixed cost of working parameter is included when working hours are greater than 40 in a week. This aims to capture the additional costs to families when a parent or guardian works more than 40 hours. These costs include less time for other activities like socialising and resting, as well as the potential for increased stress from the additional work.

Variables included in the utility function were net income, hours worked by the primary carer and hours of formal care. These variables were interacted with a combination of family-level and person-level characteristics, such as age and age squared of the primary carer, dummy variables for the age of the youngest child in the income unit, number of children in the income unit, and education dummy variables for the primary carer. Interaction terms that had very little impact on the overall fit of the model (as determined by the log likelihood) were removed from the final specification. A multinomial logistic regression was used to estimate the utility equation.

The deterministic component of the utility function can be represented as:

$$u = \beta_1 y + \beta_2 h_w + \beta_3 h_c + \beta_4 y^2 + \beta_5 h_w{}^2 + \beta_6 h_c{}^2 + \beta_7 y \cdot h_c + \beta_8 y \cdot h_w + \beta_9 h_w \cdot h_c + \beta_{10}\, \gamma + \beta_{11}\gamma_{40} + \beta_{12}\gamma_{hi}$$
$$+\; interaction\ terms$$

where

- u is utility
- the β's are the utility coefficients
- y is family income net of taxes and transfers less out-of-pocket childcare costs for all children in the household
- h_w is the labour supply choice of the primary carer (as in the hours worked)
- h_c is the number of hours the youngest child participates in formal care
- γ is a working dummy
- γ_{40} is a dummy for when labour supply is greater than 40 hours
- γ_{hi} is a dummy for when informal care of hours is greater than zero.

Hours of formal care for the youngest child is explicitly included in the utility equation as it is used as a proxy for remaining children in the family. The out-of-pocket ECEC expenses of formal care for all children in the family are taken into account in the net family income variable in the utility equation.

Net family income is calculated taking into account:

- the income of the primary carer's partner for partnered parent families
- the income of the primary carer which is dependent on the hours worked for the given choice and wage of the primary carer (which is imputed for primary carers who are not observed to be working in the SIH data, as discussed above)
- the out-of-pocket expense for childcare for all children within the family (which takes into account the family's ECEC subsidies)
- the family's transfer payments (such as Family Tax Benefit and Parenting Payments) given the family's income level
- the family's tax liability given the family's income level.

The main differences between the utility equations for the sole parents and partnered primary carer parents are the interaction terms.

- In the sole parents equation, four interaction terms which involve a female dummy variable are included. They are the female dummy variable interacted with the fixed cost of working dummy, income, labour supply hours and formal care hours.
- In the partnered primary carer parents equation, two interaction terms which involve the labour supply of the primary earner are included. They are the labour supply of the primary earner interacted with income and labour supply of the primary carer.

Otherwise the variables included in both equations are identical.

CAPITA-B with ECEC can calibrate the model by selecting error terms such that, in a simulation without a policy change, the resulting working hours for all 'draws' will match the observed hours in the underlying SIH data. This feature has been extended to include formal care hours. Further details on this are provided in section G.7.

The remaining parts of this section details the utility equation estimates and estimated elasticities from the model.

Utility function estimates

A multinomial logistic regression approach was used to estimate the utility parameters as families can jointly decide on the primary carer's hours of work and hours of formal care.[28] This allows for a set of discrete choices to be modelled taking into account variation in family characteristics. The utility function was estimated using a dataset produced by a version of CAPITA-B with ECEC based on the SIH CURF (coefficients and p-values are in table G.5).[29]

The population used to estimate the utility function was limited to families with sole carer parents and partnered primary carer parents. Additional observations were excluded due to their unsuitability to be used in the utility equation. For example, observations were excluded if it was considered there were constraints on their labour supply that would exist regardless of ECEC or tax and transfer policies (section G.7). Observations of families interviewed during the June 2020 quarter were also excluded as a precaution due to restricted business activity and changes to childcare provider operations during this period (section G.7).

Table G.5 – Utility function coefficient estimates[a,b]

Explanatory variable	Sole parents		Partnered primary carer parents	
	Coefficient	p-value	Coefficient	p-value
Net income	0.003	0.007	0.001	<0.001
Labour supply	0.146	0.006	0.174	<0.001
Formal care	-0.521	<0.001	-0.377	<0.001
Net income squared / 100,000	-0.004	0.803	0.002	0.266
Labour supply squared / 100	-0.068	0.262	-0.185	<0.001
Formal care squared / 100	0.191	<0.001	0.147	<0.001

[28] A number of utility equation specifications were tested, with alternatives that excluded terms for fixed costs of work and that were more similar to the Commission's 2014 inquiry specification (PC 2014a). The chosen specification performed best on fit statistics such as proportion of correct predictions, log-likelihood values and McFadden's R-squared.
[29] Work was initiated to re-estimate the utility equation using a dataset produced by CAPITA-B with ECEC based on the SIH MURF linked to administrative CCS data but due to time constraints this work was not able to be finalised in time for the inquiry's final report.

Explanatory variable	Sole parents		Partnered primary carer parents	
	Coefficient	p-value	Coefficient	p-value
Labour supply x Formal care / 100	0.105	0.020	0.119	<0.001
Net income x Labour supply / 100,000	-2.513	0.145	-0.554	0.004
Net income x Formal care / 100,000	0.168	0.836	0.343	0.001
Net income x Number of children / 100	-0.005	0.917	-0.029	0.009
Net income x Vocational education / 100	-0.064	0.495	-0.044	0.176
Net income x Diploma education / 100	-0.104	0.348	-0.060	0.051
Net income x Degree education / 100	-0.126	0.136	-0.061	0.012
Labour supply x Youngest child aged 0-2 / 100	-3.655	0.003	-4.570	<0.001
Labour supply x Youngest child aged 3-5 / 100	-3.524	0.002	-3.657	<0.001
Labour supply x Youngest child aged 6-9 / 100	-0.041	0.966	-1.312	0.032
Labour supply x Number of children / 100	0.236	0.870	0.838	0.132
Labour supply x Vocational education / 100	4.151	0.104	2.246	0.081
Labour supply x Diploma education / 100	6.394	0.052	3.594	0.007
Labour supply x Degree education / 100	8.162	0.001	3.978	<0.001
Formal care x Youngest child aged 0-2 / 100	18.297	<0.001	12.955	<0.001
Formal care x Youngest child aged 3-5 / 100	16.874	<0.001	14.033	<0.001
Formal care x Youngest child aged 6-9 / 100	12.538	0.001	7.929	<0.001
Formal care x Number of children / 100	0.733	0.244	-0.780	0.023
Formal care x Age / 100	0.847	0.105	0.434	0.243
Formal care x Age squared / 10,000	-1.128	0.115	-0.475	0.349
Fixed cost of working	-6.604	<0.001	-3.204	<0.001
Fixed cost of working where labour supply is greater than 40	-1.996	<0.001	-1.422	<0.001
Fixed cost of working x Female	2.860	<0.001		
Net income x Female / 100	0.058	0.392		
Labour supply x Female / 100	-9.861	0.001		
Formal care x Female / 100	4.000	0.023		
Fixed cost of informal care	-0.413	0.151	-0.951	<0.001
Hours worked by primary earner x Net income / 10,000			0.046	0.425
Hours worked by primary earner x Labour supply / 100			-0.104	<0.001
Log-likelihood	-979.627		-4096.745	

Source: Productivity Commission estimates.

Marginal utilities can be useful to inform how changes to labour supply and formal care would affect modelled utility. However owing to the presence of fixed cost coefficients in the utility function, deriving the

marginal utilities by calculating the derivatives is not straightforward – no derivative exists at the points in which the fixed first costs take effect. Instead, marginal utilities were approximated by calculating the change in utility from an additional hour of ECEC demand and from an additional hour of labour supply for some hypothetical families.

Table G.6 presents the change in utility from an additional hour of labour supply for a range of families at extreme choices of labour supply and formal care. For both sole and partnered parent families, the change in utility with respect to labour supply are negative, suggesting that families have decreased utility from supplying more labour, all else equal.

Table G.6 – Changes in utility from an additional hour of labour supply are negative[a,b]

	Estimated change in utility
Sole parents	
Low labour supply, low ECEC demand ($h_w = 0, h_c = 0, y = \$44,000$)	-3.77
Low labour supply, high ECEC demand ($h_w = 0, h_c = 50, y = \$44,000$)	-3.72
High labour supply, low ECEC demand ($h_w = 60, h_c = 10, y = \$50,000$)	-0.10
High labour supply, high ECEC demand ($h_w = 60, h_c = 50, y = \$50,000$)	-0.06
High labour supply, low ECEC demand ($h_w = 60, h_c = 10, y = \$80,000$)	-0.13
High labour supply, high ECEC demand ($h_w = 60, h_c = 50, y = \$80,000$)	-0.09
Partnered primary carer parents	
Low labour supply, low ECEC demand ($h_w = 0, h_c = 0, y = \$60,000$)	-3.07
Low labour supply, high ECEC demand ($h_w = 0, h_c = 50, y = \$60,000$)	-3.01
High labour supply, low ECEC demand ($h_w = 60, h_c = 10, y = \$80,000$)	-0.08
High labour supply, high ECEC demand ($h_w = 60, h_c = 50, y = \$80,000$)	-0.03
Low labour supply, low ECEC demand ($h_w = 0, h_c = 0, y = \$200,000$)	-0.11
Low labour supply, high ECEC demand ($h_w = 0, h_c = 50, y = \$200,000$)	-0.06

a. The individual is assumed to be female, 30 years old and have two children (with the youngest child aged between three and four years old). The sole parent has a high school education and the partnered parent has a diploma education. In partnered parent families, the primary earner is assumed to work 40 hours per week. **b.** Labour supply (h_w), ECEC demand (h_c) and net family income (y) are assumed values. Net annual incomes are converted to fortnightly incomes for consistency with units used in the utility equation.

Source: Productivity Commission estimates.

Table G.7 presents the change in utility from a one hour increase in ECEC demand hours for a range of families at extreme choices of labour supply and formal care. When ECEC use is low, families see a decrease in utility from an additional hour of ECEC whereas when ECEC use is high families see an increase in utility, all else equal. This reflects observed data – while there are many children not using ECEC (especially children aged under two), among those that do use ECEC, attending only one day a week is relatively rare (appendix D). This is reflected in the model as a higher preference for zero hours than a low number of hours of ECEC. Children attending ECEC most commonly attend for three days per week (appendix D) and families that already use ECEC for a large number of hours may be more comfortable with additional ECEC use than those who are not using ECEC. This is consistent with survey results that indicate that 'attempts to increase ECEC usage may be constrained by the personal values and preferences of

non-users and low users' (NSW PC 2023, p. 32). However, as noted in section G.2, estimation of the utility equation is not able to take into account the effect of non-price constraints on observed ECEC usage.

Additionally, the positive coefficient on the term that interacts labour supply and formal care in the estimated utility equation indicates that work and formal care are complementary (table G.5). ECEC hours have greater value when working more, and ECEC hours reduce the disutility of work.

Table G.7 – Change in utility from an additional hour of formal care are positive[a,b]

	Estimated change in utility
Sole parents	
Low labour supply, low ECEC demand ($h_w = 0, h_c = 0, y = \$44,000$)	-0.14
Low labour supply, high ECEC demand ($h_w = 0, h_c = 50, y = \$44,000$)	0.05
High labour supply, low ECEC demand ($h_w = 60, h_c = 10, y = \$50,000$)	-0.04
High labour supply, high ECEC demand ($h_w = 60, h_c = 50, y = \$50,000$)	0.11
High labour supply, low ECEC demand ($h_w = 60, h_c = 10, y = \$80,000$)	-0.04
High labour supply, high ECEC demand ($h_w = 60, h_c = 50, y = \$80,000$)	0.12
Partnered primary carer parents	
Low labour supply, low ECEC demand ($h_w = 0, h_c = 0, y = \$60,000$)	-0.15
Low labour supply, high ECEC demand ($h_w = 0, h_c = 50, y = \$60,000$)	0.00
High labour supply, low ECEC demand ($h_w = 60, h_c = 10, y = \$80,000$)	-0.05
High labour supply, high ECEC demand ($h_w = 60, h_c = 50, y = \$80,000$)	0.07
High labour supply, low ECEC demand ($h_w = 60, h_c = 0, y = \$200,000$)	-0.04
High labour supply, high ECEC demand ($h_w = 60, h_c = 50, y = \$200,000$)	0.08

a. The individual is assumed to be female, 30 years old and have two children (with the youngest child aged between three and four years old). The sole parent has a high school education and the partnered parent has a diploma education. In partnered parent families, the primary earner is assumed to work 40 hours per week. **b.** Labour supply (h_w), ECEC demand (h_c) and net family income (y) are also assumed values. Net annual incomes are converted to fortnightly incomes for consistency with units used in the utility equation.

Source: Productivity Commission estimates.

Elasticity estimates

Elasticity estimates were obtained by running simulations of wage and price increases. Labour supply and ECEC demand elasticities with respect to gross wages were estimated from a simulated 10% increase in gross wages. Elasticities with respect to gross ECEC prices were estimated from a simulated 10% increase in gross ECEC prices – that is, the fees charged by the ECEC service. Elasticities with respect to net ECEC prices were also simulated – that is, with respect to changes in out-of-pocket ECEC expenses after CCS is taken into account. As noted by Gong, Breunig and King (2014, p. 53), net ECEC prices are harder to estimate – they are endogenous and vary with labour supply and ECEC usage.

The simulations underlying these elasticities were run assuming tax and transfer policies, including CCS, as per 2023-24. These elasticities are presented at an aggregate level in tables G.9 to G.13. As an example of how to interpret these elasticities, a 1% increase in the gross ECEC price is estimated to decrease the labour supply of partnered primary carer parents by 0.03%.

The estimated labour supply elasticities with respect to gross and net ECEC prices have the expected negative sign (tables G.8 and G.9). An increase in ECEC prices is expected to reduce labour supply hours – more expensive ECEC would increase the costs of working and some parents may choose to reduce their labour supply in response.

Broadly the Commission's estimates of labour supply elasticities with respect to gross and net ECEC prices are smaller in size compared to previous estimates (except for Kalb and Lee (2008) and Doiron and Kalb (2005)). Both differences in the time period of data used and methodology can explain these differences.

Table G.8 – Labour supply hours elasticity with respect to gross ECEC prices

Author(s)	Children's age	Family type	Effect of 1% increase in gross ECEC prices on labour supply hours
PC (2024)	0–12	Partnered	-0.03%
PC (2024)	0–12	Sole	-0.01%
PC (2024)	0–12	Both	-0.02%
Kalb and Lee (2008)	0–12	Partnered	0%
Doiron and Kalb (2005)	0–12	Partnered	-0.02%
Apps et al. (2016)	0–4[a]	Partnered	-0.25%
Gong and Breunig (2017)	0–5	Partnered	-0.11%
Mumford et al. (2020)	0–5	Partnered	-0.20%
Kalb and Lee (2008)	0–12	Sole	-0.16%
Doiron and Kalb (2005)	0–12	Sole	-0.05%
NSW Productivity Commission (2022)	0–4	Both	-0.16%

a. Apps et al. (2016) focused on coupled families with preschool aged children and does not clearly specify the age range of these preschool aged children. It may be that Apps et al. (2016) captured partnered families with children aged 0–5. To be conservative, children aged 0–4 were included in this table.

