Dube, Jonathan FIN:EX

From: Enemark, Gord FIN:EX
Sent: Wednesday, January 18, 2017 10:19 AM
To: Dube, Jonathan FIN:EX
Subject: FW: Embargoed report: $10/day Child Care in BC

Jamie would like to know if we can find out where the $1.5B cost estimate came from. Can you get Ryan to dig into that?

-----Original Message-----
From: Mirza, Sadaf FIN:EX
Sent: Monday, January 16, 2017 9:32 PM
To: Edwardson, Jamie GCPE:EX
Cc: Enemark, Gord FIN:EX; Galbraith, David J FIN:EX; McLachlin, Jessica GCPE:EX
Subject: Re: Embargoed report: $10/day Child Care in BC

Agree with that response Jamie. We don't have the capacity to review this extensive report on such short notice.

Thanks,
Sadaf

> On Jan 16, 2017, at 6:30 PM, Edwardson, Jamie GCPE:EX <Jamie.Edwardson@gov.bc.ca> wrote:
>
> Just got this from mcfd. s.13
s.13
>
> Sent from my BlackBerry 10 smartphone on the TELUS network.
> From: Lauvaas, Kirsten GCPE:EX <Kirsten.Lauvaas@gov.bc.ca>
> Sent: Monday, January 16, 2017 5:16 PM
> To: Edwardson, Jamie GCPE:EX; McLachlin, Jessica GCPE:EX
> Cc: Wolford, Jessica GCPE:EX; Gordon, Matt GCPE:EX; Johnston, Karen
> GCPE:EX; Wright, Brendan GCPE:EX
> Subject: Embargoed report: $10/day Child Care in BC
>
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> Hi Jamie,
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> We received an embargoed copy of a report commissioned by the Early Childhood Educators of BC re: $10/day child care that will go out tomorrow. Our ministry staff are reviewing and will provide us with some analysis, but it would be great if FIN staff could also review from a budget/economic lens.
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> We have a media request from the Vancouver Sun (Tara Carman) on this report. She is asking for an interview with Minister Cadieux and has posed some questions, which we'll provide responses on once we have more info/analysis:
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> 1. The report found that implementing the $10-a-day plan would be an economic benefit for B.C., with revenues exceeding expenses by $158 million annually on full implementation. They say that by 2030 it would add 1.8% to B.C.'s GDP and create 69,000 full-time equivalent jobs. (By 2020, 3 years from now, they say it would add 1.3% to GDP and 42,700 jobs. In that year it would also be a net gain of $112 million for BC government revenues, they argue.) If this is true, that the economic benefits for BC would come in 3 years or sooner (still waiting for the details on this), why is the

government not considering it? The government is, however, willing to invest in LNG and transportation infrastructure that also create jobs and requires upfront investment, so why not child care?
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> That said, we acknowledge the challenges many parents face when trying to balance raising a family with pursuing work and training opportunities – and we recognize that access to quality child care is an important part of finding that balance.
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> The B.C. government is working to ensure that parents have access to the supports and services they need to help them build a better future for their families. To that end, we have targeted our investments to improve child-care affordability for those who need it most:
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> · We invest $119.9 million annually for the Child Care Subsidy program, which currently supports approximately 20,000 B.C. children and their families with the cost of child care each month. As of April 2016, child-support payments are exempt and no longer influence eligibility for parents already receiving or applying for monthly child-care subsidies. This means that more B.C. parents will get additional help with the cost of child care each month.
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> · To help with the costs of raising a young child, the B.C. government provides about $137 million annually to approximately 180,000 families with children under the age of 6 through the B.C. Early Childhood Tax Benefit, which launched in April 2015.
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> · Government has created the Single Parent Employment Initiative (SPEI), which helps single parents on income assistance with child-care and transportation costs while they are enrolled in training programs and for up to a year after they re-enter the workforce.
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> · We understand that the federal government is working on a National Early Learning and Child Care Framework, and we look forward to working with them to continue strengthening early learning and child care in B.C.
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> The B.C. government has a number of programs and supports for parents to help offset the costs of child care, including an investment of $327.8 million for child care in 2016-17. This commitment includes:
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> · $26.5 million to support the creation of more than 4,300 new licensed child-care spaces in B.C. since 2014. These spaces build on the more than 113,000 licensed child-care spaces that are currently funded throughout the province, and are part of government's commitment to create 13,000 new licensed child-care spaces by 2020.
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> rts/caring-for-young-children/child-care>
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> -assistance/employment-planning/spei<http://www2.gov.bc.ca/gov/content
> /family-social-supports/income-assistance/on-assistance/employment-pla
> nning/spei>
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>
> Thanks,
> Kirsten Lauvaas
> Government Communications and Public Engagement Ministry of Children
> and Family Development
> Ph: 250 356-1553 | Cell: 250 213-5572
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> <10aDay C4SE economist report EMBARGOED TO JAN 18.pdf>

Dube, Jonathan FIN:EX

From: Piccott, Ryan FIN:EX
Sent: Wednesday, January 18, 2017 11:33 AM
To: Dube, Jonathan FIN:EX
Subject: Fwd: Embargoed report: $10/day Child Care in BC

Sent from my iPhone

Begin forwarded message:

> **From:** "Jones, Kathy G MCF:EX" <Kathy.Jones@gov.bc.ca>
> **Date:** January 18, 2017 at 11:11:40 AM PST
> **To:** "Minnings, Anne C MCF:EX" <Anne.Minnings@gov.bc.ca>, "Piccott, Ryan FIN:EX" <Ryan.Piccott@gov.bc.ca>
> **Subject: RE: Embargoed report: $10/day Child Care in BC**
>
> No…we were not involved in this calculation…it just appeared
>
> **From:** Minnings, Anne C MCF:EX
> **Sent:** Wednesday, January 18, 2017 11:06 AM
> **To:** Piccott, Ryan FIN:EX; Jones, Kathy G MCF:EX
> **Subject:** RE: Embargoed report: $10/day Child Care in BC
> I don't think that was a ministry estimate, it was developed by an interest group a number of years ago.
> Kathy, do you have further info?
> *Anne Minnings*
> Executive Director and CFO
> Children and Family Development
> Phone: 250-356-2954
> Mobile: 250-514-9623
>
> **From:** Piccott, Ryan FIN:EX
> **Sent:** Wednesday, January 18, 2017 10:59 AM
> **To:** Minnings, Anne C MCF:EX
> **Subject:** FW: Embargoed report: $10/day Child Care in BC
> Hi Anne,
> My understanding from what has been widely reported is that CFD provided the estimate of $1.5B for a $10/day child care program. Do you know where in the ministry this estimate came from? What some of the major assumptions would be?
> Thanks,
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Cc: Wolford, Jessica GCPE:EX; Gordon, Matt GCPE:EX; Johnston, Karen GCPE:EX; Wright, Brendan GCPE:EX

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To create a universal $10-a-day child care plan would cost tax payers roughly $1.5 billion per year. The NDP's proposed child care plan would increase taxes on those earning more than $150,000 a year, which will generate $200 million a year. This makes a shortfall of $1.3 billion that would need to be generated through additional tax increases or cuts. This simply isn't feasible.

That said, we acknowledge the challenges many parents face when trying to balance raising a family with pursuing work and training opportunities - and we recognize that access to quality child care is an important part of finding that balance.

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* To help with the costs of raising a young child, the B.C. government provides about $137 million annually to approximately 180,000 families with children under the age of 6 through the B.C. Early Childhood Tax Benefit, which launched in April 2015.

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For information about SPEI, please visit:

www2.gov.bc.ca/gov/content/family-social-supports/income-assistance/on-assistance/employment-planning/spei<http://www2.gov.bc.ca/gov/content/family-social-supports/income-assistance/on-assistance/employment-planning/spei>

Thanks,

Kirsten Lauvaas
Government Communications and Public Engagement Ministry of Children and Family Development
Ph: 250 356-1553 | Cell: 250 213-5572

Dube, Jonathan FIN:EX

From: Dube, Jonathan FIN:EX
Sent: Wednesday, January 18, 2017 1:19 PM
To: Edwardson, Jamie GCPE:EX
Cc: Mirza, Sadaf FIN:EX

There is reference to the $1.5B estimate in the following news article from July 2012.

http://www.cbc.ca/news/canada/british-columbia/daycare-advocates-seek-10-a-day-plan-for-b-c-1.1231804

There is also this which provides a 2016 update from the Coalition of Child Care Advocates of BC's proposed plan from April 2011:

http://www.10aday.ca/

CFD advises that the estimate originated from the organization...maybe CFD or perhaps FIN did some analysis at that time...although Sadaf and I are unable to recall anything coming from FIN.

Jonathan Dubé
Executive Director
Treasury Board Staff
Ministry of Finance
Tel: 250-387-9043| Mobile: 250-507-2327 | Fax: 250-356-7624
E-mail: Jonathan.Dube@gov.bc.ca

Dube, Jonathan FIN:EX

From: Piccott, Ryan FIN:EX
Sent: Wednesday, January 18, 2017 3:34 PM
To: Dube, Jonathan FIN:EX
Subject: RE: Embargoed report: $10/day Child Care in BC

Looks like those costing assumptions go back to a 2009 UBC report.

Pg. 25

http://earlylearning.ubc.ca/media/publications/15by15-full-report.pdf

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From: Dube, Jonathan FIN:EX
Sent: Wednesday, January 18, 2017 12:49 PM
To: Piccott, Ryan FIN:EX
Subject: RE: Embargoed report: $10/day Child Care in BC

As discussed...Friday please.

From: Piccott, Ryan FIN:EX
Sent: Wednesday, January 18, 2017 12:38 PM
To: Dube, Jonathan FIN:EX
Subject: RE: Embargoed report: $10/day Child Care in BC

When do you need an eyes note on the most recent cab proposal?

From: Piccott, Ryan FIN:EX
Sent: Wednesday, January 18, 2017 12:33 PM
To: Dube, Jonathan FIN:EX
Subject: FW: Embargoed report: $10/day Child Care in BC

Did some digging...