Source: Productivity Commission estimates; Kalb and Lee (2008); Doiron and Kalb (2005); Apps et al. (2016); Gong and Breunig (2017); Mumford et al. (2020); NSW Productivity Commission (2022).

The CAPITA-B with ECEC model uses more recent data, from the 2019-20 SIH, linked with administrative CCS data. All other previous estimates in table G.9 used older data. For example, Gong and Breunig (2017) use HILDA data covering the years 2005-06 and Mumford et al. (2020) also use HILDA data covering the years 2003-04 to 2008-09.

Labour supply elasticities with respect to ECEC prices would be expected to change over time. This is due to changes to ECEC subsidy policies and in trends in the labour force participation rate of sole parents and partnered primary carer parents. ECEC subsidies have become more generous over the last 10–15 years, including with the introduction of the CCS in 2018. This means that the financial impact on families from a gross ECEC price change is lessened as a larger proportion is subsidised, thus leading to a smaller impact on out-of-pocket ECEC expenses. The dollar impact of a percentage increase in net ECEC prices is also smaller than it would have been under less generous subsidy schemes because net prices are starting from a lower base value. Further, the labour force participation rate of mothers has increased over time (paper 4) – there is less capacity for a reduction in ECEC prices to lead to large percentage increases in labour supply.

These factors mean that the labour supply elasticity with respect to gross and net ECEC prices would be expected to be smaller now than in the past.

Some other studies used a different the approach. Kalb and Lee (2008) (which extends the methodology in Doiron and Kalb (2005)) imputes total childcare costs for different levels of labour supply based on a childcare demand model, which is then incorporated in the estimation procedure of structural labour supply models for couple and sole parent families. CAPITA-B with ECEC estimates ECEC demand and labour supply hours simultaneously, so the results are less comparable.

Table G.9 – Labour supply hours elasticity with respect to net ECEC prices[b]

Author(s)	Children's age	Family type	Effect of 1% increase in net ECEC prices on labour supply hours
PC (2024)	0–12	Both	-0.04%
Kalb and Lee (2008)	0–12	Partnered	-0.03%
Doiron and Kalb (2005)	0–12	Partnered	-0.03%
Apps et al. (2016)	0–4[a]	Partnered	-0.17%
Gong and Breunig (2017)	0–5	Partnered	-0.08%
Kalb and Lee (2008)	0–12	Sole	-0.14%
Doiron and Kalb (2005)	0–12	Sole	-0.15%

a. Apps et al. (2016) focused on coupled families with preschool aged children and does not clearly specify the age range of these preschool aged children. It may be that Apps et al. (2016) captured partnered families with children aged 0–5. To be conservative, children aged 0–4 were included in this table. **b.** The net ECEC price elasticity was estimating by simulating an increase in out-of-pocket ECEC expenses.

Source: Productivity Commission estimates; Kalb and Lee (2008); Doiron and Kalb (2005); Apps et al. (2016); Gong and Breunig (2017).

The Commission's estimated net ECEC price elasticity is larger than the gross ECEC price elasticity, unlike in some past studies. The change from past studies reflects changes in subsidy regimes over time and that the out-of-pocket ECEC expense (the net price) is now more closely tied to gross prices. For the majority of families, the CCS subsidises families' gross ECEC expenses by a percentage determined by family income. This means that the net ECEC price or net out-of-pocket ECEC expense will, for the majority of families, always be a function of their gross ECEC price. Previous subsidy regimes such as Child Care Benefit and Child Care Rebate were structured differently (appendix D).

The estimated ECEC demand elasticity with respect to gross ECEC prices has the expected negative sign (table G.10). More expensive ECEC is expected reduce demand for ECEC. This estimated elasticity is smaller than estimates in past studies. Both changes in subsidy regimes and trends over time and differences in methodologies between studies (described above), explain these differences.

Table G.10 – ECEC demand hours elasticity with respect to gross ECEC prices

Author(s)	Children's age	Family type	Effect of 1% increase in gross ECEC prices on ECEC demand hours
PC (2024)	0–12	Partnered	-0.20%
PC (2024)	0–12	Sole	-0.40%
PC (2024)	0–12	Both	-0.24%
Apps et al. (2016)	0–4[a]	Partnered	-0.78%
Gong and Breunig (2017)	0–5	Partnered	-0.27%
Mumford et al. (2020)	0–5	Partnered	-0.52%

a. Apps et al. (2016) focused on coupled families with preschool aged children and does not clearly specify the age range of these preschool aged children. It may be that Apps et al. (2016) captured partnered families with children aged 0-5. To be conservative, children aged 0–4 were included in this table.

Source: Productivity Commission estimates; Apps et al. (2016); Gong and Breunig (2017); Mumford et al. (2020).

Estimates of the labour supply elasticity and ECEC demand elasticity with respect to gross wages are smaller than previous elasticity estimates (tables G.11 and G.12). Both have the expected sign – an increase in gross wages is expected to increase labour supply hours and to increase ECEC demand hours.

Table G.11 – Labour supply hours elasticity with respect to gross wages

Author(s)	Children's age	Family type	Effect of 1% increase in gross wages on labour supply hours
PC (2024)	0–12	Partnered	0.25%
PC (2024)	0–12	Sole	0.62%
PC (2024)	0–12	Both	0.31%
Apps et al. (2016)	0–4[a]	Partnered	1.02%
Gong and Breunig (2017)	0–5	Partnered	0.42%
Mumford et al. (2020)	0–5	Partnered	1.72%

a. Apps et al. (2016) focused on coupled families with preschool aged children and does not clearly specify the age range of these preschool aged children. It may be that Apps et al. (2016) captured partnered families with children aged 0-5. To be conservative, 0-4 was put in this table.

Source: Productivity Commission estimates; Apps et al. (2016); Gong and Breunig (2017); Mumford et al. (2020).

Table G.12 – ECEC demand hours elasticity with respect to gross wages

Author(s)	Children's age	Family type	Effect of 1% increase in gross wages on ECEC demand hours
PC (2024)	0–12	Partnered	0.19%
PC (2024)	0–12	Sole	0.40%
PC (2024)	0–12	Both	0.23%
Apps et al. (2016)	0–4[a]	Partnered	0.70%
Gong and Breunig (2017)	0–5	Partnered	0.27%
Mumford et al. (2020)	0–5	Partnered	1.13%

a. Apps et al. (2016) focused on coupled families with preschool aged children and does not clearly specify the age range of these preschool aged children. It may be that Apps et al. (2016) captured partnered families with children aged 0-5. To be conservative, children aged 0–4 were included in this table.

Source: Productivity Commission estimates; Apps et al. (2016); Gong and Breunig (2017); Mumford et al. (2020).

G.5   Results of simulated changes to ECEC subsidies

A range of options was modelled using CAPITA-B with ECEC. Table G.13 sets out the options modelled and the rest of this section sets out the results for each of the options. All options were modelled based on the 2023-24 tax and transfer system. Option 1 in this appendix corresponds to option A in the report, option 5 corresponds to option B and option 6 corresponds to option C.

Table G.13 – Modelled ECEC Subsidy policy options

Options	CCS rate	Higher CCS rate	Activity test	CCS hourly rate cap
1: Remove the activity test and increase the subsidy rate to 100% for lower-income families (Option A)	100% for families with an adjusted taxable income of $80,000 and under CCS rate tapers down from 100% by 1ppt for every $5,000 over $80,000	100% for families with an adjusted taxable income of $140,000 and under HCCS rate tapers down from 100% by 1ppt for every $5,000 over $80,000 Families with an adjusted taxable income of $580,000 and above ineligible	Remove so that all families are eligible for 50 subsidised hours of ECEC per week (100 hours per fortnight)	No change
2: Increase the subsidy rate to 100% for lower-income families	100% for families with an adjusted taxable income of $80,000 and under CCS rate tapers down from 100% by 1% for every $5,000 over $80,000	100% for families with an adjusted taxable income of $140,000 and under HCCS rate tapers down from 100% by 1% for every $5,000 over $80,000 Families with an adjusted taxable income of $580,000 and above ineligible	No change	No change

Options	CCS rate	Higher CCS rate	Activity test	CCS hourly rate cap
3: Remove the activity test for all families and retain income testing	No change	No change	Remove so that all families are eligible for 50 subsidised hours of ECEC per week (100 hours per fortnight)	No change
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	100% for families with an adjusted taxable income of $80,000 and under CCS rate tapers down from 100% by 1ppt for every $5,000 over $80,000	100% for families with an adjusted taxable income of $140,000 and under HCCS rate tapers down from 100% by 1ppt for every $5,000 over $80,000 Families with an adjusted taxable income of $580,000 and above ineligible	None for three days of ECEC per week (72 hours per fortnight), and no change for days four and five	No change
4a: Relax the activity test for all families and retain income testing	No change – based on current income test for all days of ECEC	No change	None for three days of ECEC per week (72 hours per fortnight), and no change for days four and five	No change
5: 90% subsidy for all families and retain activity test (Option B)	90% for all families	Families remain receiving the HCCS rate if they are eligible for a rate greater than 90%	No change	No change
6: Flat fee ECEC expense per day of $10 for all families and remove activity test (Option C)	Remove the CCS and replace with a $10 flat fee out-of-pocket expense per day for each child	Remove	Remove so that all families are eligible for 50 subsidised hours of ECEC per week (100 hours per fortnight)	No change
6a: Flat fee ECEC expense per day of $10, 100% subsidy rate for lower-income families and remove activity test	100% for families with an adjusted taxable income of $80,000 and under Remove the CCS and replace with a $10 flat fee out-of-pocket expense per day for each child	Remove	Remove so that all families are eligible for 50 subsidised hours of ECEC per week (100 hours per fortnight)	No change

Summary of results

This section sets out results for the options modelled as part of the inquiry (as presented in table G.13). The results are presented by income quartile. Tables G.14 to G.17 present percentage changes and full-time equivalent changes in labour supply and ECEC demand hours. Tables G.18 to G.21 distinguish between changes in labour supply and ECEC demand that are due to new entrants and people who increase hours (extensive and intensive margins). Table G.22 shows changes in CCS expenditure, and table G.23 shows changes in net fiscal impacts.

Paper 6 includes detailed discussion of the results.

Table G.14 – Percentage change in labour supply hours by income quartile[a]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	0.2%	-0.4%	-0.4%	-0.1%	-0.2%
2: Increase the subsidy rate to 100% for lower-income families	3.0%	1.7%	0.2%	0.3%	0.9%
3: Abolish the activity test for all families and retain income testing	-2.0%	-1.6%	-0.6%	-0.3%	-0.9%
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	0.7%	0.1%	-0.3%	0.0%	0.0%
4a: Relax the activity test for all families and retain income testing	-1.7%	-1.3%	-0.5%	-0.3%	-0.7%
5: 90% subsidy rate for all families with activity test	0.6%	1.6%	0.9%	2.2%	1.4%
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	-1.0%	0.5%	0.7%	2.1%	0.9%
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	0.5%	0.6%	0.7%	2.1%	1.1%

a. Income quartiles are based on household disposable income before any change in policy.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.15 – Percentage change in ECEC demand hours by income quartile[a]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	28%	11%	3%	4%	10%
2: Increase the subsidy rate to 100% for lower-income families	9%	7%	2%	3%	5%
3: Abolish the activity test for all families and retain income testing	15%	4%	1%	0%	4%
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	20%	9%	3%	4%	8%
4a: Relax the activity test for all families and retain income testing	9%	3%	0%	0%	2%
5: 90% subsidy rate for all families with activity test	1%	6%	7%	22%	9%
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	17%	10%	8%	24%	14%
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	28%	13%	8%	24%	17%

a. Income quartiles are based on household disposable income before any change in policy.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.16 – Full–time equivalent change of labour supply by income quartile[a,b,c]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	200	-700	-1,000	-200	-1,700
2: Increase the subsidy rate to 100% for lower-income families	2,700	3,000	700	700	7,100
3: Abolish the activity test for all families and retain income testing	-1,800	-2,800	-1,500	-800	-6,900
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	600	200	-800	0	0
4a: Relax the activity test for all families and retain income testing	-1,500	-2,300	-1,400	-700	-5,900
5: 90% subsidy rate for all families with activity test	500	2,800	2,500	5,700	11,500
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	-1,000	800	1,900	5,600	7,300
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	400	1,100	1,800	5,600	8,900

a. Income quartiles are based on household disposable income before any change in policy. **b.** Estimates rounded to the closest hundred. **c.** Full-time equivalent work was assumed as 35 hours per week.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.17 – Full-time equivalent change of ECEC demand by income quartile[a,b,c]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	23,900	12,400	4,200	4,600	45,100
2: Increase the subsidy rate to 100% for lower-income families	8,000	7,800	3,100	4,000	22,900
3: Abolish the activity test for all families and retain income testing	12,400	4,600	900	500	18,400
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	17,500	10,500	3,800	4,300	36,100
4a: Relax the activity test for all families and retain income testing	7,700	3,400	600	300	12,000
5: 90% subsidy rate for all families with activity test	600	5,400	8,800	24,800	39,600
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	13,800	10,100	10,300	27,700	61,900
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	24,000	14,600	10,300	27,700	76,600

a. Income quartiles are based on household disposable income before any change in policy. **b.** Estimates rounded to the closest hundred. **c.** Full-time equivalent hours for CBDC is 50 hours per week. Full-time equivalent hours for OSHC is 20 hours per week.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.18 – Net full-time equivalent change in labour supply due to entering or exiting the labour force, by income quartile[a,b,c,d]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	200	-800	-900	-100	-1,600
2: Increase the subsidy rate to 100% for lower-income families	2,600	2,800	600	600	6,600
3: Abolish the activity test for all families and retain income testing	-1,700	-2,700	-1,400	-700	-6,500
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	500	-100	-800	0	-400
4a: Relax the activity test for all families and retain income testing	-1,500	-2,400	-1,300	-700	-5,900
5: 90% subsidy rate for all families with activity test	400	2,000	1,500	3,700	7,600
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	-1,000	100	900	3,600	3,600
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	400	500	900	3,600	5,400

a. Income quartiles are based on household disposable income before any change in policy. **b.** Estimates rounded to the closest hundred. **c.** Full-time equivalent work was assumed as 35 hours per week. **d.** Due to rounding, the sum of the components in tables G.18 and G.19 may not add to the numbers in table G.16.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.19 – Net full-time equivalent change in labour supply due to increasing or decreasing labour supply hours, by income quartile[a,b,c,d]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	0	100	-100	-100	-100
2: Increase the subsidy rate to 100% for lower-income families	100	200	0	100	400
3: Abolish the activity test for all families and retain income testing	-100	-100	-200	-100	-500
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	100	300	0	0	400
4a: Relax the activity test for all families and retain income testing	0	100	0	0	100
5: 90% subsidy rate for all families with activity test	100	800	1,000	2,000	3,900
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	100	800	900	2,000	3,800
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	0	600	900	2,000	3,500

a. Income quartiles are based on household disposable income before any change in policy. **b.** Estimates rounded to the closest hundred. **c.** Full-time equivalent work was assumed as 35 hours per week. **d.** Due to rounding, the sum of the components in tables G.18 and G.19 may not add to the numbers in table G.16.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.20 – Net number of children entering ECEC by income quartile[a]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	26,600	12,900	6,400	5,400	51,300
2: Increase the subsidy rate to 100% for lower-income families	10,800	7,700	3,700	4,100	26,300
3: Abolish the activity test for all families and retain income testing	12,600	5,500	2,400	1,100	21,600
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	21,900	12,400	6,100	5,200	45,600
4a: Relax the activity test for all families and retain income testing	8,600	5,100	2,200	1,000	16,900
5: 90% subsidy rate for all families with activity test	700	7,300	10,800	26,700	45,500
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	14,200	12,100	12,900	29,900	69,100
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	26,700	16,000	12,900	29,900	85,500

a. This table presents the *number* of children not the FTE of changes in ECEC demand hours.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.21 – Net number of children increasing ECEC hours by income quartile[a]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Overall
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	8,400	5,400	1,100	1,400	16,300
2: Increase the subsidy rate to 100% for lower-income families	1,800	4,300	1,100	1,500	8,700
3: Abolish the activity test for all families and retain income testing	6,000	700	-100	0	6,600
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	6,300	2,600	1,000	1,300	11,200
4a: Relax the activity test for all families and retain income testing	4,600	-1,200	-200	-100	3,100
5: 90% subsidy rate for all families with activity test	200	900	3,500	8,100	12,700
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	6,500	1,800	3,700	8,700	20,700
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	8,400	5,500	3,700	8,700	26,300

a. This table presents the *number* of children not the FTE of changes in ECEC demand hours.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.22 – Proportion of increased CCS expenditure that goes to families in each income quartile and change in CCS expenditure[a,b]

Modelled estimates, 2023-24

Options	First income quartile	Second income quartile	Third income quartile	Fourth income quartile	Change in CCS expenditure ($b)
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	40%	27%	18%	15%	4.7 (37%)
2: Increase the subsidy rate to 100% for lower-income families	23%	24%	28%	24%	2.3 (18%)
3: Abolish the activity test for all families and retain income testing	55%	31%	8%	6%	2.1 (17%)
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	37%	27%	20%	16%	4.3 (33%)
4a: Relax the activity test for all families and retain income testing	52%	32%	9%	6%	1.7 (14%)
5: 90% subsidy rate for all families with activity test	1%	13%	27%	60%	6.0 (47%)
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	15%	15%	22%	48%	8.3 (66%)
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	21%	15%	20%	43%	9.1 (72%)

a. Income quartiles are based on household disposable income before any change in policy. **b.** The change in CCS expenditure was benchmarked to the amount the government is expected to provide in CCS payments in 2023-24 (Department of Education 2023, p. 28). This was achieved by applying the percentage change to CCS payments as modelled in CAPITA-B with ECEC to the benchmark.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.23 – Net fiscal impact[a]

Modelled estimates ($m), 2023-24

Options	Change in CCS expenditure	Change in other expenditure[b]	Change in personal income tax revenue	Overall fiscal impact[c]
1: Abolish the activity test and increase the subsidy rate to 100% for lower-income families	4,700	30	-10	4,800
2: Increase the subsidy rate to 100% for lower-income families	2,300	-100	100	2,100
3: Abolish the activity test for all families and retain income testing	2,100	100	-90	2,300
4: Relax the activity test and increase the subsidy rate to 100% for lower-income families	4,300	0	20	4,200
4a: Relax the activity test for all families and retain income testing	1,700	80	-70	1,900
5: 90% subsidy rate for all families with activity test	6,000	-20	330	5,600
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	8,300	60	290	8,100
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for lower-income families and remove activity test	9,100	30	300	8,900

a. The change in CCS expenditure was benchmarked to the amount the government is expected to provide in CCS payments in 2023-24 (Department of Education 2023, p. 28). This was achieved by applying the percentage change to CCS payments as modelled in CAPITA-B with ECEC to the benchmark. **b.** Other expenditure includes transfers such as Family Tax Benefits and Parenting Payments. **c.** The sum of the components in the table may not add to the overall fiscal impact due to rounding.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

G.6 Confidence intervals

Confidence intervals were calculated around point estimates for changes in labour supply and ECEC demand hours. The method for generating confidence intervals is described in section G.7.

The confidence intervals for the change in labour supply and ECEC demand hours are narrow around the point estimates (tables G.24 and G.25). This suggests that the point estimate is relatively stable and with repeated simulations it would not be expected to vary greatly.

Table G.24 – Percentage change in labour supply hours – 95% confidence intervals[a]

Modelled estimates, 2023-24

Options	Lower 95% bound	Point estimate	Upper 95% bound
1: Abolish the activity test and increase the subsidy rate to 100% for low-income families	-0.2%	-0.2%	-0.1%
2: Increase the subsidy rate to 100% for low-income families	0.9%	0.9%	1.0%
3: Abolish the activity test for all families and retain income testing	-0.9%	-0.9%	-0.8%
4: Relax the activity test and increase the subsidy rate to 100% for low-income families	0.0%	0.0%	0.1%
4a: Relax the activity test for all families and retain income testing	-0.7%	-0.7%	-0.7%
5: 90% subsidy rate for all families with activity test	1.4%	1.4%	1.6%
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	0.9%	0.9%	1.0%
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for low-income families and remove activity test	1.1%	1.1%	1.3%

a. Some confidence interval estimates appear to be the same as the point estimates. This is a result of rounding.

Source: Productivity Commission estimates using CAPITA-B with ECEC.

Table G.25 – Percentage change in ECEC demand hours – 95% confidence intervals

Modelled estimates, 2023-24

Options	Lower 95% bound	Point estimate	Upper 95% bound
1: Abolish the activity test and increase the subsidy rate to 100% for low-income families	9.4%	9.5%	10.3%
2: Increase the subsidy rate to 100% for low-income families	4.8%	4.9%	5.2%
3: Abolish the activity test for all families and retain income testing	3.6%	3.8%	4.2%
4: Relax the activity test and increase the subsidy rate to 100% for low-income families	7.4%	7.5%	8.0%
4a: Relax the activity test for all families and retain income testing	2.2%	2.4%	2.5%
5: 90% subsidy rate for all families with activity test	9.3%	9.5%	10.0%
6: Flat fee ECEC expense per day of $10 for all families and remove activity test	14.0%	14.2%	14.9%
6a: Flat fee ECEC expense per day of $10 for all families, 100% subsidy rate for low-income families and remove activity test	17.0%	17.2%	18.2%

Source: Productivity Commission estimates using CAPITA-B with ECEC.

G.7 CAPITA-B with ECEC – technical background information[30]

This section provides background technical information on CAPITA-B with ECEC.

Utility maximisation

Choices of labour supply and ECEC demand are made at the income unit level. Income units choose, from a restricted set of discrete working hour and ECEC demand levels, the option that maximises their utility. The labour supply and income of dependents is ignored. It is assumed that all income is consumed in the one time period.

For parents with children aged between zero and 12, utility depends on the labour supply and ECEC demand choices, the net income at that choice and other income unit characteristics. There is one utility equation for sole parents and another for partnered primary carer parents with ECEC aged children. These utility equations were re-estimated using updated SIH data.

For parents with children aged 0–12, there are 12 discrete choices for labour supply $h_w \in$ {0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60} and 6 discrete choices for ECEC demand $h_c \in$ {0, 10, 20, 30, 40, 50}, giving a combined choice set of 72 choices.

The utility equations have a quadratic functional form. This allows for consumption and the different dimensions of the choice set to be substitutes or complements. The utility function also contains terms to account for the cost of working. This is to correct for the fact that these types of models typically over-estimate part-time working hours. A cost of work term will penalise low working hours making this less likely. Costs of working are deducted from utility.

The utility equation for parents with ECEC aged children takes the following form:

$$U(y, h_w, h_c) = \beta_1 y + \beta_2 h_w + \beta_3 h_c + \beta_4 y^2 + \beta_5 h_w^2 + \beta_6 h_c^2 + \beta_7 y \cdot h_c + \beta_8 y \cdot h_w + \beta_9 h_w \cdot h_c + \beta_{10}\gamma + \beta_{11}\gamma_{40} + \beta_{12}\gamma_{hi}$$

Utility at any possible choice j from the set of possible choices $\mathcal{C}$ can be represented using a random utility model. Utility U_j^* is the sum of a deterministic component U_j and a random component ε_j that is unobserved.

$$U_j^* = U_j + \varepsilon_j$$

Assuming the error terms follow an extreme value distribution, the probability p_j of choosing hour j is given by the following multinomial logit model.

$$/p_j = e^{U_j} / \sum_{k \in \mathcal{C}} e^{U_k}$$

The multinomial logit model can be estimated using maximum likelihood. For i of N individuals in the sample the log likelihood function is given by the $L(\theta)$, where we choose the set of parameters $\theta = \{\beta_1, \cdots, \beta_{12}\}$ that maximises this function. These are the parameter estimates that define the utility equations used in CAPITA-B with ECEC.

$$L(\theta) = \sum_{i=1}^{N} \sum_{j \in \mathcal{C}} z_{i,j}(U_j - ln \sum_{k \in \mathcal{C}} e^{U_k})$$

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[30] This is an updated extract from DEWR's 'Technical Guide to CAPITA-B' document (DEWR 2017).

The $z_{i,j}$ is an indicator variable that is 1 if choice j is the observed choice of labour supply and childcare demand for individual i, otherwise it is 0.

Monte Carlo simulation

As noted above, utility comprises a deterministic and random component. The case for sole parents is presented as this is the least complex. For partnered parent families, the discussion is similar.

$$U_j^* = U_j + \varepsilon_j \; \forall \, j \in \mathcal{C}$$

where:

- j represents a choice from the set of discrete choices $\mathcal{C}$
- U_j^* represents the household's total utility for choice j
- U_j represents the deterministic component of the household's utility for choice j
- ε_j represents the random component of the household's utility.

The distribution of the error term is from the extreme value distribution (EVD) with probability density function

$$f(\varepsilon) = e^{-\varepsilon} e^{-e^{-\varepsilon}}$$

A Monte Carlo simulation begins for each income unit by drawing a vector of error terms, one for each choice in $\mathcal{C}$, and these are added to the deterministic utility to give the total utility for the draw.

Of these utilities, the optimal utility is the one that is the maximum for that draw, resulting in the optimal choice k.

$$U_k^* \geq U_j^* \;\; \forall j \in \mathcal{C}$$

This drawing process will result in a probability distribution of optimal choices for each individual.

This process is first done for a scenario where there is no policy change (the base simulation). The process is then repeated for a policy reform (the reform simulation). The same error draws are added to deterministic utility, which will change depending on how the policy reform changes disposable incomes. The result will also be a probability distribution of optimal choices.

The steps in a base simulation are outlined below.

8. Take a draw from the EVD for each discrete choice.
9. Calculate net incomes under a base policy scenario. Calculate deterministic utility and determine the random utility by drawing the error terms.
10. Determine the utility maximising choice.
11. Repeat steps 1 to 3 a total of K times.
12. Repeat for all income units N.

In CAPITA-B with ECEC, the default is K=100.

If the option of calibration is chosen, then rather than drawing from the EVD in step 1, error terms are used which have been previously calibrated. Calibration is the process whereby the error terms are drawn so that in a simulation without a policy change, the resulting working hours and ECEC hours for all draws are the observed hours in the underlying data. See the next section for a description.

The steps in a reform simulation are outlined below.

Take the same error draws used in the base simulation for each discrete choice.

13. Estimate net incomes under the new policy scenario. Calculate the new deterministic and total utility by adding the error terms drawn in the base simulation.
14. Determine the utility maximising choice.
15. Repeat steps 1 to 3 a total of K times.
16. Compare the reform results to the base results to determine the predicted change in behaviour for each income unit.

Repeat for all income units N.

Calibration of labour supply and ECEC demand

The model can run in calibrated or un-calibrated modes. Typically, the underlying labour supply and ECEC hours model do not match the observed hours distribution perfectly.

In calibrated mode, the utility equations are calibrated such that the optimal choices of the income unit match the observed choice in baseline. The model is calibrated to the labour supply and ECEC demand of the survey year.

Two techniques are commonly used to calibrate the labour supply and ECEC demand hours. First, repeated draws of error terms are added to the deterministic component of utility at each choice. Only draws that result in the optimal choice to be equivalent to the observed hours are kept. This method may be time consuming, especially if there are successive failed draws.

An alternative is to draw error terms from the conditional distribution so that they will always result in the observed hours being the optimal hours. This is the method employed in CAPITA-B with ECEC.

Uncalibrated error terms

This is when we draw errors from the EVD with cumulative distribution function (CDF)

$$F(\varepsilon) = \exp\left(-e^{-\varepsilon}\right)$$

Error draws obtained by drawing random terms r from the uniform distribution $r \sim U(0,1)$ and applying the inverse transformation.

$$\varepsilon = \mathrm{F}^{-1} = -\ln\left(-\ln(r)\right)$$

Calibrated error terms

This is when the error terms drawn are such that the resulting optimal choice will always match the observed choice.

Error term for the observed choice k_0 point has CDF

$$F(\varepsilon_i | i = k_0) = \exp\left(-\frac{1}{s}e^{-\varepsilon_i}\right)$$

where

$$s = p_{k_0} = e^{U_{k_0}} / \sum_{j \in \mathcal{C}} e^{U_j}$$

Draws of this error term are obtained by drawing random terms r from the uniform distribution $r \sim U(0,1)$ and applying the inverse CDF:

$$\varepsilon_{k_0} = F^{-1}(r) = -\ln\left[-s \cdot \ln(r)\right]$$

Error term for the other hour points $i \neq k_0$ are distributed based on the CDF

$$F(\varepsilon_i \mid i \neq k_0) = exp\left(e^{U_i - U_{k_0} - \varepsilon_{k_0}} - e^{-\epsilon_i}\right)$$

Draws of this error term are obtained by drawing random terms r from the uniform distribution $r \sim U(0,1)$ and applying the inverse CDF

$$\varepsilon_i = F^{-1}(r) = -\ln\left(-\ln\left(r \cdot exp\left[-e^{U_i - U_{k_0} - \varepsilon_{k_0}}\right]\right)\right)$$

Terms $i \in \mathcal{C}$ represent the choices, with the observed choice being k_0, and U_i is deterministic utility at choice i and U_{k_0} is the deterministic utility of the observed choice.

Take-up of benefits

When simulating persons at zero or low working hours, it is reasonable to assume that the income unit's budget constraint includes access to some welfare payments.