The organisation is "The Coalition of Child Care Advocates of B.C."

http://www.cbc.ca/news/canada/british-columbia/daycare-advocates-seek-10-a-day-plan-for-b-c-1.1231804

There is a 10aDay Child Care Campaign, a partnership between the Early Childhood Educators of BC and the Coalition of Child Care Advocates of BC
http://www.10aday.ca/

R

From: Minnings, Anne C MCF:EX
Sent: Wednesday, January 18, 2017 12:04 PM
To: Piccott, Ryan FIN:EX; Jones, Kathy G MCF:EX
Subject: RE: Embargoed report: $10/day Child Care in BC

It dates back to 2012 or so. Sorry, but I don't recall the name of the organization.

Anne Minnings
Executive Director and CFO
Children and Family Development
Phone: 250-356-2954
Mobile: 250-514-9623

From: Piccott, Ryan FIN:EX
Sent: Wednesday, January 18, 2017 11:53 AM
To: Jones, Kathy G MCF:EX; Minnings, Anne C MCF:EX
Subject: RE: Embargoed report: $10/day Child Care in BC

Do either of you happen to know what report or interest group this calculation came from? Curious it was reported as provided by the ministry.

From: Jones, Kathy G MCF:EX
Sent: Wednesday, January 18, 2017 11:12 AM
To: Minnings, Anne C MCF:EX; Piccott, Ryan FIN:EX
Subject: RE: Embargoed report: $10/day Child Care in BC

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Subject: RE: Embargoed report: $10/day Child Care in BC

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Government Communications and Public Engagement Ministry of Children and Family Development
Ph: 250 356-1553 | Cell: 250 213-5572

Dube, Jonathan FIN:EX

From: Mirza, Sadaf FIN:EX
Sent: Wednesday, January 18, 2017 4:25 PM
To: Dube, Jonathan FIN:EX
Subject: FW: Embargoed report: $10/day Child Care in BC
Attachments: Preliminary comments on Impact Analysis of Child Care.docx

FYI

-----Original Message-----
From: Mirza, Sadaf FIN:EX
Sent: Wednesday, January 18, 2017 4:05 PM
To: Enemark, Gord FIN:EX
Cc: Edwardson, Jamie GCPE:EX; Galbraith, David J FIN:EX; McLachlin, Jessica GCPE:EX; Hincks, Nicholas FIN:EX; Sehic, Eldar FIN:EX
Subject: RE: Embargoed report: $10/day Child Care in BC

Hi Jamie: Attached are some comments on the report. We have consulted with Lillian Hallin at BC Stats who runs the BC IO Model, and her comments are incorporated.

Hope this helps. Please let me know if you have any questions.

Thanks,
Sadaf

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To: Mirza, Sadaf FIN:EX
Cc: Edwardson, Jamie GCPE:EX; Galbraith, David J FIN:EX; McLachlin, Jessica GCPE:EX
Subject: Re: Embargoed report: $10/day Child Care in BC

Assume your guys will begin to review the report though? Reminds me of the "tax cuts pay for themselves" argument!

Gord Enemark, TBS
Cell: 250 217 6130

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>> We have a media request from the Vancouver Sun (Tara Carman) on this report. She is asking for an interview with Minister Cadieux and has posed some questions, which we'll provide responses on once we have more info/analysis:
>>
>> 1. The report found that implementing the $10-a-day plan would be an economic benefit for B.C., with revenues exceeding expenses by $158 million annually on full implementation. They say that by 2030 it would add 1.8% to B.C.'s GDP and create 69,000 full-time equivalent jobs. (By 2020, 3 years from now, they say it would add 1.3% to GDP and 42,700 jobs. In that year it would also be a net gain of $112 million for BC government revenues, they argue.) If this is true, that the economic benefits for BC would come in 3 years or sooner (still waiting for the details on this), why is the government not considering it? The government is, however, willing to invest in LNG and transportation infrastructure that also create jobs and requires upfront investment, so why not child care?
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>>
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>> To create a universal $10-a-day child care plan would cost tax payers roughly $1.5 billion per year. The NDP's proposed child care plan would increase taxes on those earning more than $150,000 a year, which will generate $200 million a year. This makes a shortfall of $1.3 billion that would need to be generated through additional tax increases or cuts. This simply isn't feasible.
>>
>>
>> That said, we acknowledge the challenges many parents face when trying to balance raising a family with pursuing work and training opportunities – and we recognize that access to quality child care is an important part of finding that balance.
>>
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>> The B.C. government is working to ensure that parents have access to the supports and services they need to help them build a better future for their families. To that end, we have targeted our investments to improve child-care affordability for those who need it most:
>>
>>
>>
>> · We invest $119.9 million annually for the Child Care Subsidy program, which currently supports approximately 20,000 B.C. children and their families with the cost of child care each month. As of April 2016, child-support payments are exempt and no longer influence eligibility for parents already receiving or applying for monthly child-care subsidies. This means that more B.C. parents will get additional help with the cost of child care each month.
>>
>>
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>> · To help with the costs of raising a young child, the B.C. government provides about $137 million annually to approximately 180,000 families with children under the age of 6 through the B.C. Early Childhood Tax Benefit, which launched in April 2015.
>>
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>> · Government has created the Single Parent Employment Initiative (SPEI), which helps single parents on income assistance with child-care and transportation costs while they are enrolled in training programs and for up to a year after they re-enter the workforce.
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>> · We understand that the federal government is working on a National Early Learning and Child Care Framework, and we look forward to working with them to continue strengthening early learning and child care in B.C.
>>
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>> The B.C. government has a number of programs and supports for parents to help offset the costs of child care, including an investment of $327.8 million for child care in 2016-17. This commitment includes:
>>
>>
>>
>> · $26.5 million to support the creation of more than 4,300 new licensed child-care spaces in B.C. since 2014. These spaces build on the more than 113,000 licensed child-care spaces that are currently funded throughout the province, and are part of government's commitment to create 13,000 new licensed child-care spaces by 2020.
>>
>>
>>
>> · With these new child-care spaces comes the need for new Early Childhood Educators. The Province has invested more than $2 million, in partnership with the Early Childhood Educators of B.C., in an Early Childhood Education Bursary that encourages citizens to pursue a careers in this field.
>>
>>
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>> · There are currently more than 7,000 licensed child-care facilities in B.C., of which approximately 5,000 share $89 million in Child Care Operating Funding from the B.C. government. This funding helps these providers cover day-to-day operating costs, like keeping parent fees more affordable, providing fair salaries and maintaining quality services.
>>
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>> We also have a new online Child Care Map helps parents take the guesswork out of finding child care for their children. The map includes information for child-care operators who receive Child Care Operating Funding. It provides busy parents with quick, at-a-glance information that shows – for each facility in a parent's desired location:
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>> · If there are any available spaces
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>> This is one of only three child-care maps in all of Canada that show which centres have vacancies: www.gov.bc.ca/findchildcare<http://www.gov.bc.ca/findchildcare> This may not solve the issues of waitlists in all regions, but it's a tool parents can use to help narrow their search for available spaces.
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>> For more information about child-care programs in B.C. please visit:
>> www2.gov.bc.ca/gov/content/family-social-supports/caring-for-young-ch
>> ildren/child-care<http://www2.gov.bc.ca/gov/content/family-social-sup
>> ports/caring-for-young-children/child-care>
>>
>>
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>> For information about SPEI, please visit:
>> www2.gov.bc.ca/gov/content/family-social-supports/income-assistance/o
>> n-assistance/employment-planning/spei<http://www2.gov.bc.ca/gov/conte
>> nt/family-social-supports/income-assistance/on-assistance/employment-
>> planning/spei>
>>
>>
>>
>> Thanks,
>> Kirsten Lauvaas
>> Government Communications and Public Engagement Ministry of Children
>> and Family Development
>> Ph: 250 356-1553 | Cell: 250 213-5572
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>> <10aDay C4SE economist report EMBARGOED TO JAN 18.pdf>

Preliminary Comments on the Report "Socio-Economic Impact Analysis of the $10aDay Child Care Plan for British Columbia"

- **A January 2017 study commissioned by the Early Childhood Educators of BC concluded that implementing $10 a day child care in BC would lead to large GDP and job increases and have a positive impact on the government's budget balance.**
- **However, there are general concerns about the way the study was conducted and some of the assumptions underpinning the work, particularly as they relate to using input-output multipliers with a sector that receives government funding through subsidies.**
- **A thorough review of the subject by BC Stats could take up to a month.**

Summary of the Report

- The study examines the socio-economic benefits of implementing a child care plan to reduce the cost to parents to $10 a day.
- The report estimates the cost of the plan and uses those estimates along with Statistics Canada's input-output (IO) methodology to calculate the impact of the expansion and operation of the program on the BC economy.
- The analysis projects that full implementation of the plan will increase GDP by $5.8 billion, increase employment by 68,900 jobs (both by 2030) and generate sufficient overall government sector revenues to pay for the additional government spending required to build and operate the system.

Preliminary Concerns

- According to BC Stats, there are potential problems in applying IO multipliers to sectors where there are subsidies. Because of the way multipliers are calculated, the use of standard multipliers in sectors such as day care (where there are significant subsidies) will produce misleading results if the multipliers are applied to expenditure data.
    - If the proportion of expenditures that is subsidized increases, standard multipliers must be recalibrated to explicitly take into account the change in the proportion of total spending that is subsidized. If this is not done, the estimated GDP, employment and revenues based on standard multipliers will be incorrect. It is not clear how subsidies are treated in this work.
- While IO analysis can be practical and useful, it is also limited by its many assumptions, which include the following:
    - assumption of fixed prices and wages,
    - use of sector averages,
    - assumption of sectors operating at capacity (eg. if all child care centres are built they will be filled immediately), and
    - a lack of capacity constraints (eg. unlimited supply of labour and other inputs).
- There are potential concerns regarding the use of existing subsidies towards the proposed child care program, as well as any displacement of services resulting from the program.