For persons who are not observed to be receiving a benefit (typically because they are working and earning sufficiently as to not be eligible) a problem arises when modelling their utilities at zero or low hours of work. To ensure that these persons have access to welfare payments, benefit take-up rules are applied. The rules assume 100% benefit take-up of benefits at zero and low working hours and ensure that all income units are simulated to have some income over all working hour possibilities. The 100% take-up assumption is also applied at the observed hours point at basefile creation, so that the behavioural response to policy reform simulations does not predict behavioural changes where hours of work are unchanged.

In CAPITA-B with ECEC, a distinction is made between beneficiaries and non-beneficiaries. Non-beneficiaries are persons who do not receive Department of Veterans Affair (DVA) pensions, Department of Social Security (DSS) pensions or DSS allowances in the SIH. Depending on the person's circumstances and how benefits are modelled in CAPITA, the general rule is that non-beneficiaries are allocated to a benefit if they are eligible. Generally these are one of Parenting Payment Single, Parenting Payment Partnered, Jobseeker or Youth Allowance (YA). For partnered parent families with eligible dependent children, the benefit types for each partner will depend on which partner is the principal carer for the purpose of Parenting Payment eligibility. CAPITA-B with ECEC uses the rule that the partner working fewer hours is the principal carer, and if both work the same hours, the partner with the lower wage rate is the principal carer.

Take-up rules can also be applied to dependent persons, though this is not recommended as there is not sufficient information on the SIH to determine whether the tertiary study undertaken meets youth allowance eligibility requirements. A dependent person is allocated to YA if this option is chosen.

Exclusion groups

Some individuals' labour supply and ECEC demand are not modelled. Instead, for these individuals, labour supply and ECEC demand are kept at the observed level. These excluded income units in CAPITA-B with ECEC include income units in which at least one person meets at least one of the following conditions:

- over 64 years or receiving age pension
- self-employed
- disabled or receiving DVA service pension
- has wages that are too small (<$4 per hour) or too high (>$125 per hour)
- a full-time student
- a recipient of Carer Payment or Carer Allowance
- on payments not modelled in CAPITA
- lives in non-private dwellings
- very high number of hours of observed childcare
- couple with childcare-aged children where both parents are unemployed
- couple with childcare-aged children which was interviewed in June quarter of 2019-20.

The reason for this treatment is mostly because a different type of modelling would be required to adequately model labour supply for these income units. For persons close to or at retirement age, decisions to supply labour would involve considerations such as superannuation and other savings and whether their assets are such that would make them eligible for the Age Pension. For self-employed persons, a more complex relationship exists between labour supply and wage rates than the simple one assumed in this model. For persons with work-limiting disabilities, considerations other than financial incentives are important in making labour supply decisions.

Income units were also excluded if the youngest child could not be linked to the PLIDA spine.

In addition, the labour supply of dependents is not modelled. However, in non-excluded income units with dependents, the parental labour supply may impact on the parental income test for YA eligibility.

Selecting appropriate income units for estimating the preference equation for families with children aged 0–12

Income units may not be suitable to be used in the proposed preference equation if there is a reason to believe that they may have constraints on their labour supply, unreliable data in the SIH, or other reasons. A considerable portion of records surveyed during the June quarter of the 2019-20 financial year were excluded as a precaution due to restricted business activity and changes to childcare provider operations during this period.

A breakdown of the number of income units that are included/excluded is provided in table G.26, with each income unit assigned a single exclusion reason to ensure accurate counts of the total number of income units. For example, some income units initially excluded due to being interviewed in the June quarter may be inappropriate for inclusion in the model for another reasons.

Table G.26 – Number of income units in the 2019-20 SIH CURF with a youngest child aged 0–12, and their suitability for inclusion in the preference equation estimation dataset

Exclusion reason	Sole parents of childcare-aged children	Partnered parents of childcare-aged children
None (i.e. included)	359 (53%)	1,264 (45%)
At least one parent aged 65 or older	3	2
At least one parent has income from own unincorporated business	7	60
At least one parent receives a disability or DVA pension payment	31	15
At least one parent reports an hourly wage that is very high or very low	25	302
At least one parent is currently studying	67	311
At least one parent receives Carer Payment	40	43
At least one parent receives Special Benefit or a discontinued income support payment	3	6
Very high number of hours of observed childcare	9	21
Couple, both unemployed	n/a	89
Interviewed in June quarter	130	675
Total (included + excluded)	674	2,788

Tax deductions and negative private incomes

In the current version of CAPITA-B with ECEC, tax deductions are assumed to be zero at all modelled choices. This is due to a compatibility issue with CAPITA's tax deduction imputation that is anticipated to be resolved in future updates.

Uncertainty quantification and confidence intervals

The CAPITA-B with ECEC model provides point estimates for labour supply and ECEC demand. However, the wage and utility equation inputs to the model are estimated with uncertainty. Thus, the point estimates have an associated uncertainty, albeit uncalculated. Because of this, uncertainty quantification is applied to the point estimates to generate confidence intervals and provide a better idea of the variance in the results from the model. This is done by taking random draws of the preference equations and seeing how estimates vary given those draws.

In order to quantify uncertainty in the coefficient estimates, estimates are randomly drawn using the following method:

$$\vec{x} = \vec{\mu} + \Omega^{1/2}\vec{\eta}$$

where x is an n-element vector from the multivariate normal distribution $NM(\mu, \Omega)$, that is, the randomised preference equation with n variables, $\vec{\mu}$ is the point estimate of the regressions, $\vec{\eta}$ which consists of n draws form the standard normal distribution and Ω is the variance-covariance matrix.

Overall uncertainty within the model can be quantified through a standard bootstrapping approach. As the model is run iteratively, each time using freshly drawn parameters, the estimates will begin to distribute themselves around the point estimate. By running this process n times and removing the top and bottom 2.5% of ranked estimates, the 95% confidence interval will be generated for each point estimate.

Contributions of past research to the model

Many past research papers have contributed to the development of CAPITA-B (and hence CAPITA-B with ECEC), including to inform the models' labour supply framework, calibration and fixed costs of working. This section acknowledges the following papers and authors for their contributions to CAPITA-B.

- Australian Government Treasury (2015)
- Bourguignon, Fournier and Gurgand (1998)
- Creedy et al. (2000, 2002)
- Heckman (1979)
- Kalb (2000, 2002)
- Kalb and Scutella (2002)
- Kalb and Lee (2007b, 2007a)
- Mercante and Mok (2014a, 2014b)
- van Soest (1995).

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H. Children's outcomes literature

This appendix describes the academic papers reviewed in the process of preparing supporting paper 1 – Children's outcomes that used quasi-experimental techniques to estimate the effects of early childhood education and care (ECEC) programs on children's outcomes. It describes methodological issues with the interpretation of empirical research then includes tables covering each study's methodology, population, treatment and findings.

In addition to the papers listed in this appendix, paper 1 also includes studies that looked at the effect of particular characteristics of ECEC programs rather than their overall effect (covered in more detail in section 1.3 of paper 1), and some that used methodologies other than quasi-experimental techniques (which may generally be less credible or less relevant to Australia).

H.1 Background

Methodological issues

In ascertaining the extent to which any empirical research finding is applicable to a policy question, there are two main factors:

- establishing that the statistical relationship identified in the study accurately reflects the effect the intervention had on its cohort (internal validity)
- for the particular policy question, gauging the relevance of the intervention, the cohort affected by it and the broader context (external validity).

Internal validity

The outcomes of the children who attended an ECEC program may differ from the outcomes of those who did not. This may partly be due to the effect of the program itself, and partly due to the reasons why only one of these groups of children attended ECEC. The method a study uses to analyse its data needs to be able to separate the former from the latter.

By far the most common approach used in the literature is to control for some covariates in a regression model (most commonly using an ordinary least squares (OLS) approach) – estimating the relationship between ECEC participation and children's outcomes that, conditional on these covariates, best fits the data. For example, if parental education increases attendance at ECEC, but also independently improves children's outcomes, the estimated effect of ECEC in a simple comparison of children who do and do not attend will be upwardly statistically biased – an overestimate, on average. But including information about parental education in the regression model can sometimes account for this, meaning the estimated effect can be similar to comparing children whose parents have the same level of education.

However, this observational approach can only succeed in generating unbiased estimates if all relevant variables are included in the model.[1] At least in the context of ECEC, this seems unlikely to ever be the case. For example, parents who place a higher value on their children's education and are more willing to invest in it would be more likely to enrol their children into ECEC. They may also spend more time reading to their children or be more involved in their child's homework while at school. An observational approach would then be unable to disentangle the effect of the child's ECEC attendance from the *reason* for the child's ECEC attendance.

Any factor that is not captured (or is imperfectly captured) in the regression and that relates to both ECEC attendance and children's outcomes will cause some degree of statistical bias. While this bias may not always be material, some empirical evidence suggests this is very often the case (Duncan et al. 2004; Oster 2019).

Further, the results produced by this approach are usually interpreted as the average effect for the children in the sample but, even if all confounding factors are perfectly captured, this will still be incorrect. The groups of children who did and did not receive the intervention will be weighted differently, depending on their relative size (Słoczyński 2022). For example, if most children in the sample attended ECEC, the estimated effect would mostly consist of the effect for the children who did not attend ECEC. If the group of children who did not attend ECEC were on average less socio-economically advantaged, and this meant they would have been affected differently by ECEC, the estimated effect would not be a good indication of the average effect of ECEC across the sample. This issue was not known until recently and is poorly recognised.

The simplest way to overcome these issues to randomly assign the intervention, as this will lead on average to treatment and control groups that are comparable in all other respects (although only on average, and there still can be important differences in smaller samples). But for many reasons, these randomised control trials (RCTs) are rare and typically consider contexts that are too specific to provide much indication of the effect that mainstream ECEC services are likely to have in Australia.

'Quasi-experimental' techniques aim to isolate the variation in treatment that is as good as random, and to use only this variation, rather than variation that is related to unobserved factors and could independently affect outcomes. When all the assumptions of these techniques are met, results can be just as credible as those produced by an RCT. Very often, however, these assumptions may not be fully met, and their validity often cannot be tested directly. Nonetheless, these techniques often allow for the credible examination of interventions that are usually more policy-relevant than those studied by RCTs, and allow for examination of a broad array of outcomes, at a large scale, in the long term.

Most of the studies included in this appendix use some variant of three common quasi-experimental techniques.

Difference-in-differences analysis (DiD)

This method uses a control group that did not receive an intervention and a treatment group that did, with effects identified by how the difference in outcomes between these two groups changes after the treatment group received the intervention. This allows for there to be differences between these two groups, as long as these differences do not change before and after the intervention, for reasons other than the intervention. For example, when there are two neighbouring states, and only one makes a reform to ECEC policy, DiD

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[1] They must also be accurately measured and their 'functional form' in the model must perfectly reflect their relationship with the outcome variable (which will not be the case if, for example, parental education is modelled as having a linear effect, but the 10th year of education has a different effect to the 16th).

would compare the difference in children's outcomes in the reforming state and the control state[2] before and after the intervention. If the reforming state was performing better before the intervention, but the gap increased (or was performing worse before the intervention, but the gap narrowed), this would be taken as evidence that the reform improved outcomes.

This requires the assumption that, had the intervention had not taken place, the difference in outcomes between these groups would have remained the same. This cannot be directly tested, as we cannot observe the world in which the intervention did not take place. But there are ways to gain more confidence that this assumption holds.

If outcomes were moving in parallel in treatment and control groups prior to the intervention, it is more plausible that they would have continued moving in parallel after the intervention, had it not taken place. If data is available on outcomes before the intervention, this can be directly tested, and most of these studies conduct such tests.

Even if outcomes were moving in parallel before the intervention, this does not prove they would have continued to be move in parallel after the intervention, as another change besides the reform could also have occurred. For example, the gap in test scores between two neighbouring states could have been identical in every year before one state expanded access to ECEC. But if it did so as part of a package of reforms that also affected school quality or the testing process, DiD would not isolate the effect of ECEC. Studies typically attempt to show that there were no other policy changes or shocks during their time period that would have affected outcomes.

'Placebo tests' determine if an approach is estimated to affect an outcome that it should not have affected. For example, attending preschool at age four cannot affect the likelihood that same child had an unhealthily low weight when they are born. But if treatment and control groups had different characteristics,, a DiD analysis may falsely suggest that it did. Placebo tests can provide an indication of whether confounding factors have not been adequately accounted for.

DiD will identify effects for the group affected by the change, which may not be representative of effects for all children. Typically, intent-to-treat (ITT) effects will be identified, such as the effect of being in a jurisdiction that expands access to ECEC, and not the effect of attending ECEC. An expansion of access may increase the ECEC attendance rate by ten percentage points, but the identified effect will relate to average outcomes across all children regardless of ECEC attendance. Individual effects could be approximated by multiplying this ITT effect by ten, but this will not be accurate if 'spillovers' took place, where effects on children who received the intervention also affected children who did not, for example if those children were later in the same classroom and ECEC led to them to contribute to a collaborative learning environment.

In the classical DiD setting, there is a time period before the reform and after, and a treatment and control group. Reality is often more complex. There may be many different groups, for example, regions within a country, with treatment occurring at different times and/or not being binary (for example, if the measure of treatment is the increase in the number of services per child in each state, not just whether the child was in the state in which a particular reform occurred). Common methods of implementing DiD in these settings require additional assumptions.

Where groups are treated at different times or to different extents, not all will be weighted equally in estimating the effect of the intervention, and some may be weighted negatively – that is, a more positive

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[2] Some studies use a 'synthetic' control group that may be more similar to the state in which the intervention took place. This is constructed from states in which the intervention did not occur, by placing different weights on them in order to construct a synthetic state that is as close as possible to the treated state in its measured characteristics (Abadie 2021).

effect for one group would reduce the overall estimated effect. At the extreme, an intervention could have positive effects for all groups but be estimated to have a negative effect (de Chaisemartin and D'Haultfœuille 2023). This will not be an issue if treatment effects are the same across groups and times, but this is unlikely to be the case.

Techniques that can account for this issue have now been developed (for example, Borusyak et al. 2024; Callaway and Sant'Anna 2021; Sun and Abraham 2021). But some papers on ECEC were written before these issues were well recognised and used DiD techniques in settings where this concern is relevant. There has not been a systematic attempt to assess the robustness of these papers against this issue. However, a reanalysis of 38 political science papers found that using a robust technique sometimes led to meaningful shifts in estimated magnitudes or produced statistically insignificant results, but did not produce substantively different findings (Chiu et al. 2023). And some recent papers on ECEC using DiD show that their results are robust to this concern (Anders et al. 2023; Bailey et al. 2021; Bosque-Mercader 2022; DeMalach and Schlosser 2024; Gruber et al. 2023).

Instrumental variables (IV) analysis

Another method to solve the problem of children attending ECEC for reasons that independently affect their outcomes is to use a variable (an 'instrument') that affects ECEC attendance but is as good as random, and only consider how the variation in attendance that comes from this variable affects children's outcomes. For example, when a service is oversubscribed and determines which children can attend through a lottery, an IV would identify the effects of attendance using only the variation in attendance that stems from families randomly winning this lottery.

This technique requires some strong assumptions. The instrument:

- must have a sufficiently large effect on the likelihood of attending ECEC. This can easily be tested, and almost always is by studies using this technique[3]
- must be as good as randomly assigned – that is, not correlated with any factor that relates to the outcome variable
- must only be able to affect the outcome through ECEC attendance
- must only be able to increase and not decrease the likelihood of ECEC attendance.[4]

Most of these are 'maintained assumptions' that cannot be directly tested. Studies using IV methods typically look for signs in their data or details about institutional settings that indicate these assumptions are more likely to hold.

In the simplest case, under these assumptions an IV approach would identify the local average treatment effect of the intervention, or its average effect for the 'compliers' – those who only attended due to the instrument. Depending on the exact instrument, this group may comprise those on the margins of attending ECEC – not representative of all children, but potentially more relevant when considering the likely effects of an expansion of ECEC.

But, similarly to DiD, the way many IVs are implemented in practice will not identify a local average treatment effect, which was not known until relatively recently. If the instrument is only as good as randomly assigned when controlling for covariates, the usual implementation of an IV produces estimates that are affected by negatively weighted estimates for at least some of those in the sample that were not-compliers leading to harder-to-interpret and less useful results (Blandhol et al. 2022; Słoczyński 2021). It is unclear how much this issue matters in practice for ECEC studies. It may not be relevant for those that use a lottery as an

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[3] Although these tests will not always be sufficient to justify this assumption (Keane and Neal 2023).

[4] Although results can still be meaningful under weaker versions of this assumption (de Chaisemartin 2017).

instrument, one of which showed that its technique could still estimate a local average treatment effect (Gray-Lobe et al. 2023). Some studies also report 'reduced-form' estimates of the direct effect of the instrument, which may not be affected by this issue.

Regression discontinuity (RD) design

This approach exploits cutoffs created by policy design, where those just above and below some threshold have a different likelihood of receiving the intervention. For example, children may be eligible for a preschool program if they were born on 1 July, but not if they were born on 30 June. Children born on these two dates may (on average) be identical in every way, except for their likelihood of attending ECEC.[5]

This requires the assumption that the variable for the cutoff is not subject to 'manipulation', in this case either timing births to be on one side of the cutoff, or misreporting the age of the child in order to gain access to the program. This can easily be tested, which most papers do. It must also be assumed that crossing the threshold only affects outcomes through ECEC and not in other relevant ways, for example affecting when children start school (unless this is otherwise accounted for).

Regression discontinuity design is generally applied as a form of IV[6], and so will also only estimate effects for compliers. For age eligibility cutoff RDs, this will mean that results are specific to children around a certain age.

Other techniques

A sibling control approach compares siblings who do or do not attend ECEC. This will account for differences in family background, but has to assume that the difference in ECEC attendance between the siblings did not arise for any relevant reason, for example if families perceived one child as having a greater need for support from ECEC. It can also only identify effects for a small number of families that may not be representative (for example, this technique is unable to identify effects for only children).

Propensity score matching is sometimes considered to be a quasi-experimental technique. This approach attempts to identify children who seem, based on observed characteristics, to have the same likelihood of attending ECEC, but only some of them do so. Then, the outcomes of children in the first group are compared to their matched equivalent in the second group. This differs to regression-based approaches in that it directly compares matched children, rather than considering outcomes for all children in the sample and seeing how they differ after adjusting for observed characteristics. It may in some circumstances be preferable to a regression-based approach. But it does not address the fundamental issue that, if any unobserved factor is related to both treatment and outcomes, children who seem similar based on observed factors would still be different in ways that may have independently affected their outcomes.

External validity

As well as being credible in its own context, a finding also needs to be relevant for the context of the policy question to which it is applied. There are many ways in which these contexts may differ.

- ECEC programs can have a broad range of characteristics, with varying service types, attendance patterns (time attended per day, days attended per week, weeks attended per year), staffing practices (qualifications, educator-to-child ratios, training and professional development), ownership structures and regulatory systems.

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[5] Children will differ in terms of the 'running variable' that determines the cutoff, in this case age, but differences will be small and can be adjusted for.

[6] This will not be the case in a 'sharp' RD, where crossing the threshold leads to a 100% chance of treatment. But all the RDs contained in this appendix are 'fuzzy' RDs, where crossing the threshold increases the likelihood of treatment, but does not guarantee it.

- The effects of any intervention can only be estimated against a counterfactual. For example, had they not attended a preschool program, children may have received parental care, informal care, family day care (FDC) or centre-based day care (CBDC). This will differ by context, and also affect whether parental income increases due to ECEC use – another potential mechanism for effects on children's outcomes. The quality of the counterfactual may also differ – parental care may have different effects depending on parental education or income levels, for example.
- The characteristics of children will also vary, with age likely to be particularly important both directly and for the counterfactual care arrangements.
- The broader policy context, including around parental leave and child health is likely to be relevant. Where outcomes are measured at school or in adulthood this is even more relevant; effects on earnings will be affected by the labour market, effects on justice system outcomes will depend on the nature of the justice system.

As well as differences in contexts, differences in ways of measuring outcomes may also cause estimated effects to differ between studies in ways that make their results harder to compare.

- Outcomes can be measured in many ways. Two studies may estimate effects on tests of school readiness but take place in different countries that have unique measures, or both consider effects on health outcomes but have data on different sets of diseases.
- Effects of ECEC on outcomes such as test scores are typically estimated to be lower when measured at a later date, and studies may use data on outcomes recorded at different points after children attended ECEC.
- There are many different measures of ECEC effects. Intent-to-treat effects often cannot be compared to 'treatment effects on the treated'. Some studies may estimate effects for children on the margin of attending ECEC, while others may estimate the average effect across all children who attended. This would affect the results if these groups of children differ according to a factor such as disadvantage which may affect the effects of ECEC.

If there were a very large number of studies, each credibly identifying an effect in a way that could be compared between them, it may be possible to adjust for these differences. But there are too many factors that could affect the estimates a study produces, relative to the number of credible studies, for this to take place. Issues around external validity, including child and program characteristics by which the effects of ECEC may vary, are considered in paper 1.

Which studies are included in this appendix?

As noted above, this appendix does not include all studies cited in paper 1. It only covers papers that consider the effect of ECEC programs on children's outcomes and use quasi-experimental techniques, the primary focus of section 1.2 in that paper. This does not include studies that look at the effect of particular characteristics of ECEC programs, such as educator qualifications, or whether a program is half- or full-day, which are covered in more detail in section 1.3 of that paper. It also does not include observational studies and randomised controlled trials, many of which have been summarised elsewhere (for example, Bruhn and Emick 2023; Melhuish et al. 2015).

Sometimes, there are multiple studies that considered the same intervention, for example where a program was evaluated after three years and again after five years. Not all of these studies are included unless they considered different outcome variables or use different methodologies. A small number of studies that used quasi-experimental techniques, but relied on assumptions that seemed highly unlikely to be met, have not been included. Given the issues described above, studies that solely rely on propensity score matching have generally not been included.

Guide to the tables

The tables below contain three columns.

- The first names the study, briefly summarises its methodology and lists the country the intervention took place in and the type of outcomes it considered.
- The second contains information on the children who attended the program analysed in each study, the characteristics of that program and the counterfactual care arrangements the children may have otherwise received.
- The third describes the main findings of the study.

This information is taken from the study and will vary by the level of detail that was published. Some studies did not provide much information on the characteristics of the cohort and program they assessed. The tables also do not include a full description of each study's methodology. Depending on the approach taken, the description of the cohort included in column two may relate either to the children who attended the program, or the broader cohort of children in the sample.

The contexts of and terminology used by these studies can differ. The tables use the terms 'preschool' and 'CBDC' to refer to service models similar to the service models described by these terms in Australia. Services described as preschool may operate for a shorter number of hours a day, often with an older cohort, a more pedagogical focus and be taught by an educator with a higher level of qualification than CBDC. Not all programs described with this term will have all these characteristics. Some programs are referred to more generally as ECEC if they are more difficult to categorise in this way.

The words significant and insignificant are used below to mean statistically significant or insignificant[7], and do not refer to the magnitude of the effect.

These studies are roughly grouped by the outcomes they consider (although many consider multiple categories of outcomes). Educational attainment and labour market outcomes are considered, then justice system outcomes, then health outcomes, then social connection outcomes, then shorter-term educational or skills development outcomes.

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[7] The threshold used for statistical significance in this appendix is a 'p-value' of 5%. The p-value is often used as a measure of the probability that a statistical result is due to chance and not a true effect – for example, that if the p-value for the test of whether an ECEC program had an effect was 4%, there is a 4% probability that the finding was due to random chance, and a 96% probability that it did have an effect. There are many reasons why this interpretation will not be accurate (Gelman et al. 2020; Imbens 2021). The concept of statistical significance is used in this appendix only to briefly communicate some information about the reliability of findings, which it is far from able to fully capture.

H.2   Tables of studies

Table H.1 – Educational attainment and/or labour market outcomes

Study and methodology	Population and treatment	Findings
Rossin-Slater and Wüst 2020 DiD exploiting the rollout of a targeted preschool program in Denmark; long-term educational, labour market and health outcomes.	Children in Denmark attending a public preschool program from ages three to seven who were born between 1933 and 1957. Some outcomes are from the children that the original program participants had later in their life. Centres were required to meet standards for sanitation and nutrition, have qualified staff, be open at least four hours each working day and predominantly enrol children from low-income families. Health checkups and vaccinations could be provided. By 1953, 72% of educators were qualified, typically with two-year qualifications. The rollout of a nurse home visiting program partially overlapped with the rollout of the preschool program.	Access to preschool at age three increased the likelihood of completing post-compulsory education and earnings in adulthood, as well as the likelihood of surviving beyond age 65. Children of the participants in the program were more likely to have completed post-compulsory education by age 25. Children who could also access the nurse home visiting program saw smaller but still positive effects, suggesting a significant mechanism of the program was its health-related components.
Havnes and Mogstad 2015 DiD exploiting the rollout of a reform that expanded access to ECEC in Norway; long-term educational and labour market outcomes.	Children born in Norway from 1973 to 1976 who accessed ECEC due to a reform that expanded access. Universal ECEC was publicly and privately provided to children between the ages of three and six, with services open during 'normal working hours'. The average ratio was 1:8, with one degree-qualified teacher for every one or two unqualified assistants. The counterfactual seemed to be informal care in almost all cases.	The reform replaced informal care with formal ECEC, not affecting maternal labour supply. Structural quality indicators were not measurably affected by the expansion. Intent-to-treat quantile treatment effects on earnings in adulthood were positive for the bottom 82% of the earnings distribution, and negative for the top 18% (effects were significant between the 15th and 60th percentiles and for some of the top percentiles). Years of schooling increased significantly for children whose families were in the lower two thirds of the income distribution, with a much larger effect for the bottom third. This was driven by increases in high school completion and university attendance. There were no significant effects for the top third.

Study and methodology	Population and treatment	Findings
		A related paper (Havnes and Mogstad 2011) considered heterogeneity in less detail but reported results on a broader set of outcomes. Similar average results were found for educational and labour market outcomes, but the paper also identified reductions in the likelihood of being single and of accessing government support payments.
Silliman and Mäkinen 2022 DiD exploiting the rollout of a reform that expanded access to ECEC in Finland; long-term outcomes.	Children born in Finland between 1970 and 1976 in rural areas, and had access to universal ECEC between the ages of three and six. There was a mix of half- and full-day care. Maximum group sizes were regulated, but services were 'likely of considerably inferior quality compared to modern childcare'. The counterfactual included private ECEC.	For children whose family income was at the 10th percentile, there were significant benefits for high-school completion, tertiary education, income and employment. For children whose family income was at the 50th percentile, there were no significant effects. For children whose family income was at the 90th percentile, there were significant adverse effects for high school graduation and tertiary education. There were insignificant increases in marriage rates for low-income children and decreases for high-income children. Both cognitive and non-cognitive skills were improved in poor children and impaired in rich children, although effects on non-cognitive skills were much better predictors of effects on long-term outcomes.
Berne 2022 DiD of a US state preschool program; long-term educational outcomes.	Children born between 1987 and 1998 in the US state of Georgia, who attended a universal preschool program. The services were provided by a mix of school, for-profit, and not-for-profit providers, and were required to operate for at least 6.5 hours a day, with a maximum class size of 20 and minimum ratio of 1:10 including one qualified teacher and one qualified assistant.	High school graduation was increased by access to the program, with suggestive evidence of an increase in bachelor degree completion. There were no significant effects on employment, although outcomes were measured at age 24 when some may still have been in tertiary education.
Andreoli et al. 2023	Children entering universal preschool between the ages of two and four in France, who were born between 1964 and 1973.	The reform increased the duration of preschool attendance similarly across SES.

Study and methodology	Population and treatment	Findings
IV exploiting a reform that expanded access to ECEC in France; education and labour market outcomes.	Children were taught by degree-qualified teachers, with an average class size of 25 and a more academic focus that some other ECEC models. About two thirds of children who did not attend preschool received parental or informal care (these were not reported separately).	Average effects on long-term outcomes were not significant. For middle- and high-SES children, attending preschool for longer increased educational attainment, employment and wages. Reduced form (ITT) estimates were generally in the same direction and also significant for middle- and high-SES children, although (as would be expected) of lower magnitude.
Bingley et al. 2021 DiD exploiting a reform that expanded access to ECEC in Denmark; education and labour market outcomes.	Children who attended universal ECEC in Denmark at age four between 1966 and 1979, as it was expanded from the previous system which was targeted at low-income families. Centre directors were required to be certified teachers and educators were required to have two years of formal training (which increased to three years from 1970). The average ratio was 1:6.2. The counterfactual seemed to primarily be parental care but included informal care and FDC. FDC initially had no qualification requirements, a maximum of seven children and a maximum number of hours of 45. From 1973, there was a 70-hour training course for educators and from 1974 the maximum number of hours and children were reduced to five and 45, respectively.	Increased availability of ECEC led to increases in the years of schooling that children completed, driven by increases in both the likelihood of high school and university completion. Earnings in adulthood also increased. Based on other estimates of the return to schooling, less than half of the effect on earnings would be explained by increased educational attainment. The positive average effect on earnings was driven by the top of the income distribution, while at the bottom, effects were negative but smaller in magnitude. Children whose mothers had completed high school or university saw positive effects, while for children whose mothers had less than a high school education, effects were insignificant and close to zero. The authors estimate a benefit-to-cost ratio of 7.6, with a significant majority of these benefits estimated to come from increased maternal labour force participation.
Bailey et al. 2021 DiD exploiting the rollout of the US Head Start program; educational attainment and labour market outcomes.	Children born before 1980 in the US, who attended the Head Start program. Head Start is a preschool program targeted at children experiencing disadvantage. It began as an 8-week program in 1965 before transitioning to a full-year program for three-to-five-year-old children.	Children were more likely to complete high school and university (including professional or doctoral degrees). Employment (including in professional jobs) and work hours increased, and adult poverty and receipt of government support payments fell. Effects seemed fairly similar for white and non-white children.