- It appears that the costs and benefits presented in the report are not separated by level of government (federal, provincial or local), which matter from a provincial budget balance perspective:

  "Finally, the analysis confirms that the projected benefits to government are shared between the B.C. and federal governments. The province is responsible for child care and the increased expenditures associated with the Plan, while the federal government receives a higher portion of the revenues because of its generally higher tax rates. Thus, it is reasonable to anticipate a cost-shared approach to financing the $10aDay Plan, with the federal government contributing at a level that is commensurate with its expected gain in revenues. "

- IO modeling requires consideration of many factors to arrive at a justified conclusion, especially when dealing with sectors which receive subsidies. BC Stats maintains a BC-specific IO model and are familiar with the challenges associated with this type of work.
  - BC Stats estimates that it could take up to a month to do a thorough review of this report's findings, including running their own estimates.
  - On cursory review, BC Stats cautions that some of the multipliers in this report appear to be on the high side; however, they would need to do more work to verify.

Mirza, Sadaf FIN:EX

From: Dube, Jonathan FIN:EX
Sent: Wednesday, January 18, 2017 1:20 PM
To: Edwardson, Jamie GCPE:EX
Cc: Mirza, Sadaf FIN:EX

There is reference to the $1.5B estimate in the following news article from July 2012.

http://www.cbc.ca/news/canada/british-columbia/daycare-advocates-seek-10-a-day-plan-for-b-c-1.1231804

There is also this which provides a 2016 update from the Coalition of Child Care Advocates of BC's proposed plan from April 2011:

http://www.10aday.ca/

CFD advises that the estimate originated from the organization...maybe CFD or perhaps FIN did some analysis at that time...although Sadaf and I are unable to recall anything coming from FIN.

Jonathan Dubé
Executive Director
Treasury Board Staff
Ministry of Finance
Tel: 250-387-9043 | Mobile: 250-507-2327 | Fax: 250-356-7624
E-mail: Jonathan.Dube@gov.bc.ca

Mirza, Sadaf FIN:EX

From: Hallin, Lillian MTIC:EX
Sent: Wednesday, January 18, 2017 11:11 AM
To: Mirza, Sadaf FIN:EX
Cc: Hincks, Nicholas FIN:EX; Sehic, Eldar FIN:EX
Subject: RE: call this morning
Attachments: Input-Output Multipliers Provincial Detailed - GDP 2010.xls; Input-Output Multipliers Provincial Detailed 2010.xls

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From: Mirza, Sadaf FIN:EX
Sent: Wednesday, January 18, 2017 10:18 AM
To: Hallin, Lillian MTIC:EX
Cc: Hincks, Nicholas FIN:EX; Sehic, Eldar FIN:EX
Subject: call this morning

Hi Lillian: I'm stuck in meetings this morning, but I've asked Nick and Eldar to give you a call to discuss what we talked about yesterday. Thanks!

Thanks,
Sadaf

Mirza, Sadaf FIN:EX

From: Hallin, Lillian MTIC:EX
Sent: Wednesday, January 18, 2017 11:12 AM
To: Mirza, Sadaf FIN:EX
Cc: Hincks, Nicholas FIN:EX; Sehic, Eldar FIN:EX
Subject: RE: call this morning
Attachments: 2011 Multipliers.xlsx

From: Hallin, Lillian MTIC:EX
Sent: Wednesday, January 18, 2017 11:11 AM
To: Mirza, Sadaf FIN:EX
Cc: Hincks, Nicholas FIN:EX; Sehic, Eldar FIN:EX
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Sent: Wednesday, January 18, 2017 10:18 AM
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Sadaf

Sehic, Eldar FIN:EX

From: Hincks, Nicholas FIN:EX
Sent: Wednesday, January 18, 2017 2:15 PM
To: Hallin, Lillian MTIC:EX
Cc: Mirza, Sadaf FIN:EX; Sehic, Eldar FIN:EX
Subject: Impact analysis of day care
Attachments: Impact analysis of day care.docx

Hello Lillian,

Thank you for your comments earlier. As we discussed, here are our drafted preliminary comments for your review. We are hoping to get these comments out quickly; if you could take a look at this soon and let us know if it summarizes your views accurately, we would appreciate it!

Best Regards,
Nicholas

Page 27

Withheld pursuant to/removed as

s.13

Mirza, Sadaf FIN:EX

From: Hallin, Lillian MTIC:EX
Sent: Wednesday, January 18, 2017 2:34 PM
To: Hincks, Nicholas FIN:EX
Cc: Mirza, Sadaf FIN:EX; Sehic, Eldar FIN:EX
Subject: RE: Impact analysis of day care

Hi,

This looks good. Just a couple of comments:

s.13

You might want to consider strengthening that statement to something like:
Because of the way multipliers are calculated, the use of standard multipliers in industries such as day care (where there are significant subsidies) will produce misleading results if the multipliers are applied to expenditure data.
If the proportion of expenditures that is subsidized increases, standard multipliers must be recalibrated to explicitly take into account the change in the proportion of total spending that is subsidized. If this is not done, the estimated GDP, employment and revenues based on standard multipliers will be overstated. It is not clear how subsidies are treated in this work.

s.13

Let me know if you have any further questions.

From: Hincks, Nicholas FIN:EX
Sent: Wednesday, January 18, 2017 2:15 PM
To: Hallin, Lillian MTIC:EX
Cc: Mirza, Sadaf FIN:EX; Sehic, Eldar FIN:EX
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Hincks, Nicholas FIN:EX

From: Mirza, Sadaf FIN:EX
Sent: Tuesday, January 17, 2017 8:12 AM
To: Hincks, Nicholas FIN:EX; Sehic, Eldar FIN:EX
Subject: FW: Embargoed report: $10/day Child Care in BC
Attachments: 10aDay C4SE economist report EMBARGOED TO JAN 18.pdf

FYI

From: Edwardson, Jamie GCPE:EX
Sent: Monday, January 16, 2017 6:31 PM
To: Enemark, Gord FIN:EX; Mirza, Sadaf FIN:EX
Cc: Galbraith, David J FIN:EX; McLachlin, Jessica GCPE:EX
Subject: Fw: Embargoed report: $10/day Child Care in BC

Just got this from mcfd. s.13
s.13

Sent from my BlackBerry 10 smartphone on the TELUS network.

From: Lauvaas, Kirsten GCPE:EX <Kirsten.Lauvaas@gov.bc.ca>
Sent: Monday, January 16, 2017 5:16 PM
To: Edwardson, Jamie GCPE:EX; McLachlin, Jessica GCPE:EX
Cc: Wolford, Jessica GCPE:EX; Gordon, Matt GCPE:EX; Johnston, Karen GCPE:EX; Wright, Brendan GCPE:EX
Subject: Embargoed report: $10/day Child Care in BC

Hi Jamie,

We received an embargoed copy of a report commissioned by the Early Childhood Educators of BC re: $10/day child care that will go out tomorrow. Our ministry staff are reviewing and will provide us with some analysis, but it would be great if FIN staff could also review from a budget/economic lens.

We have a media request from the Vancouver Sun (Tara Carman) on this report. She is asking for an interview with Minister Cadieux and has posed some questions, which we'll provide responses on once we have more info/analysis:

1. **The report found that implementing the $10-a-day plan would be an economic benefit for B.C., with revenues exceeding expenses by $158 million annually on full implementation. They say that by 2030 it would add 1.8% to B.C.'s GDP and create 69,000 full-time equivalent jobs. (By 2020, 3 years from now, they say it would add 1.3% to GDP and 42,700 jobs. In that year it would also be a net gain of $112 million for BC government revenues, they argue.) If this is true, that the economic benefits for BC would come in 3 years or sooner (still waiting for the details on this), why is the government not considering it? The government is, however, willing to invest in LNG and transportation infrastructure that also create jobs and requires upfront investment, so why not child care?**
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Here's what we provided to her so far (from recent responses on child care):

To create a universal $10-a-day child care plan would cost tax payers roughly $1.5 billion per year. The NDP's proposed child care plan would increase taxes on those earning more than $150,000 a year, which will generate $200 million a year. This makes a shortfall of $1.3 billion that would need to be generated through additional tax increases or cuts. This simply isn't feasible.

That said, we acknowledge the challenges many parents face when trying to balance raising a family with pursuing work and training opportunities – and we recognize that access to quality child care is an important part of finding that balance.

The B.C. government is working to ensure that parents have access to the supports and services they need to help them build a better future for their families. To that end, we have targeted our investments to improve child-care affordability for those who need it most:

- We invest $119.9 million annually for the Child Care Subsidy program, which currently supports approximately 20,000 B.C. children and their families with the cost of child care each month. As of April 2016, child-support payments are exempt and no longer influence eligibility for parents already receiving or applying for monthly child-care subsidies. This means that more B.C. parents will get additional help with the cost of child care each month.

- To help with the costs of raising a young child, the B.C. government provides about $137 million annually to approximately 180,000 families with children under the age of 6 through the B.C. Early Childhood Tax Benefit, which launched in April 2015.

- Government has created the Single Parent Employment Initiative (SPEI), which helps single parents on income assistance with child-care and transportation costs while they are enrolled in training programs and for up to a year after they re-enter the workforce.

- We understand that the federal government is working on a National Early Learning and Child Care Framework, and we look forward to working with them to continue strengthening early learning and child care in B.C.

The B.C. government has a number of programs and supports for parents to help offset the costs of child care, including an investment of $327.8 million for child care in 2016-17. This commitment includes:

- $26.5 million to support the creation of more than 4,300 new licensed child-care spaces in B.C. since 2014. These spaces build on the more than 113,000 licensed child-care spaces that are currently funded throughout the province, and are part of government's commitment to create 13,000 new licensed child-care spaces by 2020.

- With these new child-care spaces comes the need for new Early Childhood Educators. The Province has invested more than $2 million, in partnership with the Early Childhood Educators of B.C., in an Early Childhood Education Bursary that encourages citizens to pursue a careers in this field.

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We also have a new online Child Care Map helps parents take the guesswork out of finding child care for their children. The map includes information for child-care operators who receive Child Care Operating Funding. It provides busy parents with quick, at-a-glance information that shows – for each facility in a parent's desired location:

- What programs are offered
- If there are any available spaces
- Contact information
- Hours of operation, and more.