Study and methodology	Population and treatment	Findings
	Early childhood education comprised 70% of its budget in 1966–1967, with the 17-20% for health services and nutrition and the remainder for parental involvement, social services and mental health services. In the early stages of the program, there was a suggested ratio of one teacher for every 15 children, although many educators did not have postsecondary education.	Effects were larger in areas where access to Medicaid (a health insurance program for low-income people) was greater, potentially because effects were partially driven by referrals to health services. Effects were smaller in areas where access to child health centres and food stamps was greater, potentially because these programs partially substituted for the effects of Head Start. Head Start was estimated to pay for itself (primarily due to reductions in need for government support payments) and to have a very high internal rate of return for the children who participated in the program. Other research on Head Start has found that benefits were affected by later schooling experiences (Johnson and Jackson 2019). Effects of Head Start for children who attended schools that saw funding reductions on educational attainment, wages, incarceration and poverty were small and insignificant; for children who attended schools that saw funding increases, there were large effects on these outcomes.
Akee and Clark 2024 IV exploiting an admissions lottery in the US; labour market outcomes.	Children who attended free preschool under a program that provided it primarily for four-year-old Indigenous children in one US state (with non-Indigenous children eligible but not prioritised), born between 1992 and 1996. When services were oversubscribed, a lottery determined which children were offered a place. Services operated from 8am to about 2pm daily. Teachers were required to hold bachelor degrees and for aides, associate degrees were required. The average class size was about 20 children. Many teachers and aides came from the same Indigenous community as the children and reported being informed in their methods by Indigenous history, traditions and language.	Earnings in early adulthood were increased by attending the program. Effects were somewhat larger for children whose parents earned below the median income of the sample. Effects on employment were positive but not significant.

Study and methodology	Population and treatment	Findings
Herbst 2017 DiD exploiting the rollout of a historic universal ECEC program in the US; long-run effects.	Children in the US who attended an ECEC program introduced during WWII that operated between 1943 and 1946. The program included both CBDC for children aged 0-5, and outside school hours care for children aged 6–12. Most centres operated six days a week, with it being common for children to attend 12 hours a day. The recommended ratio was 1:10, with many centres abiding by this. There was a recommended 10–12-week training course and some schoolteachers worked in the centres. Quality varied significantly, and was sometimes very poor. For children of school age, before- and after-school care was provided, at which children typically spent a few hours. Programs included meals, activities, reading and assistance with schoolwork. The counterfactual seemed to be parental care (with fathers unlikely to be present given mobilisation for WWII).	Access to the program improved university completion, employment and earnings in adulthood, while reducing the likelihood of not completing high school, receiving government support payments and having work-related disabilities. The bottom half of the earnings distribution saw the strongest effects. Estimates were negative, although much smaller, for the top half of the distribution at the earlier stages of their working life, although positive or close to zero later. Results were not broken down between children who may have attended CBDC and outside school hours care.
Haimovich Paz 2015 -DiD exploiting the introduction of early kindergarten in various US cities; long-term outcomes.	Children who attended public kindergarten in the US between the ages of four and six, from 1890 to 1910. Children in the analytical sample were born in the US, male and White. Teachers were mostly high school graduates with two years of specific training. Sessions were typically for 2–3 hours in the morning. The counterfactual was parental care, with mothers unlikely to work regardless of access to ECEC.	Access to early kindergarten increased years of schooling and earnings in adulthood. Effects on earnings were driven by children whose mothers did not have English as their first language; effects on education were larger for these children but also significant for children of native English speakers.
Kawarazaki 2023 IV exploiting differential changes in supply from an expansion of ECEC in Japan; education and labour market outcomes.	Japanese children who attended ECEC at age four and were born between 1960 and 1989. The ECEC system comprised a mix of preschool and CDBC models. The preschool model required teachers to have university education and had an average ratio of 25; the CBDC model did not require university education, had an average ratio of about 25-30, and operated for longer hours.	ECEC attendance increased university completion rates and earnings in adulthood, driven by higher wages rather than increases in hours worked.

Table H.2 – Educational, labour market and/or justice system outcomes

Study and methodology	Population and treatment	Findings
Gray-Lobe et al. 2023 IV exploiting a lottery for oversubscribed preschools in the US; education and labour market outcomes.	Four-year-old universal public preschool in Boston from 1997 to 2003, with a high and disproportionate share of low-income and non-White students. The average class size was 19, and teachers were degree qualified. There was a mix of half-day (2.5 hours) and full-day (6 hours) preschool. Quality concerns about the program had been noted. Of the children who attended, 38% may not have otherwise attended any other form of ECEC, 33% may have attended Head Start and 29% may have attended private preschool.	The preschool program did not significantly affect school test scores but improved disciplinary outcomes, high school graduation, university attendance and juvenile incarceration. Differences in effects by parental income were generally not statistically significant but in the direction of benefits being larger for higher-income children.
DeMalach and Schlosser 2024 DiD exploiting the introduction of universal public preschool in Israel; educational and justice system outcomes.	Children who attended universal public preschool at age three and four in Israel, between 1999 and 2003. The introduction of preschool was prioritised, and first expanded access in disadvantaged areas. These were disproportionately areas in which the population was almost entirely Arab, on which the study focuses. Preschools were open six days a week and 6.5 hours a day. The maximum class size was 35 with one teacher and one or two aides. Attendance was compulsory, although this was not enforced.	There were benefits to school test scores that generally faded out by eighth grade. Children were more likely to report they enjoyed school, that students helped each other in class and that they had better relationships with their teachers. They were less likely to report that they were afraid to go to school or that they had been insulted by teachers. High school completion rates and university entrance examination scores improved. There were also increases in university and vocational education enrolment. The likelihood of having a juvenile crime record was significantly decreased for boys. For girls, there was an insignificant decline in the probability of marriage between the ages of 18 and 21. Effects on educational outcomes were stronger for children whose parents completed fewer than 12 years of education and whose mothers were not employed. For juvenile crime and early marriage outcomes, effects did not differ by parental education levels. Declines in early marriage were stronger for children whose fathers had low incomes.

Study and methodology	Population and treatment	Findings
Gruber et al. 2023 Two reforms in Finland; medium-term educational and justice system outcomes. 1. DiD exploiting the introduction of a payment to parents who do not use ECEC. 2. DiD exploiting a standardisation of ECEC fees.	1. A subsidy paid to parents of children who were not in ECEC between the ages of nine months and three years. 2. A 1997 reform that standardised ECEC fees, increasing them in some municipalities and reducing them in others. These affected the attendance of ECEC in Finland, which is mostly publicly provided. There was a minimum ratio of 1:3 for one-year-old children. Teachers were generally required to have university education.	1. The payment, which reduced maternal labour supply, increased children's likelihood of failing cognitive ability checks at maternal and child health clinics at age four or five. Enrolment in academic high schools was lower and criminal convictions between the ages of 15 and 18 years were higher. 2. ECEC attendance reduced the likelihood of failing the same checks, increased enrolment in academic high schools and seemed to reduce youth criminal convictions (although this was not significant). Effects were generally larger in absolute terms for children whose parents have higher income or education levels, although similar in relative terms.

Table H.3 – Justice system outcomes

Study and methodology	Population and treatment	Findings
Wentzel 2023 Three reforms in Norway; justice system outcomes. 1. DiD exploiting the rollout of a reform that expanded access to ECEC. 2. Difference-in-regression-discontinuity[73] exploiting the introduction of compulsory ECEC for six-year-olds. 3. DiD exploiting the introduction of payments to parents who do not use ECEC.	1. As described for Havnes and Mogstad 2015 above – the same intervention is studied with a similar methodology, but a different outcome variable. 2. Previously, 89% of children at age six attended ECEC, with those not attending more likely to be experiencing disadvantage. The reform brought ECEC for six-year-olds under the schooling system with enrolment increasing to 100%, while maintaining a similar model. The children in the sample were born between 1989 and 1991. 3. Payments to parents who do not use full-time subsidised ECEC, with these payments smaller when part-time ECEC was used. This decreased maternal workforce participation and increased both parental and informal care. Children in the sample were born between 1983 and 2000.	1. The reform significantly decreased the likelihood of being charged with a criminal offence in adulthood, and there was an insignificant decrease in the number of charges. 2. An insignificant decrease in the likelihood of being charged, and a significant decrease in the number of charges. 3. Significant increases in both the likelihood of being charged and the number of charges. Across the reforms, effects were almost always limited to men, and larger in families with lower education and income levels.
Ando et al. 2023 DiD exploiting a reform that expanded access to preschool in Japan; justice system outcomes.	Children who attended universal preschool at age four in Japan due to an expansion that primarily took place between 1964 and 1970. Preschools offered programs lasting at least four hours a day. Teachers were required to have at least two years of post-secondary education. The average ratio was about 1:24 from 1957 to 1985. The counterfactual was mostly parental or informal care; decreases in CBDC resulting from the preschool expansion attendance were fairly small.	There was a significant decrease in arrests for violent offences between ages 14 and 19 years. Arrests for non-violent offences decreased insignificantly. There was also a significant reduction in teen pregnancy. The reform did not increase enrolment in high school (which at the time was voluntary). Benefits were larger in areas where maternal education levels were higher. In these areas, the counterfactual was more likely to be parental care. In areas with lower maternal education, preschool

[73] A cutoff may be relevant in multiple ways, for example affecting both ECEC attendance and school starting age. If an ECEC program with an age cutoff is introduced one year, and the school starting age cutoff was in place before and after the introduction, a difference-in-regression-discontinuity approach would consider how the effect of crossing the age cutoff changes as it starts to affect ECEC attendance as well as school starting age.

Study and methodology	Population and treatment	Findings
		attendance was more likely to CBDC attendance and effects on arrests and teen pregnancy were not significant, potentially because CBDC would have provided similar benefits.
Anders et al. 2023 DiD exploiting the rollout of the US Head Start and Smart Start programs; justice system outcomes.	1. Children who attended the Head Start program in the US state of North Carolina and were born between 1955 and 1968. The Head Start preschool program was targeted to children experiencing disadvantage, with the median participant in the early years of the program having a family income that was about half the national average. 2. Children who were affected by the rollout of the Smart Start program in North Carolina and were born between 1980 and 1994. Smart Start was a state program that aimed to increase the availability and quality of ECEC and to improve access to preventive healthcare.	Access to Head start reduced criminal convictions to the age of 35 (beyond which data was not available), with this effect being limited to low-poverty areas. Access to Smart Start reduced criminal convictions to the age of 24. These effects were larger in high-poverty areas, with reductions in low-poverty areas smaller and insignificant. When Smart Start was rolled out, its benefits were smaller in areas where Head Start was not operating. Effects were similar by crime category. For Sure Start but not for Head Start, effects were smaller for White children. The benefits of Head Start and Sure start on a subset of crimes, over the years for which data were available, were estimated to be about a quarter and about four fifths of the costs of each program, respectively.
Smith 2015 Difference-in-regression-discontinuity exploiting the age cutoff for a US state preschool program as it was introduced; justice system outcomes.	Children who attended universal preschool in Oklahoma at age four, between 1997 and 1999. Preschools were operated out of the school system, with teachers certified in early childhood education. The maximum class size was 20 with one teacher and one assistant.	There were reductions in the likelihood of being charged with a misdemeanour or felony at age 18 or 19. These were driven by Black children, with insignificant effects for White children.
Brutti and Montolio 2021 DiD exploiting the rollout of three-year-old preschool in Spain; justice system outcomes.	The same reform was analysed as Felfe et al. (2015) below. Children in Spain who attended preschool at age three between 1984 and 1997. Preschool for three-year-olds, delivered in school settings with the same hours (9am-5pm, five days a week, excluding school	Recorded offences in adulthood were reduced by the expansion of three-year-old preschool. Effects seemed larger for drug offences, violent offences and rules compliance. There was some evidence of larger effects for cohorts experiencing disadvantage.

Study and methodology	Population and treatment	Findings
	holidays). Teachers were degree-qualified, with a maximum class size of 20.	A benefit-to-cost ratio of 4.25 was estimated, considering only benefits to justice system outcomes (for the two thirds of offences where these could be quantified).
	The expansion of preschool did not reduce use of private ECEC; rather the counterfactual seemed to be parental care (with informal care being fairly uncommon).	

Table H.4 – Health outcomes[a]

Study and methodology	Population and treatment	Findings
Cattan et al. 2021 DiD exploiting the rollout of an early childhood program in England; health outcomes.	Children born between 1993 and 2006 in England who had access to early childhood centres as they were being rolled out. Centres were first set up in disadvantaged areas, although they were open to all children and later spread more broadly. The largest area of expenditure for these centres was ECEC, although there were also significant healthcare, parenting support and home visiting components. Educators delivering ECEC through the program were required to hold higher-level qualifications than educators in alternative forms of ECEC.	Children saw overall reductions in the likelihood of hospitalisation to age 15, with increases at early ages more than offset by decreases after children started school. Early increases in hospitalisations seemed to be driven by earlier treatment of chronic and preventable conditions and by exposure to infectious diseases such as influenza shifting to earlier years, without longer-term adverse effects. Hospitalisations due to external causes such as injuries were lower at all ages, with this effect being larger while children had access to ECEC. Hospitalisations in adolescence for mental health were also less likely. The financial benefits of reduced health system costs were estimated to offset about a third of the costs of the program. Effects were broadly similar for children in areas in the lowest 30% of the SES distribution and children in areas in the middle 40% of areas (although the latter were less precisely estimated). For children in areas in the highest 30% of the SES distribution, long-term effects were close to zero.
van den Berg and Siflinger 2020 DiD exploiting a fee reform in Sweden; health outcomes.	Children born between 1993 and 2004 who, in a later period, attended CBDC in a particular region of Sweden. Attendance before age one was virtually absent due to parental leave, and could last until school entry at age six. The reform significantly reduced the fees paid by parents (with a reform at a similar time allowing parents who were unemployed or on leave to access 15 hours of subsidised ECEC a week). The Swedish CBDC program was described by the UN as the best in the world. It included nutritional and hygiene education components.	There was a short-term increase in infections, that was partially offset by later decreases until the age of seven (beyond which data was not available). There was an insignificant reduction in accidents from ages two to seven. Access to ECEC reduced diagnoses for mental health problems, with this being statistically significant from age four. Overall, acute medical visits decreased, and preventive medical visits seemed to increase. Total estimated healthcare costs were estimated

Study and methodology	Population and treatment	Findings
	Centres were open from 6:30am to 6:30pm, with the average number of hours attended per week reported as 32.	to decrease even without considering the long-term benefits of an increase in use of preventive care.
	Around the period of the reform, average ratios were about 1:5.5 and about 55% of staff had pedagogical training. These quality indicators did not seem to be affected by the reform.	Effects on health seemed largely driven by children of low-income parents, although the increases in CBDC attendance due to the reform disproportionately took place in low-SES areas.
		Another study specifically looked at the children of unemployed in Sweden as they gained an entitlement to 15 hours of ECEC a week (Aalto et al. 2019). This also showed an immediate increase in infections as children gained access to ECEC that did not persist. At ages 10-11, prescriptions for respiratory issues such as asthma were reduced, with most observed health outcomes unaffected.
Barschkett 2022
DiD exploiting the expansion of ECEC in Germany; health outcomes.	Children born in West Germany between 1999 and 2015, who were able to attend ECEC at an earlier age due to a reform that phased in an entitlement for all children between the ages of one and three. Previously, the entitlement to subsidised ECEC was for children age three or older. Data was limited to the about 90% of the population insured through the public health system.
The structure and organisation of ECEC varied by region. Almost all providers were not-for-profit.
Parental care was typically the counterfactual.	There was a short-term increase in communicable diseases such as influenza that was offset by later decreases (with data available from ages one to ten). At older ages, diagnoses for mental disorders and obesity were reduced.
Across all medical issues and over the period for which data was available, doctor visits and healthcare costs were reduced modestly but significantly.
Effects on some outcomes were driven by children from lower-SES areas, although differential effects of ECEC for children who attended could not be separated from differential effects of the reform on the likelihood of attending ECEC.
Breivik et al. 2020
DiD exploiting the expansion of ECEC in Norway; long-term health outcomes.	As described for Havnes and Mogstad 2015 above – the same intervention was studied with a similar methodology, but a different outcome variable.
Children born in Norway from 1973 to 1976 who accessed ECEC due to a reform that expanded access.	Between the ages of 30 and 47, healthcare use increased, driven by visits for non-high-risk pregnancies. This seemed to reflect an increase in preventive care, as there was no increase in visits for high-risk pregnancies and no change in fertility.
For the children of the original participants of the program, there were small but significant benefits on two measures of health at birth.