This is one of only three child-care maps in all of Canada that show which centres have vacancies: www.gov.bc.ca/findchildcare This may not solve the issues of waitlists in all regions, but it's a tool parents can use to help narrow their search for available spaces.

For more information about child-care programs in B.C. please visit: www2.gov.bc.ca/gov/content/family-social-supports/caring-for-young-children/child-care

For information about SPEI, please visit: www2.gov.bc.ca/gov/content/family-social-supports/income-assistance/on-assistance/employment-planning/spei

Thanks,

Kirsten Lauvaas
Government Communications and Public Engagement
Ministry of Children and Family Development
Ph: 250 356-1553 | Cell: 250 213-5572

Socio-Economic Impact Analysis of the $10aDay Child Care Plan for British Columbia

Prepared by:

Robert Fairholm, Centre for Spatial Economics, and Lynell Anderson, CPA, CGA

Prepared for:

Early Childhood Educators of BC

January 2017

NOT FOR IMMEDIATE RELEASE – EMBARGOED UNTIL WEDNESDAY, JANUARY 18, 2017

C4SE

Assessing past, present and future economic and demographic change in Canada

ECEBC | early childhood educators of BC

ABSTRACT: The Early Childhood Educators of BC commissioned an examination of the proposed $10aDay Child Care Plan for the province of British Columbia. The focus of this study is on the socio-economic benefits over the implementation period and subsequent operations through 2030. Therefore only the short-to-medium term effects of the plan on British Columbia are included in the impact analysis.

The report estimates the cost of the plan, summarises the available evidence regarding the socio-economic benefits and costs of early childhood education and care, and uses those estimates along with detailed input-output multiplier effects to calculate the impact on the B.C. economy from the expansion and operation of the child care system as proposed in the $10aDay Plan.

Socio-Economic Impact Analysis of the $10aDay Child Care Plan for British Columbia

Prepared by: Robert Fairholm, Centre for Spatial Economics, and Lynell Anderson, CPA, CGA

Prepared for: Early Childhood Educators of BC

January 2017

ACKNOWLEDGEMENTS: The Early Childhood Educators of BC would like to thank Lochmaddy Foundation for their generous funding support for this project.

Thanks also to principal author Robert Fairholm of the Centre for Spatial Economics, and Lynell Anderson.

Any errors or omissions are the responsibility of the authors. The views in this report reflect those of the authors and do not necessarily reflect those of the publishers or funders.

Questions or comments about this report can be sent to: Robert Fairholm, (416) 346-2739, rfairholm@c4se.com or Lynell Anderson, (604) 313-6904, lynellanderson74@gmail.com

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SUMMARY OF KEY FINDINGS

THIS STUDY ESTIMATES the short-term socio-economic impacts arising from the implementation and operation of the proposed $10aDay Child Care Plan for the province of British Columbia.[1] The analysis considers several impacts on the provincial economy, including the economic effects from the construction and operation of the new system and the resulting increase in mothers' labour supply. The analysis also illustrates the impact on the government sector's revenues and expenditures.

In summary, based on the assumptions outlined throughout this report, the implementation of the $10aDay Child Care Plan is projected to generate sufficient overall government sector revenues to pay for the additional government spending required to build and operate the system. The underlying assumptions are conservative, particularly related to the projected increase in mothers' labour supply.

This analysis also projects substantial benefits to employers and households throughout the implementation period, and beyond. Full implementation of the $10aDay Plan will have a significant and positive impact on GDP and jobs. The increase to GDP is estimated at close to 2.0 per cent or $5.787 billion on full implementation, which is more than 3.0 times the total cost increase to government associated with the Plan (including both construction and operational costs). Increased employment on full implementation is in the range of 2.8 per cent, or 69,100 net new FTE jobs, which is an employment multiplier of 36.4 jobs per million dollars of spending. Both of these multipliers are well above the benefits the province conventionally expects to receive from other investments.

Moreover, it is likely that these gains will provide particularly significant benefits to single mothers, and help many families to leave social assistance, which will reduce income inequality.

Based on the assumptions outlined throughout this report, the implementation of the $10aDay Child Care Plan is projected to generate sufficient overall government sector revenues to pay for the additional government spending required to build and operate the system.

1 For more information about the $10aDay Child Care Plan, also known as the *Community Plan for a Public System of Integrated Early Care & Learning*, see ecebc.ca/news/integrated_project.html and 10aDay.ca.

The study also compared the economic impacts of the $10aDay Plan to a scenario that charges parent fees at $20 per day. Both approaches are projected to realize positive government budget balances, although the $10aDay Plan requires a higher level of direct government spending and the projected overall budget balance is lower. However, the $10aDay Plan results in a higher number of children utilizing child care, more mothers returning to work, and a larger increase in overall GDP and jobs.

Although the analysis focuses on the near-term implications of the $10aDay Plan, research indicates that the benefits should increase over time, as children who benefit from high quality, affordable child care enter adulthood healthier, better educated, and less likely to be involved in the criminal justice system — all of which contribute to higher earnings, higher tax revenues for governments, and reduced government spending.

The study also compared the economic impacts with a $20 per day scenario, and found that the $10aDay Plan results in a higher number of children utilizing child care, more mothers returning to work, and a larger increase in overall GDP and jobs.

Finally, the analysis confirms that the projected benefits to government are shared between the B.C. and federal governments. The province is responsible for child care and the increased expenditures associated with the Plan, while the federal government receives a higher portion of the revenues because of its generally higher tax rates. Thus, it is reasonable to anticipate a cost-shared approach to financing the $10aDay Plan, with the federal government contributing at a level that is commensurate with its expected gain in revenues.

EXECUTIVE SUMMARY

THIS STUDY ESTIMATES the short-term socio-economic impacts arising from the implementation and operation of the proposed $10aDay Child Care Plan (the Plan)[2] for the province of British Columbia. The analysis considers several impacts on the provincial economy, including the economic effects from the construction and operation of the new system and the resulting increase in mothers' labour supply. The analysis also illustrates the impact on the government sector's revenues and expenditures.

The study consists of three phases: costing review; benefits review; and impacts of the $10aDay Plan.

The analysis projects that full implementation of the $10aDay Plan will have a significant and positive impact on GDP and jobs, and will generate sufficient overall government sector revenues to pay for the additional government spending required to build and operate the system.

The analysis considers several impacts on the provincial economy, including the economic effects from the construction and operation of the new system and the resulting increase in mothers' labour supply.

TOTAL IMPACT

	2020	2025	2030
Total GDP ($2015 millions)	3,616.4	5,787.4	5,767.5
% of BC GDP	1.3%	2.0%	1.8%
Total employment	42,700	69,100	68,900
% of BC employment	1.7%	2.8%	2.7%
Increase in government revenues	$2015 millions		
	1,234.7	1,952.4	1,932.5
Increase in government expenditures	1,122.6	1,794.3	1,748.4
Budget balance	**112.1**	**158.1**	**184.1**

2 For more information about the $10aDay Child Care Plan, also known as the *Community Plan for a Public System of Integrated Early Care & Learning*, see ecebc.ca/news/integrated_project.html and 10aDay.ca.

Phase 1: Costing Review

The child care costing model developed by Anderson and colleagues calculated the incremental annual government expenditures required to operate the $10aDay Plan, on full implementation, at $1.5 billion.[3] For the purpose of this study, Anderson updated the model to reflect recent and substantive changes to child care policy, such as the introduction of full school-day kindergarten, along with population projections through the implementation period and beyond. For the first time, the updated model incorporates estimates of the government expenditures (capital costs) required for construction of new, stand-alone child care spaces. Anderson estimates that government will need to directly fund the creation of 31,215 (net, FTE) new spaces and that each space will cost on average $10,000 in 2015 dollars (real or inflation adjusted dollars).[4] In the impact calculations, the $312.2 million in real construction expenditures are evenly distributed throughout the implementation period.

To ensure that child care fees are reduced to $10 per day, and sustained at that level, the provincial government will provide subsidies and transfers to all eligible regulated child care providers. Consequently, operational costs to the B.C. government from expanding the system will be significantly higher than the projected public spending without the Plan. On full implementation, Anderson estimates that the total real operating and administrative costs of the new system will be $1.777 billion, net of parent fees ($2.083-$0.306). Anderson also estimates that the direct provincial subsidies currently provided to the child care sector are $224.0 million, which brings the incremental annual public cost to $1.553 billion ($1.777-$0.224) — similar to the original projection developed in 2009.

Phase 2: Benefits Review

There is a vast literature that examines the socio-economic benefits to society from quality early childhood education and care. In the short-to-medium term there are four avenues that deliver benefits to society:

1. Economic gains via the short-term economic stimulus generated from expanding and operating the new child care system;

3 See, for example, Kershaw et al. (2009). Unless otherwise noted, all figures used in the cost estimates are for children under age 6. As the $10aDay Plan also includes services for elementary school age children, the full operating costs — and related benefits — will be higher.

4 Unless otherwise noted, all dollar figures are in 2015 inflation adjusted or real dollars and all employment estimates are stated in the number of full-time equivalent (FTE) jobs, rounded to the nearest 100.

2. Benefits to households from lower child care fees and increased utilization that is manifest via mothers' labour supply effects;

3. Benefits to businesses from reduced staff turnover, absences, and increased productivity; and

4. Benefits to governments via higher revenues from increased economic activity and employment and lower spending in other areas.

Impact estimates are calculated versus a "No Change scenario" in which the number of spaces and child care utilization remain at 2016 levels. There are a number of different channels of spending and cost reduction that result from the implementation and operation of the $10aDay Plan. Each channel has a different set of economic impacts. In order to calculate the impact on the economy, five input-output impact scenarios were utilized to estimate the direct, indirect, and induced effects on the B.C. economy from changes in spending related to expanding and operating the new child care system. In addition, the literature on the socio-economic effects was utilized in order to estimate other influences on the economy, including special education, grade retention, social assistance, employee turnover, absences, productivity, and mothers' labour supply effects.