Study and methodology	Population and treatment	Findings
	Universal ECEC was publicly and privately provided to children between the ages of three and six. Services were open during 'normal working hours'. The average ratio was 1:8, with one degree-qualified teacher and one or two unqualified assistants. Most services were open from 8am to 4pm, and about two thirds were operated by local or state governments. In 1976, 50% of those in ECEC were children of working parents. 14.7% were in ECEC 6–15 hours per week, 37.6% 16–30 hours per week, 32% 31–40 hours per week, and 15% more than 40 hours per week. Meals were provided, without charge to families at about half of services. About a third of staff were managers or teachers (mostly without approved preschool education), with a quarter being interns and another quarter being assistants. The counterfactual seemed to be informal care in almost all cases.	Access to the program led to reductions to the likelihood of GP consultations for psychological symptoms and the number of specialist visits for psychiatric care (the latter being significant before but not after adjustment for the testing of multiple hypotheses). The number of GP consultations for injuries and social problems also fell. Effects across these outcomes seemed similar for children of different family backgrounds.
Bosque-Mercader 2022 DiD exploiting the rollout of three-year-old preschool in Spain; health outcomes.	The same reform was analysed as Felfe et al. (2015) below. Children in Spain who attended preschool at age three between 1984 and 1991. Preschool for three-year-olds, delivered in school settings with the same hours (9am-5pm, five days a week, excluding school holidays). Teachers were degree-qualified, with a maximum class size of 20. The expansion of preschool did not reduce use of private ECEC; rather the counterfactual seemed to be parental care (with informal care being fairly uncommon).	The reform did not significantly affect most health outcomes through adulthood. Asthma diagnoses decreased, while total hospital visits increased. Increases in hospital visits were driven by visits related to pregnancy and childbirth (with no data on fertility that could determine if this was due to increases in pregnancy, with worse health or increased health-seeking behaviour being alternative explanations). There were no significant effects on hospital visits for other reasons. There was generally stronger evidence of benefits for children for low and moderate levels of maternal education. A reduction in diagnoses of mental health disorders and use of prescription medication was insignificant on average, but significant for children who had at least one parent with secondary but not tertiary education.

Study and methodology	Population and treatment	Findings
Lacey 2023 RD exploiting income cutoffs for eligibility for the Head Start program in the US; health outcomes.	Male children who were born from 1977 to 1990 and attended the US Head Start preschool program. To be eligible, the children's parents must have been below an income threshold, which varied by family size and structure, or received other some forms of government support payments. Health and nutrition components were added to the program around 1983, including collaborations with nutritionists and greater food provision.	There were marginally significant reductions in illness, mental health problems and a limited ability to work due to poor health in adulthood. Effects on an index that combined health outcomes were significant. There were positive but insignificant effects on an index of economic outcomes in adulthood. This included the likelihood of receiving food stamps, which was significantly reduced. Effects on health outcomes were much stronger for the cohort born after 1983, after health-focused components of the program were strengthened.
Gørtz et al. 2024 IV exploiting random variation from a waiting list for CBDC in Denmark; health and cognitive outcomes.	Children who attended CBDC in Copenhagen and were born between 2009 and 2015, between the ages of six months and 18 months. There was a mix of CBDC services that could be attended by children from six months to three years old, and combined CBDC and preschool services that children could attend through age five. Most children started attending before age one, with about a third attending by nine months old or earlier. Group sizes were 11-13 and the average ratio was 1:3.1. Staff comprised bachelor-degree-qualified educators, assistants with two years of training and other, unqualified staff. The counterfactual was almost always parental care; informal care is relatively rare in Denmark and FDC was uncommon in Copenhagen.	Earlier enrolment in CBDC led to a marginally significant reduction in the likelihood of inadequate language development by age five. There was a small and insignificant reduction in the likelihood that a child's school entry was delayed. Visits to primary care physicians were increased in the short term, with this being offset by later decreases. These results were not significant when adjusting for the testing of multiple hypotheses. There were no effects on hospitalisation. Effects seemed the same for children whose mothers had different levels of education.

a. Rossin-Slater and Wüst (2020), included above, also considered health outcomes.

Table H.5 – Social connection outcomes

Study and methodology	Population and treatment	Findings
Schlotter 2011 RD and IV exploiting age cutoffs for entry to preschool in Germany; early social outcomes.	Children born in 1996 or 1997 in Germany. Children were able to enrol in preschool from the age of three.	Attending preschool from an earlier age increased a child's ability to make friends, as reported by their mother. A measure of assertiveness was also improved. These effects seemed to come from the earlier age when starting preschool and not just a longer duration in preschool.
Bach et al. 2019 IV exploiting differential levels of availability during an expansion of preschool in Germany; personality traits.	Children born between 1994 and 1996 in West Germany, who attended preschool at age three or four. Preschool was half-day and publicly funded.	Extroversion at age 15 was increased significantly by earlier preschool attendance. The authors note estimates of the relationship between extraversion and labour market outcomes could, when combined with these results, imply meaningful increases in employment and earnings. There was also a large but not significant increase in conscientiousness, with no evidence of effects on openness to experience, agreeableness or neuroticism.

Table H.6 – Shorter-term educational and skills development outcomes

Study and methodology	Population and treatment	Findings
Zachrisson et al. 2023 IV exploiting an expansion of access to early ECEC in Norway; medium-term educational outcomes.	Children born between 2002 and 2008 in Norway who attended ECEC by age 1.5. Data came from a survey that had high levels of attrition and underrepresented low-income and low-education families. There was a mix of publicly and privately provided CBDC. Typically, children attended in groups of nine children and three educators, one of whom was a degree-qualified teacher. Not all quality standards were strict requirements, although centres mostly followed guidelines. The counterfactual seemed to be primarily parental care for low-income families, and a mix of parental, informal and family day care for middle- and high-income children.	Regressions controlling for birth cohort in each municipality produced estimates of the effect of starting ECEC by age 1.5 on fifth grade math and reading test scores that were positive and at least marginally significant. IV estimates were positive and much larger, but only marginally significant. Effects were larger for children whose parents had lower levels of education, For children whose parents had lower incomes, effects seemed larger but by a smaller extent, and evidence of a difference was less clear.
Drange and Havnes 2019 IV exploiting random assignment to oversubscribed services in Norway; short-term educational outcomes.	Children aged 1-2 in Oslo, who were born between 2004 and 2006 and whose parents applied for a place in ECEC in the year they turned one. A random lottery determined which families were offered a place. Children could not be included in the analysis if they had a priority placement (for reasons such as disability) or had a private centre as their first preference. Children attended CBDC, which was typically open from 7:30am to 5pm and had an average ratio of about 3:10, including one degree-qualified teacher.	An offer of a place seemed to lead to children to attend centres with somewhat worse quality indicators and worse-performing peers, compared to those who were not offered a place but still attended ECEC at another centre, usually at a later age. Nonetheless, reduced-form estimates of the effect of being offered a place, and IV estimates of attending ECEC at an earlier age on maths and language test scores at age seven were positive.
Dearing et al. 2015 Birth month as IV for age of entry; early ECEC attendance and aggression.	Norwegian children who entered ECEC by 24 months old in Norway, between 2007 and 2010. It was rare for entry to occur before children were ten months old due to parental leave entitlements.	Children who entered ECEC at an earlier age had higher teacher-reported measures of aggression, but these measures also improved at a faster rate, with the difference disappearing by age four. IV estimates were imprecise and were not significant in showing higher reported aggression at earlier ages, but point estimates were similar to those from OLS and propensity score matching models.

Study and methodology	Population and treatment	Findings
		No specification showed associations between ECEC starting age and parent-reported aggression.
Yamaguchi et al. 2018 IV exploiting the staged rollout of an expansion of access to CBDC in Japan; short-term behavioural outcomes.	Children who were born between 2001 and 2010 and attended CDBC by age 2.5. To be eligible for subsidised ECEC, their parents had to have been unable to provide care due to a factor such as work. Where there was excess demand, single parents were generally prioritised. Children attended centre-based day care, with 94% of centres meeting Japan's quality standard. Educators were required to have a two-year postsecondary qualification, with a minimum ratio of 1:6 for children between the ages of one and two. About 90% of children spent at least seven hours each week in care, and more than 90% attended at least five days a week.	Childcare enrolment by age 2.5 led parents to spend more on their children (excluding expenditure on ECEC) and improved indicators of parenting quality for low-education mothers. Reduced-form and IV estimates of effects on a measure of language skills was positive, with this effect not varying by maternal education. There were no significant average effects on measures of aggression and inattention and hyperactivity, but the gap between children of high-education and low-education mothers was narrowed.
Felfe et al. 2015 DiD exploiting the rollout of three-year-old preschool in Spain; medium-term educational outcomes.	Children born in Spain between 1984 and 1993 in Spain, who attended preschool at age three. Preschool for three-year-olds, delivered in school settings with the same hours (9am-5pm, five days a week, excluding school holidays). Teachers were degree-qualified, with a maximum class size of 20. The expansion of preschool did not reduce use of private ECEC; rather the counterfactual seemed to be parental care (with informal care being fairly uncommon).	PISA reading test scores at age 15 were significantly increased, although maths scores were not significantly affected. There was a substantial but only marginally significant reduction in grade repetition in primary school. van Huizen et al. (2019) used these results alongside estimates of the effects of the reform on maternal employment to estimate a benefit-to-cost ratio of about 4.3, with most of these benefits stemming from improved childhood development.
Cornelissen et al. 2018 IV exploiting an expansion of access to ECEC in Germany; school readiness.	Three-to-six-year-old children in a region of Germany who attended half-day ECEC and entered school between 1994 and 2002. The reform mostly increased the proportion of children who commenced ECEC at age three and continued to attend until they started school. Educators had completed a two-year qualification and a one-year apprenticeship, and the median ratio was 1:9.4 (with the regulated	The average effect of ECEC attendance was not significant. For the children who did not attend, who were more likely to be from disadvantaged backgrounds, it was estimated that attending would have substantially improved a doctor-reported measure of school readiness. For the children who did attend, effects were not significant and of a much lower magnitude, but in the opposite direction.

Study and methodology	Population and treatment	Findings
	minimum ratio being 1:12.5). More than 90% of children attended for four hours in the morning. The counterfactual was mostly parental care and partly care from other relatives.	
Felfe and Lalive 2018 IV exploiting an expansion of access to early ECEC in Germany; school readiness.	Children in a different region of Germany who attended half-day ECEC before the age of three and entered school between 2009 and 2014. Centres were required to remain open for at least four hours a day. The average ratio was 1:10.1, and about 62% of staff were degree qualified. The counterfactual seemed to be parental care, with average use of other forms of care being low.	Early attendance of ECEC was found to improve motor and socio-emotional skills as measured by a school entry examination. There was not clear evidence of effects for language skills. More advantaged children seemed to benefit more in terms of motor skills, and more disadvantaged children seemed to benefit more in terms of socio-emotional skills.
Kuehnle and Oberfichtner 2017 RD exploiting age cutoffs in Germany; medium-term educational outcomes.	Children born in West Germany between 1994 and 1996, who started ECEC before age three. Children typically spent about four hours in ECEC a day.	Starting ECEC earlier, on average by five months, was not found to improve cognitive or noncognitive skills at age 15 or affect whether children entered academic or vocational school tracks. There was not robust evidence of effects for any subgroup.
Blanden et al. 2016 DiD exploiting the expansion of free part-time ECEC in England, medium-term academic outcomes.	Children in England who at age three attended ECEC due to the rollout of free part-time places, which primarily increased provision by CBDC services run by private, voluntary or independent providers, from 2002 to 2007. The number of average weekly hours in formal ECEC for children who attended any form of it was about 15. 50% of educators were required to hold a qualification equivalent to two years of post-compulsory schooling. If a degree-level-qualified teacher was present the minimum ratio requirement was 1:13; otherwise it was 1:8.	The increase in free places mostly crowded out private expenditure and increased usage to a lesser extent. An increase in the availability of free places was estimated to modestly improve age five literacy and numeracy scores and but not have effects by age seven, with very small but sometimes significant effects on age 11 reading scores. Effects seemed larger for lower-SES children.
Blanden et al. 2022	Children in England who attended private ECEC as soon as they were eligible at age three, and started school between the 2008 and 2011 academic years.	Attending an additional 3.5-month term of ECEC slightly increased the likelihood of being at or above the expected level on a teacher assessment of cognitive non-cognitive skills at age five, with no

Study and methodology	Population and treatment	Findings
RD exploiting the age cutoff for ECEC in England; short-term academic outcomes.	50% of educators were required to hold a qualification equivalent to two years of post-compulsory schooling. If a degree-level-qualified teacher or equivalent was present the minimum ratio requirement was 1:13; otherwise, it was 1:8. Centres were rated by the English education regulator about every four years. 1.5% were rated Inadequate, 15% Satisfactory, 55% Good and 13% Outstanding.	significant effect by age seven. Effects were stronger for the literacy component of the assessment. Effects of this addition term were no different when children attended centres where a greater proportion of the educators were qualified at the degree level. Effects were much larger for children attending a centre rated as Outstanding by the English education regulator, with no significant differences between those rated Good and those rated Inadequate or Satisfactory.
Corazzini et al. 2021 IV exploiting regional variation in availability in Italy; short-term academic outcomes.	Children in Italy who attended CBDC before the age of three and were in 5th grade between 2014 to 2017. Services were provided both publicly and privately, with this mix varying by area. In public settings, educators were required to hold a bachelor's degree in education sciences. The average weekly attendance was about 31 hours. The counterfactual for non-immigrant children may have primarily been grandparent care, with parental care more likely to be the counterfactual for immigrant children.	There were beneficial effects on language and maths school test scores for immigrant children, and adverse effects for non-immigrant children. Beneficial effects for immigrant children were limited to areas with higher shares of public provision. Adverse effects for non-immigrant children were limited to areas with lower shares of public provision.
Fort et al. 2020 RD exploiting an income eligibility cutoff for CBDC in Italy; cognitive outcomes.	Children in Bologna, Italy who attended CBDC before the age of two, whose parents applied for a place between 2001 and 2005. CBDC places were rationed based on a measure of SES, with lower-SES families being prioritised. Children close to the cutoff came from very affluent families and had average IQs that were significantly above average. The minimum ratio was 1:4 before age one and 1:6 between age one and two.	For children close to the eligibility cutoff, IQ through to age 14 was reduced by a greater amount of time in CBDC before the age of two. Measures of agreeableness and openness to experience were also worsened. Adverse effects were stronger for more advantaged children, and only significant for a group whose parents earned, on average, more than twice the national average income.