The economic literature typically finds that child care programs have very large multipliers, ranking among the largest of any economic sector. A multiplier shows the rise in overall economic activity, or GDP, in the short-run per dollar increase in expenditure. Overall, and based on data from Statistics Canada, the child care sector in B.C. is estimated to boost GDP by $1.63 per dollar of increased expenditure as compared with $0.86 for the average industry and $1.04 for other provincial government spending.

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Phase 3: Impacts of the $10aDay Plan

The estimates show that on full implementation net new (gross new spending less estimated spending in the No Change scenario) real government spending is $1.794 billion, including construction costs as well as subsidies and transfers to providers. Shortly after, the annual cost falls to $1.748 billion primarily because of the end of construction costs. These costs reflect the estimated reduction in government spending related to reduced education spending, primarily because of lower rates of special education and grade retention. On the revenue side of the ledger, the net increase for the overall government sector is $1.952 billion on full implementation. The annual revenue projection drops to $1.933 billion shortly afterwards, because of the reduction in economic activity associated with the end of construction costs and reduced education spending.

Thus, the net impact on the overall government sector's budget is positive, with revenues exceeding net expenses by $158 million annually on full implementation, and $184 million annually shortly afterwards.

In addition, construction of the new spaces required to implement the Plan will boost GDP by an estimated $28.8 million and boost employment by around 300 FTE jobs each year throughout implementation. The net new spending associated with the operation of the Plan will boost GDP via direct, indirect, and induced economic effects by $2.441 billion by full implementation and create 28,600 full-time equivalent (FTE) jobs.

One of the important impacts on the economy in the short-to-medium term occurs via the mothers' labour supply effect. More children participating in child care means that more parents, particularly mothers, are available to join the workforce. This topic has been the subject of considerable research and it is generally found that lower child care fees and greater access lead to a significant increase in the number of women working. Using very conservative estimates, the net increase in employment via the mother's labour supply effect is estimated at 24,800 by full implementation, resulting in an increase in GDP of $1.959 billion. Notably, it is generally found that lone parents and those with lower incomes tend to benefit more from a child care price reduction than women with a partner. Therefore, the labour supply effect will have a direct positive impact on income inequality and poverty reduction.

Relatively conservative estimates suggest that business-related gains will result in a GDP increase of around $1.2 billion, and full-time equivalent employment growth of approximately 14,000.

Another important impact on the economy is from the household budgetary effect. Lower child care fees will directly reduce the cost for all those who currently use child care. There would be some offset to the overall household budgetary position given that lower fees will encourage some parents to use regulated child care rather than relying on friends or family, for example, to provide child care at no cost. After taking account of all of the pluses and minuses to the overall household budgetary position, there is a net gain of $259.0 million, which leads to more spending and GDP in the economy with the end result being a $172.1 million increase in GDP and 1,700 more jobs.

There are also projected benefits to employers from productivity gains and cost reductions. The impact on the economy from the potential savings to businesses via reduced turnover, absenteeism and productivity enhancement is less certain than the above estimates because the ultimate impact depends on how the gains are achieved and how businesses use the increase in profits. Nonetheless, relatively conservative estimates suggest that business-related gains will result in a GDP increase of around $1.2 billion, and full-time equivalent employment growth of approximately 14,000.

Input-output estimates do not include the potential effect on the economy from the change in business profits. While it is known that each round of stimulus that leads to higher GDP will also result in higher corporate profits, it is not known how or where these funds will be spent. While this effect could reach an increase of $740 million to GDP by 2025, and 8,600 more jobs, this channel is not included in the main estimates in order to keep the overall impact estimates conservative.

The study also compared the economic impacts of the $10aDay Plan to a scenario that charges parent fees at $20 per day. Both approaches are projected to realize positive government budget balances, although the $10aDay Plan requires a higher level of direct government spending and contributes $205 million less to the projected overall budget balance. However, the $10aDay Plan results in a higher number of children utilizing child care, more mothers returning to work, and a larger increase in overall GDP and jobs.

Since the focus of this study is on the short-to medium-term impacts on the economy, long-term benefits are not included. Many of the benefits that society derives from the provision of quality early childhood education become evident later in the children's lives, particularly when today's child care participants enter the workforce. Therefore most of the benefits to children from the expansion of quality child care are not included.

It is important to keep in mind when reading this study that these long-term benefits will accrue to B.C. in the future and are in addition to the short-term benefits that are illustrated in this report. And these long-term gains are quite significant. Indeed, in the current economic environment, with the long-term bond yield substantially lower than the discount rate that was used in many past studies, the present value of these benefits is dramatically larger. Using the provincial government's long-term bond yield as the discount rate, the net present value of the benefits to children alone may exceed the net operating costs of the expanded quality child care system.

Finally, the analysis confirms that the projected benefits to government are shared between the B.C. and federal governments. The province is responsible for child care and the increased expenditures associated with the Plan, while the federal government receives a higher portion of the revenues because of its generally higher tax rates. Thus, it is reasonable to anticipate a cost-shared approach to financing the $10aDay Plan, with the federal government contributing at a level that is commensurate with its expected gain in revenues.

Using the provincial government's long-term bond yield as the discount rate, the net present value of the benefits to children alone may exceed the net operating costs of the expanded quality child care system.

PHASE 1: COSTING REVIEW

Parents are expected to respond to the lower fees and higher quality of care by significantly increasing their demand for regulated child care.

THE CHILD CARE COSTING MODEL developed by Anderson and colleagues calculated the incremental annual government expenditures required to operate the $10aDay Plan, on full implementation, at $1.5 billion.[5] For the purpose of this study, Anderson updated the model to reflect recent and substantive changes to child care policy, such as the introduction of full school-day kindergarten, along with population projections through the implementation period and beyond. For the first time, the updated model also incorporates estimates of the government expenditures (capital costs) required for construction of new child care spaces.

Under the Plan, parents will pay annual fees of $2,600 for full-day child care and $1,820 for part-day care. By way of contrast, a letter from B.C. Children and Family Development Minister Stephanie Cadieux, available on the Ministry's website, shows that the median monthly fees across the province were $995, $925 and $750 respectively for infants, toddlers and children aged 30 months to five years for the 2014/15 fiscal year. Therefore, the proposed fees are between 71 and 78 per cent lower than current parent fees for child care in B.C., as shown in Table 1.1.

TABLE 1.1: CHILD CARE FEES ($2015)

	Median monthly fees (2014/15)	Median annual fees	$10aDay Plan full-day fees[a]	% Decline
Infants	$995	$11,940	$2,600	-78.2%
Toddlers	$925	$11,100	$2,600	-76.6%
30 months to five years	$750	$9,000	$2,600	-71.1%

[a] Fees will be fully subsidized for families earning less than $40,000 annually, indexed to inflation.

5 See, for example, Kershaw et al. (2009). Unless otherwise noted, all figures used in the cost estimates are for children under age 6. As the $10aDay Plan also includes services for elementary school age children, the full operating costs — and related benefits — will be higher.

Parents are expected to respond to the lower fees and higher quality of care by significantly increasing their demand for regulated child care. By 2025,[6] for example, Anderson projects that the participation rate for children aged three to four years in regulated child care will rise to 85 per cent, or 85,371 children, based on the most recent demographic projection from BC Stats. The projected child care participation rates by age are shown in Table 1.2.

TABLE 1.2: REGULATED CHILD CARE PARTICIPATION IN 2025 UNDER PROPOSED $10ADAY PLAN

Age of child	Participation rate	Total children in regulated child care, either part-day or full-day
Age 1 to 2	66%[a]	32,995
Age 2	75%	37,592
Age 3 and 4	85%	85,371
Age 5 (school year, 9 months)	55%[b]	27,631
Age 5 (out of school, 3 months)	80%[b]	40,191

[a] Reflects projected participation rate by age two, assuming gradual uptake concentrated in second year as parental leave utilized in first year.
[b] While approximately 90 per cent of five year olds participate in full school-day kindergarten in B.C., Anderson estimates that 55 per cent will participate in out-of-school care programs during the school year—and 80 per cent of five year olds will participate outside of the school year (e.g., summer holidays, spring break)—to support the full working-day needs of families.

Given the number of child care spaces currently available in B.C., a significant number of new spaces will be required to satisfy demand. Anderson estimates that the provincial government will need to provide capital funding to create the full-time equivalent (FTE) of 31,325 new, stand-alone child care spaces by 2025. For illustrative purposes, Table 1.3 (page 14) summarizes the calculations for total spaces.

The increased utilization of child care will be funded by a significant increase in provincial government spending. Anderson estimates that each child requires 50 square feet of space and that the cost per square foot is $200,[7] so the estimated average real construction cost per new FTE space is $10,000. This analysis assumes that government will directly fund the total construction costs for the net new FTE spaces required.

6 This study assumes that full implementation is achieved by 2025.

7 Cost estimates based on those from the rsmeans website. www.rsmeans.com/models/daycare-center.aspx. This average is used for estimating purposes in the economic analysis, recognizing that the actual costs are expected to range from minimal (in privately-owned licensed family homes, for example) to higher than average (for construction of new, purpose-built centres in the Lower Mainland, for example).

TABLE 13: ESTIMATED NUMBER OF NET NEW CHILD CARE SPACES FOR 2025

Source of existing and required spaces	Number of spaces
Total FTE spaces required for children under 5 years old by 2025[a]	118,850
Current FTE child care spaces in B.C.	77,311
Less: 50% of family child care spaces, assumed to serve children over 5 years old	(7,235)
Total current FTE child care spaces for children under 5	70,076
Net new FTE spaces required	48,774
Less: public spaces funded from other sources (e.g., developers, employers)	(9,755)
Less: new spaces available by maximizing use of existing public spaces (e.g., re-configuring schools, community centres, libraries, colleges, universities)	(7,804)
Net new FTE spaces requiring B.C. government funding directly for child care	31,215

[a] All five year olds will have a kindergarten space, which can be retrofitted to accommodate before and after school child care if need be, and as outlined in the Plan. The FTE calculation reflects that two part-time spaces are approximately equivalent to one full-time space.

To ensure that child care fees are reduced to $10 per day, and sustained at that level, the $10aDay Plan requires the provincial government to provide subsidies and transfers to all eligible regulated child care providers. Consequently, operational costs to the B.C. government from expanding the system will be significantly higher than the projected public spending without the Plan (i.e., the No Change scenario). Anderson estimates that the total operating and administrative costs of the new system, net of parent fees, will be $1.777 billion ($2.083-$0.306) by 2025. Anderson also estimates the direct provincial subsidies currently provided to the child care sector are $224.0 million, which brings the incremental annual public cost to $1.553 billion (1.777-0.224) — similar to the original projection developed in 2009.[8]

For the impact estimates, subsidies paid to the unregulated sub-sectors were also assumed to remain at current levels per child. So any projected difference between the No Change scenario and the $10aDay Plan reflects the change in the number of children in those sub-sectors.

8 The incremental annual cost utilized in this economic modelling is conservative because it does not include, for example, the projected cost reductions associated with new federal child care transfers, some of which are already committed in Federal Budget 2016, or the projected reduction in costs associated with lower utilization of the Child Care Expense Deduction.

Anderson estimates additional spending of $80.2 million for early childhood educators working alongside teachers in kindergarten and Grade 1 classes, as proposed in the $10aDay Plan.

A significant portion of the overall cost increase is related to higher labour costs. Not only are more early childhood educators required, given the existing regulations that determine maximum staff:child ratios, but the Plan also features employing an appropriately educated workforce in order to deliver high quality child care. Anderson estimates average wages for senior staff, staff, and assistants at $30, $25 and $20 per hour respectively, as shown in Table 1.4. Including benefits estimated at 20 per cent of wages, the level of labour income per FTE is significantly higher than under the No Change scenario. Furthermore, substitutes are expected to earn $20 per hour on average and represent 12 per cent of total wages.

A significant portion of the overall cost increase is related to higher labour costs. Not only are more early childhood educators required, but the Plan also features employing an appropriately educated workforce in order to deliver high quality child care.

For the economic modelling discussed below, the implication of higher wages and salaries is that the total wage cost must rise for a given number of children in child care.

TABLE 1.4: STAFF WAGES AND LABOUR INCOME UNDER PROPOSED $10ADAY PLAN

FTE employees	Hourly wage rates	Annual wages	Labour income[a]
Senior staff	$30.00	$54,600	$65,520
Staff	$25.00	$45,500	$54,600
Assistant	$20.00	$36,400	$43,680

[a] Labour income reflects wages plus benefits.

To estimate the short-to-medium term economic impact on the B.C. economy arising from the injection of new funds into the child care system, Anderson's cost estimates are used in combination with estimates from the economic literature and the results from input-output model simulations. The following sections of the report summarize the research, methodology and results achieved.

PHASE 2: BENEFITS REVIEW

There is general agreement in the academic literature that universal access to high quality child care programs improves cognitive abilities, future economic well-being and social outcomes for children overall, with disadvantaged children benefiting even more so.

A CONSIDERABLE NUMBER OF STUDIES have examined the benefits to society from the provision of quality child care. The following four sections examine the benefits via the impact on children, parents, businesses and governments with an emphasis on the short to medium term.

2.1 Benefits to Participating Children

There is general agreement in the academic literature that universal access to high quality child care programs improves cognitive abilities,[9] future economic well-being and social outcomes for children overall, with disadvantaged children benefiting even more so.[10] More advantaged children can also benefit from high quality child care.

Barnett (2013) states that the most recent and comprehensive meta-analysis for the U.S. and other countries shows that the long-term effects on participants include gains on cognitive tests, improvements in social and emotional development, and improvements in school success including less grade repetition, less special education placement, and increased high school graduation.[11] And Barnett and Frede (2010) indicate that the better quality studies find more positive outcomes for the socio-emotional and child development outcomes than the overall meta-analysis.[12] Gains

9 In the literature "quality" ECEC generally reflects those factors that positively influence child developmental outcomes. Barnett and Frede (2010) state that a "high-quality" program develops children's knowledge and skills and also helps facilitate children's social, emotional, moral, and physical development, as well as helps shape their attitudes, beliefs, dispositions, and habits.

10 See Camilli et al. (2010) for a meta-analysis of 123 U.S. studies, and Nores and Barnett (2010) for a meta-analysis of rigorous research conducted by 56 studies outside the U.S.

11 The average long-term cognitive effect in the U.S. is about half the size of the initial effect.

12 Differences in study design provide different degrees of confidence in the results. The most persuasive studies are randomized experimental studies that randomly assign people with the same attributes to two groups: experimental and control groups. Quasi-experimental studies match the two groups and typically use pre-tests and post-tests to determine the impact of the experiment. Non-experimental studies do not assign different groups, but use statistical techniques, such as correlation analysis, to ascertain the impact.

to child development are found across socio-economic groups.[13] Another important finding in the literature is that quality early childhood education and care (ECEC) improves the English language abilities of English language learners.[14]

Quality differences can explain why some programs produce positive effects and others do not. Higher-quality child care is associated with better cognitive and language development, positive peer relations, compliance with adults, fewer behaviour problems, and better mother-child relations.[15] Doherty (1996) cites five studies comparing children in high-quality and low-quality programs, which mention significant positive impacts on children's cognitive skills and socio-emotional well-being from high-quality ECEC. Doherty concludes that in order to maximize positive effects and minimize negative effects of programs, it is important to ensure they are of high quality.

Barnett (2013) states that underfunded programs with low standards produce few significant benefits, but higher quality large-scale public preschool programs have produced substantive long-term gains.[16] Barnett also indicates that disadvantaged children gain more from universal programs than means-tested programs because of peer effects. Disadvantaged children benefit from attending preschool programs with more advantaged children. And there are substantial spillover benefits to learning in kindergarten through Grade 3 when children have more classmates who have attended pre-K programs.

Since the proposed $10aDay Plan is focused on a high-quality child care system, many of the benefits will accrue to the participating children over the long term. These benefits include higher wages, and lower health and crime related costs to government.

Cleveland and Krashinsky (1998) suggest that parents' misjudgement concerning quality is one reason why there could be "market failure" and underutilization of child care, which argues for government intervention in the sector to achieve the socially optimal level of quality child care.

In summary, it is found that large-scale public programs have succeeded in producing meaningful long-term gains for children and not just disadvantaged children. The size of those gains depends on the quality of the program.

Since the proposed $10aDay Plan is focused on a high-quality child care system, many of the benefits will accrue to the participating children over the long term. These benefits include higher wages, and lower health and crime related costs to government. The economic impact from these benefits, however, were not included in the present analysis given the focus on the short to medium term. For the present study, the impact on society via children is restricted to the impact on government's educational spending resulting from the anticipated improvement in young children's healthy development at school entry, which will in turn be reflected in the reduced

13 See Gormley et al. (2005), Wong et al. (2008) and Tucker-Drob (2012).

14 See Bilbrey and Hofer (2012), Barnett (2007), Gormley (2007), and Magnuson, Lahaie and Waldfogel (2006).

15 Anderson (2003) and Owen (2004).

16 See Barnett and Nores (2015) and Melhuish et al. (2012).

need for special education, grade retention, additional classroom support costs, etc.[17] To estimate the economic impact on B.C., this model translates the existing U.S. research to estimates specific for the average Canadian child.

The method used to estimate the short-to-medium term benefits via participating children is outlined in Appendix I. The calculations show there is a net reduction in education costs of $23.4 million by 2025, rising to $36.2 million by 2030. While these cost savings to government are included in the analysis, they are partially offset by a negative short-term impact on the economy because, unless the government reinvests these savings, there will be reduced employment in the education and health sectors. Clearly, these savings could be recycled into other spending or tax reductions, but in order to estimate conservatively those reactions were not included in the analysis.

2.2 Benefits to Parents

Most of the literature concerning the impact on parents of children participating in child care programs focuses on the demand for child care services and on mothers' labour supply. These two choices are inextricably linked. According to Chevalier et al. (2006), one of the key factors that influence both child care utilization and labour force participation is child care fees.

Numerous studies have examined the impact of fees on the demand for child care. They consistently find that higher child care fees are related to lower demand for child care services and lower labour force participation. There is a large range of estimates of the impact of higher fees on child care use, which is represented by the own-price elasticity (percentage change in child care use relative to a one per cent increase in child care fees). Given the significant institutional differences between countries, Canadian and U.S. studies are likely to be the most relevant. Relatively small elasticities are reported by Blau and Hagy's (1998) U.S. study (-0.34) and Chaplin et al.'s (1999) U.S. study (-0.41 for centre-based care). In contrast, Connelly and Kimmel's (2003a) U.S. study, Powell's (2002) Canadian study, and Cleveland et al.'s (1996) Canadian study all report estimates of -1.0 or larger.[18] Powell (2002) estimated price elasticities of the various child care arrangements ranging from -1.0 for daycare centres to -3.0 for childminders in their home. Michalopoulos and Robins' (2000) combined U.S. and Canadian study reports price elasticities of -1.08 for formal child care centres. Studies of the Quebec experience show large increases in child care use, but researchers identify that there were an insufficient number of spaces available for all the parents

17 For a detailed analysis of the state of B.C. children's early development, and the impact of introducing $10aDay child care, along with expanded parental leave, see Kershaw et al. (2009).

18 Baker, Gruber and Milligan's (2005) Canadian study.

who wanted them at these fees, so these changes should not be used to estimate parents' price elasticity. Indeed, child care use continued to increase in Quebec even after fees went from $5 per day to $7 per day in 2004 in current dollars.

Notably, Canadian parents tend to have relatively high price elasticities of demand, meaning that changes in child care fees have a large influence on parents' decision to use child care, compared to those found in other countries. The higher price sensitivity of Canadian parents could be because they are paying more out of pocket. In many countries, fees paid by parents represent a smaller share of total costs than for Canadian parents. In our analysis of the effect of prices on demand the price elasticity was assumed to be -1.0, which is similar to the estimate used by Cleveland et al. (2016) for their analysis of child care in the City of Toronto.[19]

Researchers also find that demand for child care rises with women's wages and that wage elasticity (percentage change in child care use relative to a one per cent increase in wages) is positive for both formal and informal child care. Cleveland et al. (1996) estimated an elasticity of 0.18 for Canada, and Ribar's (1995) U.S. study found a range from 0.14 to 0.76. Blau and Hagy's (1998) U.S. study found a wage elasticity of 0.67. These estimates put Canadian wage elasticities below those for other countries. The implication is that Canadians are more price sensitive, but put relatively less of every extra earned dollar into child care than parents in other countries.