Study and methodology	Population and treatment	Findings
Carta and Rizzica 2018 RD exploiting age eligibility cutoffs for access to ECEC in Italy.	Children who attended one form of ECEC in Italy at age two, between 2013 and 2016. Services were open five to six days a week for eight hours a day, with a ratio of 1:11 and a requirement for educators to hold a diploma or degree in ECEC. They were mostly publicly provided. Alternative services were open five days a week for nine hours a day, with a ratio of 1:10 and the same educator qualification requirements. Provision was mostly private. Fees between the two service types were about the same for low-income families, but lower for the first type for higher-income families. There was an age threshold for entry into this first type of service, and the increase in participation this led to mostly came from parental or informal care, with a smaller reduction in use of other forms of ECEC.	Age seven school test scores were not significantly affected, overall and for children with different maternal education or paternal occupational status levels.
Berger et al. 2021 IV exploiting variation in attendance from birth time and from oversubscription to services in France; short-term cognitive and noncognitive outcomes.	Children in France who were born in 2011 and attended CBDC at age one. Services had minimum ratios of 1:5 for children who were not yet walking and 1:8 for older children. Staff included educators and paediatric nurses and were required to have subject-specific secondary or university qualifications. The counterfactual included FDC – with FDC educators required to complete 120 hours of training over their first three years of operation and follow a minimum ratio of 1:3.	CBDC attendance improved language skills at age two, but worsened mother-reported behavioural issues. Language benefits were larger when the counterfactual seemed to be parental or informal care rather than FDC or nanny care, and for disadvantaged children. Behavioural effects were only present when the counterfactual seemed to be parental or nanny care (not FDC or informal care), and were larger for advantaged children. The effect of the number of days attended per week could not be causally analysed, but language development was better in children who attended four or five days a week than in those who attended three days, who in turn performed better than who attended one or two days. For behavioural outcomes, children who attended three or

Study and methodology	Population and treatment	Findings
		five days performed better than those attending one, two or four days.
Leuven et al. 2006 Reduced-form analysis exploiting age cutoffs; early academic outcomes.	Dutch children who were in 2nd grade between 1994 and 2002 and had attended preschool at age four. Preschool for four-year-old children was run through the schooling system and taught by primary school teachers. The program ran for 24 hours a week, 41 weeks a year.	Being eligible to attend preschool for one additional month increased 2nd grade language and maths test scores for disadvantaged students, with there being no significant effects for non-disadvantaged students.
Berlinski et al. 2009 DiD exploiting the expansion of preschool in Argentina; early academic outcomes.	Children who attended preschool in Argentina, at least some of the time between the age of three and five, between 1991 and 2001 in Argentina. Preschools were linked to primary schools, and delivered a program 3.5 hours a day, five days a week, during the school year.	Preschool increased students' maths and Spanish test scores in the third grade. Teachers were more likely to report that students paid a lot of attention, put in a lot of effort and participated in class regularly. Benefits seemed larger in areas where the poverty rate was higher.
Felfe and Huber 2017 IV exploiting varying distances between families and their nearest centre in Europe; early cognitive outcomes.	Roma children in 12 central and south-eastern European countries, who attended preschool at three or older in 2011. The children in the sample experienced considerable levels of disadvantage. The characteristics of the preschool programs varied by country. Generally, services operated for at least 30 hours a week, with groups between 20 and 25 children.	There were significant improvements in early literacy and numeracy skills, and an increase in vaccination rates.
Szabó-Morvai et al. 2023 IV exploiting age eligibility cutoffs in Hungary; medium-term educational outcomes.	Children who attended universal preschool in Hungary from around age three. Preschool was compulsory at age five, although most children started attending at age three or four. Eligibility started in the calendar year that children turned three. For younger children, CBDC services with no pedagogical content were available but not commonly used.	Starting preschool at an earlier age increased school test scores in maths and reading through to grade ten. Effects were larger with children for lower maternal education levels.

Study and methodology	Population and treatment	Findings
Folkestad 2022 DiD exploiting a change allowing children whose parents were on parental leave to use ECEC in Sweden; medium-term academic outcomes.	Children born between 1993 and 2001 who attended ECEC in Sweden while their parents used paid parental leave and who had a younger sibling. The reform allowed children whose parents used parental leave to attend ECEC, if they had a younger sibling. Previously, this was only the case in some municipalities. Paid parental leave had a duration of 14-15 months during this time period. Children attended during a period of cuts to per-child funding and relaxations of ratio requirements in order to limit fiscal costs. The increases in full-time ECEC came from decreases in parental or informal care, FDC and part-time ECEC.	There was an insignificant positive effect on high school grade point average at age 16, with a significant positive effect on maths test scores. Effects seemed larger for children with higher levels of maternal education, although parental education levels could have been affected by the reform and were only measured when the children were at age 16.
Cascio 2023 DiD exploiting age eligibility cutoffs in 16 US states; short-term educational outcomes.	Children who were four years old in 2005 and attended universal or targeted preschool programs in one of 16 US states. In the targeted programs, eligibility was limited based on parental income or risk factors. Ten of the state programs were targeted and six were universal. These two groups of programs had similar costs on average, with the targeted programs performing slightly better on a measure of quality. The universal programs had less stringent training requirements but smaller classroom sizes, on average. Within each type of program, there was significant variation in indicators of quality.	Universal preschool programs led to (marginally) significant increases in test scores at age four, while targeted programs did not. This difference in effects could not be fully explained by differences in the observed characteristics of these programs. Benefits of the universal programs were driven by effects for low-SES children, who saw significant and much larger increases in test scores. The estimated benefit-to-cost ratio for universal preschool for four-year-olds was higher than the equivalent for universal kindergarten for five-year-olds. Other quasi-experimental analyses, each considering multiple US preschool programs, have also found positive effects on short-term academic outcomes from at least some of these programs (Bartik and Hershbein 2018; Wong et al. 2008; Zerpa 2018).
Chor et al. 2016 DiD exploiting changes to preschool availability in Queensland; short-term academic outcomes.	Children who attended preschool in Queensland at age four, around 2007 when a policy change reduced access.	Early vocabulary and school readiness scores were improved by access to preschool. There was an improvement in a measure of socioemotional development that was only significant for girls.

Study and methodology	Population and treatment	Findings
	Services were almost all managed by one not-for-profit provider. Children attended prior to the introduction of the National Quality Framework. The length of enrolment varied but was mostly from four to six months.	Effects did not seem to vary by maternal education levels.
Durkin et al. 2022 IV exploiting an admissions lottery in a US state; medium-term academic outcomes.	Children who attended preschool in Tennessee at age four in 2009 and 2010. The program was targeted at children of low-income families. The minimum daily instructional time was 5.5 hours, five day a week. The maximum class size was 20 with one teacher and one assistant. Oversubscribed services determined which families to offer a place to through a lottery. Almost two thirds of the children who were not offered a slot received home-based care, with the remainder split between Head Start and private CBDC.	Children offered a place had worse school test scores in sixth grade, and were more likely to be in special education programs. There were no significant effects on grade repetition. There was also an increase in school disciplinary infractions and a small but significant reduction in attendance.
Cascio and Schanzenbach 2013 DiD exploiting the introduction of two US state preschool programs; medium-term educational outcomes.	4-year-olds who attended universal state-funded preschool in Georgia and Oklahoma, around the time these programs became universal in 1995 and 1998, respectively. A disproportionate amount of the increase in enrolment caused by the introduction of these programs came from disadvantaged families. The programs had higher quality measures than most US state programs. There was a maximum class size of 20, with a degree-qualified teacher and an assistant. Oklahoma's program was school-based and Georgia's was run through private centres.	Accessing preschool caused mothers to spend less time in the presence of their children, but more time caring for or helping their children, for example reading to or doing art projects with them. For low-income children, fourth grade maths and reading test scores increased, although this only persisted through to eight grade for maths test scores. Effects for higher-income children were negative although not significant. Using estimates of the relationship between early test scores and later earnings, a benefit-to-cost ratio was estimated that depended on the assumptions used, but was at least three.
Bartik et al. 2012	Public school students in Tulsa, Oklahoma who attended preschool in the 2005-06 academic year at age four.	Tests for cognitive skills on kindergarten entry were significantly improved. Effects were significant regardless of children's eligibility for

Study and methodology	Population and treatment	Findings
RD exploiting age eligibility cutoff for a US state preschool program; short-term academic outcomes.	Preschools were located on school premises, and offered either half- or full-day programs. Full-day programs were more likely to be available in disadvantaged areas. Teachers were required to have a bachelor degree and there was a minimum ratio of 1:10. 42% of participants (although not necessarily 42% of compliers) were in other forms of ECEC prior to entering the program.	free or reduced-price lunch (an indicator of parental income), but were larger for children with low parental incomes. Effects for children who attended services that offered full-day programs seemed larger, although differential effects by program length could not be separated from differences in SES between areas where full-day programs were offered. Using estimates of the relationship between early test scores and later earnings, benefit-to-cost ratios of about three to four were estimated, depending on the assumptions used.
Montrosse-Moorhead et al. 2019 RD exploiting age eligibility cutoff for a US state preschool program; academic outcomes.	Children in Connecticut who attended preschool at age four between 2014 and 2016. The program was targeted at low-income or non-native English-speaking families and traditionally underserved racial groups. The program offered full-day and school-day versions (up to ten hours a day, 50 weeks a year, and six hours a day, 180 days a year, respectively). It also offered a 2.5-hour program, which was not studied.	There were significant benefits for early maths and reading scores, with positive but insignificant effects on oral language and receptive vocabulary scores. Effects seemed larger for students who were not eligible for free or reduced-price lunch.
Hustedt et al. 2021 RD exploiting age eligibility cutoff for a US state preschool program; early academic outcomes.	Children who attended preschool at age four in New Mexico between 2005 to 2010. Services were required to have at least two thirds of students come from low-income catchment zones. There was a maximum class size of 20, with a ratio of 1:10 and teachers required to be at least working towards a bachelor degree	Test scores on kindergarten entry across language, literacy and maths were significantly improved by preschool attendance.
Williams 2019 DiD exploiting the introduction of a US state preschool program; short-term educational outcomes.	4-year-old children in South Carolina who attended a targeted preschool program between 2005 and 2009. Children were eligible for the preschool program if they were also eligible for free or reduced-price lunch or Medicaid at age four.	There were increases in third- and fifth-grade test scores for children who were eligible to attend preschool earlier. Ineligible students saw smaller but still significant increases.

Study and methodology	Population and treatment	Findings
	A half-day program was provided by public and private schools. Children attended five days a week, for at least 6.5 hours a day. Food was provided as part of the program. There was a minimum ratio of 1:10 and in larger classes, was a requirement for a degree-qualified teacher and an assistant with at least two years' experience.	These could have been driven by spillovers from students who did attend. There was a significant reduction in involvement in disciplinary for children who were eligible (but not for those who were ineligible), from which ineligible children may have benefitted.
Figlio and Roth 2011 Sibling control and IV exploiting distance to services for a US state preschool program; behavioural outcomes.	Children who attended preschool in Florida at age four, who were born after 1989 and enrolled in school before 2002. Services were required to operate for at least six hours a day, five days a week during the school year, although could operate ten hours a day all year. There was a minimum ratio of 1:10 and lead teachers were required to hold an associate-level credential.	Preschool participation improved school disciplinary records, and children were less likely to be classified as emotionally disabled or severely emotionally disturbed. Effects seemed larger for children living in areas with greater levels of socio-economic disadvantage.
Baker et al. 2019 DiD exploiting a reform that introduced low-cost ECEC in Quebec, Canada; developmental, health and justice system outcomes.	Children aged 0-4 who attended ECEC in Quebec after low-cost ECEC was introduced in 1997. Children attended FDC or CBDC, with FDC more common at younger ages. There was a mix of public and private providers, although the expansion was almost entirely limited to private providers. After the reform, two-thirds of educators were required to have a diploma or degree in early childhood education, although this was often not met. FDC educators were required to have completed 24-45 hours of training. The maximum centre size increased from 60 to 80 and the minimum ratio for four-to-five-year-old children decreased from 1:8 to 1:10.	Short-term measures of behaviour and cognitive development worsened. There were significant benefits for PISA maths test scores at age 15, with smaller and insignificant positive effects on PISA reading and science scores. For school test scores, there negative but insignificant effects. In adolescence, self-reported physical health was worsened, although there was a small and insignificant improvement in self-reported mental health. Accusations of and convictions for criminal offences increased. Effects of ECEC could not be separated from the effects of changes in the quality of ECEC due to the reform. Kottelenberg and Lehrer (2013), for ECEC in Quebec in the same period, used an IV approach that could estimate effects for children who only attended due to the reform, at the quality level after the reform, and found adverse effects.

Study and methodology	Population and treatment	Findings
		They also used an inverse probability weighting[74] approach that could estimate effects for all children who attended ECEC in Quebec, at the quality level after the reform, finding beneficial effects on a measure of motor and social development (which DiD and IV models found to be adversely affected). These results could be consistent if adverse DiD and IV estimates were driven by reductions in ECEC quality due to the reform, with newly established services being low quality, while ECEC remained at a quality level high enough to benefit most children (on this measure at least). Montpetit et al. (2024) found no effects on high school graduation and positive but insignificant effects on the likelihood of completing a university degree, using more recent data with a broadly similar approach to Baker et al. (2019).

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[74] This technique is vulnerable to the issue with statistical bias from unobserved confounding factors described above. However, in this case this bias would have to be very high to fully account for the estimated effect.

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