Many studies have examined the impact of child care costs on mothers' labour force participation decisions. They consistently find that higher fees result in lower labour force participation, employment and work hours. These elasticities are significantly smaller than the own-price elasticities for formal child care. In general, the average price elasticity with respect to mothers' labour supply is in the range of -0.2 to -0.35. Across 42 international studies the average elasticity was -0.25. For the six studies that examined Canadian data, the average was -0.27.[20] Given the proposed reduction in B.C. fees by 70 to 80 per cent under the $10aDay Plan, using this average elasticity would result in a projected increase in employment of 18.75 per cent. There are, however, potential drawbacks to using this type of estimate in the current analysis.

In addition to fees, availability of child care is also critically important.[21] In many studies child care utilization and mothers' labour supply is impeded by a lack of access to child care spaces.[22]

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19 They estimated the own-price elasticity of -1.04 at the means of explanatory variables.

20 Cleveland et al. (1996) -0.39, Powell (1997) -0.23, Powell (2002) -0.16, Michalopoulos and Robins (2002) -0.20 Canadian data only, Baker et al. (2005) -0.236, Cleveland (2016) -0.32 full-time employment.

21 In an OECD report that examined female labour force participation and employment rates, Thévenon (2013) used child care expenditures per child and coverage of child care facilities among children under age three to help explain full and part-time female employment rates. He found the effect of child care enrolment rates on female full-time employment is particularly strong in "English-speaking" countries.

22 Havnes and Mogstad (2011) study of Norwegian reform found excess demand. Baker et al. (2008) indicates there was excess demand in Quebec during the initial stages of the plan. Bauernschuster and Schlotter (2015) examined German reform and found a lack of access impacts their employment estimates. Flaming, Kwon and Burns (2002) found that a lack of access to affordable ECEC was the most significant barrier to employment for Los Angeles women transitioning off CalWORKs. Viitanen and Chevalier (2003) found evidence for considerable excess demand (shortage of child care spaces) in the U.K. Davis and Connelly (2005) found that availability and accessibility impact choice for the U.S.

Other confounding factors include the suggestion that labour supply effects might diminish over time as mothers' participation rates have risen (Akgunduz and Plantenga, 2015).[23] Lundin et al. (2008) also state that a decrease in child care fees would not affect labour supply if child care attendance rates are already high or if as suggested by Blau and Currie (2004) there is a significant degree of "crowding out" of private provision such as informal care.

Moreover, many of the elasticities described above were estimated using a much smaller fee change, so the responsiveness of mothers' labour supply might not be the same for a very large fee change. Therefore, to understand the potential impact on B.C. from the proposed $10aDay Plan it is helpful to examine the employment impact from a systemic change that is of similar magnitude, such as Quebec's, and to explicitly consider the potential limiting factors mentioned above.

Quebec's child care system was introduced in 1997 with parent fees initially at $5 per day, increasing to $7 per day in 2004 in current dollars. As a result, the percentage of children under age five in regulated care grew from 18 per cent in 1998 to 51 per cent by 2008.[24] A number of researchers have examined the impact on the employment rates of mothers with young children (see Table 2.1).[25] It is evident from the results that the employment impact was large and rose over time as the system expanded. Notably the employment impact continued to rise despite the 40 per cent increase in fees in 2004.

TABLE 2.1: IMPACT OF QUEBEC CHILD CARE SYSTEM ON MOTHERS' EMPLOYMENT RATE

Study	Age	Period	Family type	Δ Employment rate (percentage point)
Baker et al. (2008)	0–4	1999–2003	Couples	7.7%
Lefebvre and Merrigan (2008)	1–5	2002	All	8.1%
Lefebvre et al. (2011)	0–5	2002–2003	All	8.8%
Lefebvre et al. (2011)	0–5	2006–2007	All	12%
Kottelenberg and Lehrer (2013)	0–4	2002–2007	All	11%
Haeck et al. (2013)	1–4	2008	All	13%
Haeck et al. (2013)	1–4	2008	Couple	14%
Haeck et al. (2013)	1–4	2008	Single-high school	27%

A comparison of the impact results for Quebec's child care program found by Baker, Gruber and Milligan (2008) with those by Kottelenberg and Lehrer (2013) is instructive. Both studies

23 The potential magnitude of the effect is unclear. In many cases estimation technique and population examined appear to have a larger effect on the elasticity estimate than participation rates. In countries for which there is at least two studies, there was a mix of declining and increasing elasticities over time.

24 Fortin et al. (2012).

25 Haeck et al. (2015) find that the impact on mothers' labour force participation in Quebec is similar to the impact from other comprehensive reforms — Norway 2006, Spain 1990s, Germany 1996.

examine the impact on employment for mothers with children aged 0–4, using the same data and pre-program period, but they use different time periods to measure the post-program effects. Baker et al. used the post-program period of 1999–2003 and find mothers' employment rate increased by 7.7 percentage points more in Quebec than the rest of Canada and children participating in child care rose by 14.6 percentage points. So the ratio of the increase in mothers working per additional child in child care was 0.53 (7.7/14.6). In comparison, Kottelenberg and Lehrer used the same pre-program period, but used the post-program time period of 2002–2007. They find that the number of children participating in child care in Quebec rose by 19.6 percentage points, while employment increased by 11.0 percentage points for a ratio of additional employment per child participating in child care of 0.56, which is larger than the estimate for the earlier period.

Both studies use the same starting period, so the differences between the estimates can be used to isolate the impact on employment rates over the 2002–2007 period compared with 1999–2003. The calculation summarized in Table 2.2 highlights a significantly higher ratio of mothers' employment per additional participating child of 0.66 over the later period, despite higher participation and employment rates for mothers with young children at that time. Haeck et al. (2015) find that the attributes of Quebec's child care policy first benefited those with higher education and only later benefited those with lower education when the expansion of spaces allowed greater access.

TABLE 2.2: RISING IMPACT ON EMPLOYMENT AND CHILD CARE PARTICIPATION IN QUEBEC

	Baker, Gruber and Milligan (2008)	Kottelenberg and Lehrer (2013)	Δ 2002–2007 vs. 1999–2003
Children in child care (%)	14.6	19.6	5.0
Mother works (%)	7.7	11.0	3.3
Ratio of mother works per child in child care	0.53	0.56	0.66

To understand the implications of the above research for B.C., it is necessary to also consider the limiting factors discussed above — mother's employment and participation rates, child care participation rates and crowding out effects. These factors will determine whether B.C. will likely experience a higher or lower mothers' labour response.

In 2003, Quebec's employment and participation rates for mothers with children under age six were at or above B.C.'s rates in 2015. And the percentage of children in child care centres in Quebec by 2000–2004 was roughly similar to B.C.'s in 2014. So it appears that B.C. should experience at least an increase in its employment and labour force participation rates for mothers with young children similar to what Quebec experienced after 2003 depending on the degree of coverage and crowding out.

By all indications there should be more availability of child care spaces in the $10aDay Plan than what Quebec experienced during the expansion of its program. The $10aDay Plan explicitly includes significant construction expenditures to expand the system to 119,000 spaces for children under age five by 2025 and projects higher participation rates for young children than what Quebec experienced, particularly during Quebec's period of continued expansion past 2003. Therefore, by 2025 the $10aDay

Plan should not be affected by significant excess demand for child care that limits the labour supply effects. However, there is still the likelihood that the expansion of regulated child care will crowd out unregulated (informal) providers, which would partially offset the labour supply effects.

Baker et al. (2008) estimated the degree of crowding out in Quebec. They found the comparative rise in child care use for children 0–4 was 14.6 percentage points and that there was a shift from care provided by relatives (down 2.1 percentage points) and unlicensed non-relatives (down 2.5 percentage points) to regulated care provided in both licensed homes (up 4.8 percentage points) and centres (up 15.2 percentage points). These estimates were used to calculate the degree of crowding out in the B.C. model.

Despite these crowding out effects in Quebec the number of employed mothers increased significantly and Baker et al. estimate that the increase in employment was dominated by women working more than 30 but less than 40 hours per week, which is essentially full-time employment, a finding that is supported by an examination of the Labour Force Survey.

Another finding of the literature on this topic is that lone parents[26] respond more to price changes than married mothers. Connelly and Kimmel (2003b) suggest that is because child care expenses represent a larger share of lone parent or poor household incomes, so they are more affected by the same fee change than married couples or households with higher incomes. Connelly and Kimmel (1999) found a price elasticity of -0.16 for married mothers, and -0.32 for lone parents. Han and Waldfogel (2001) found the price elasticity was -0.3 to -0.4 for married mothers and -0.5 to -0.73 for lone parents.

In a similar vein, the U.S. General Accounting Office (1994) reported that the response of poor parents was -0.5 compared with -0.34 for the near poor, and -0.19 for the not poor. Anderson and Levine (2000) found single mothers with young children were more price sensitive (-0.73) than those with older children (-0.47). Connelly and Kimmel (2001) also found that subsidizing child care reduces the welfare dependency of single mothers. And Connelly and Kimmel (2003b) found a substantial positive effect of child care costs on receiving welfare, with the child care price elasticity of welfare recipients varying from 1.0 to 1.9. In addition, Boushey (2002) found that two main factors that determine whether a woman trying to move from welfare to work will be able to sustain employment are job quality and availability of child care. Former welfare recipients who received child care subsidies were 60 per cent more likely to be employed after two years than those who did not.

The implication of these estimates is that an affordable, accessible child care system will have disproportionately positive impact on the less well off, which will reduce income inequality and potentially lower the costs of other social programs to government. Indeed, this has been found in the Quebec situation. As shown in Table 2.2, Haeck et al. find that by 2008 the employment response of single mothers with high school education is dramatically larger than for mothers in couple families.

In contrast to the impact on mothers' labour supply, increased child care seems to have little or no effect on male labour supply. Australian researcher Kalb (2002) found no significant effects. Seven other studies found either much lower effects of children on male (as compared to female) labour

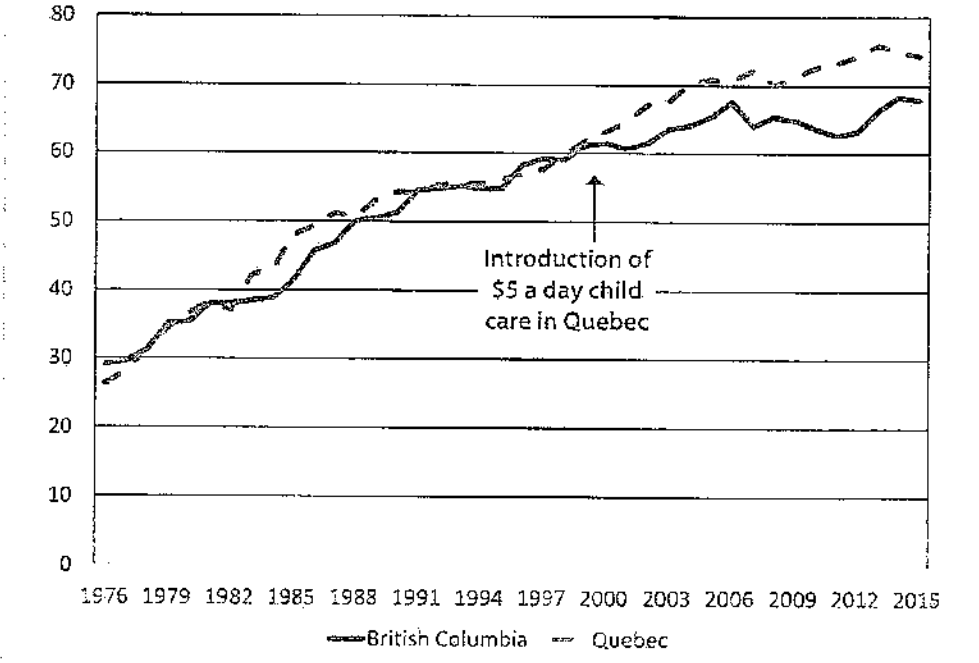
26 The terms 'lone parent' and 'single parent' are both used in research studies, sometimes interchangeably, although a lone parent is not necessarily single (e.g., may be married, but separated). For the purpose of this report, the term 'lone parent' is used.

supply or no effect. Lefebvre, Merrigan and Roy-Desrosiers (2011) estimated the impact of the Quebec child care program on fathers and generally did not find significant results.

Clearly the immediate economic benefit that employed mothers enjoy are wages. Joshi (1990) finds that the additional work experience women gain while using child care also boosts future wages. Mothers who stay out of the workforce for an extended period face a future wage penalty once they come back to work. For example, Anderson et al. (2003) found that the wage penalty is 4 to 6 per cent for women who go back to work three to five years after the birth of a child. Conversely, mothers using child care to go back to school for additional training can increase future earnings.

Since the focus of this report is on the short-to-medium term impacts, the future wage gains that mothers could achieve from additional work experience or education is not included in the analysis. Instead the focus is on the immediate gains mothers achieve from using child care via mothers' labour supply and employment effects. This is a key assumption in the overall impact analysis, so two different estimates are used. First, an estimate is developed based on closing the gap between the employment rate in Quebec and B.C. for mothers with children under age six. This gap opened after the introduction of the Quebec child care system (see Figure 2.1). This gap is closed when the number of new full-time equivalent employees per net new child participating in child care is 0.272. Since the B.C. system will have a higher child participation rate than Quebec, this estimate is extremely conservative. Second, an estimate of 0.5 jobs per net new child participating in a child care program will be used based on the calculations by Baker et al. (2008), which is still more conservative than other estimates of the employment impacts.

FIGURE 2.1: MOTHERS EMPLOYMENT RATE WITH CHILDREN UNDER AGE SIX



2.3 Benefits to Businesses

There are a number of potential benefits to business from the implementation of the $10aDay Plan primarily via reduced employee absenteeism and turnover as well as improved productivity.[27]

Absenteeism

Unscheduled employee absences are a significant expense for employers. Stewart (2013) in a Conference Board of Canada report estimated that the direct cost of absenteeism was $16.6 billion to the Canadian economy in 2012 based on an average of 9.3 days lost per employee. Carillo (2004) found that the total cost of absenteeism is a minimum of two times the absent worker's wage, after including the cost of benefits, supervisor's time, and lost productivity. Mercer also (2008) estimates that the indirect costs of absences are twice the wages of the absent employee. So the direct and indirect cost of absences is in the range of 2.5:1.

Statistics Canada's Labour Force Survey reports that in 2015 mothers with preschool-aged children lose 2.4 more days per year than women without children for personal or family responsibilities, including child care, which amounts to around 1% of total work days.

Bond, Galinsky and Swanberg (1998) found that almost 30 per cent of working parents had child care issues, which affected absenteeism, tardiness, or concentration on the job. Friedman (1986) reviewed three national studies of businesses that provide reliable (in these cases, on-site) child care for their employees and found that 54 per cent of the employers reduced absenteeism by 20 to 30 per cent as a result of this service.

Statistics Canada's Labour Force Survey reports that in 2015 mothers with preschool-aged children lose 2.4 more days per year than women without children for personal or family responsibilities, including child care, which amounts to around 1 per cent of total work days. Men with preschool-aged children lose 0.9 more days per year. Given the estimated number of people with children under age six who will be employed in B.C. by 2025, and based on an average labour income in $2015, the total direct and indirect cost to employers is in the range of $225.6 to $272.4 million by 2025 (depending on the number of net new jobs for mothers).

Duxbury and Higgins (2003) find that family-to-work interference is positively associated with absenteeism due to child care problems. Respondents with high levels of family-to-work interference were seven times more likely to miss three or more days of work in a six-month period due to child care issues than those with low levels of this form of work–life conflict. Notably, this estimate is significantly larger than the estimate from the Labour Force Survey over the course of a year. Using an estimate of six days per 12 months for mothers would boost the direct and indirect negative impact for B.C. to $539.6 to $584.8 million by 2025.

27 See Shellenback (2004); MacGillvary and Lucia (2011).

Kershaw et al. (2009) estimated that their recommended policy proposals, which include enhanced child care provision, would reduce absenteeism and save B.C. businesses $200 million annually.[28] Since child care is part of their overall package of improvements, the gain from expanded child care alone would be less.

These absenteeism estimates are not directly comparable and at best provide a rough range of the possible maximum impact from improvements in child care if the new system eliminates all absences for family reasons. If widely accessible child care reduces absences by 25 per cent, then benefits to B.C. employers would be in the range of $134.2 to $144.8 million using Duxbury and Higgins' estimates, which seems more specific to child care than the Statistics Canada estimates.

Employee Turnover

Employee turnover is another major issue for employers. Statistics Canada estimates that in B.C. the employee turnover or separation rate was in the range of 22.5 per cent over 2000 to 2008, and data from the Workplace Survey suggests that the turnover rate was 20.2 per cent in 2012. There are various estimates of the cost associated with employee turnover. Carillo (2004) estimates that employee turnover cost is as high as 250 per cent of the annual salary of the lost worker, while Phillips and Resiman (1992) estimate turnover costs at one and half times annual salary for exempt employees and three quarters of annual wages for hourly workers. Others estimate the cost anywhere from 30 to 50 per cent for entry-level employees, to 150 per cent for mid-level employees all the way to 400 per cent for high-level employees.[29]

Employers that provide child care services find that recruitment and retention of employees are improved. Access to child care can reduce turnover by 37 to 60 per cent (Ransom and Burud, 1988). An average of these estimates would translate into a 9.8 percentage point reduction in B.C.'s 20.2 per cent turnover rate. Huselid and Becker (1995) found that a 7 per cent decrease in employee turnover led to increases of more than $27,000 in sales and $4,000 in profits per employee.

According to Munro (2008) in a Conference Board of Canada report, U.S. companies that have offered a variety of child care arrangements have also experienced improvements in employee retention and engagement. He provides the example of the Children's Health System in Alabama that introduced a Back-Up and Mildly Ill Child Care Center for employees and saw improved job satisfaction and a reduction in turnover from 22 to 12 per cent. He also provided examples of employers offering on-site or extended-hours child care that experienced a reduction in employee turnover.

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28 Based on Duxbury, Higgins and Johnson (2004) who use current dollars cost estimates for 1998-99, 1999-2000, and 2000-01 for various components of the overall costs.

29 https://www.bcjobs.ca/blog/the-true-cost-of-employee-turnover-depends-on-who-you-lose/

Lee and Hong (2011) investigated the impact of several family-friendly programs in U.S. federal agencies. The only family-friendly benefit that was found to reduce turnover was child care subsidies. Similarly, Caillier (2016) found that only one dependent care program — child care — reduced employee turnover. He found that a one-point increase in satisfaction with child care decreased turnover by 0.44 percentage points.

For Canada, Munro (2008) found that employers that offered child care arrangements have achieved improvements in employee retention while addressing one of the primary causes of stress for employees who have children. He provided the example of Statistics Canada, which offers on-site child care as part of its wellness programs for its employees. The program as a whole has been credited with the department's turnover rate of 5 per cent, which is lower than the 12.5 per cent that other government departments of comparable size experience.

Duxbury and Higgins (2003) find that employees with a high role overload at work[30] are 5.6 times more likely to report high levels of job stress and 2.3 times more likely to report a high turnover intention.

The degree to which the findings above can be generalized to a broader child care system depends on how much of the reduction in turnover rates estimated above results from a more accessible child care system versus how much of the reduction in turnover is attributable to the non-transferability of the child care services provided by the employer. The estimate for this analysis assumed one half of the average reduction in turnover rates from the studies above for mothers entering the workforce, with 25 per cent of the reduction for women already in the workforce, and 15 per cent for men. The adjusted turnover rates were combined with the estimated number of mothers and fathers who would be potentially affected by 2025, when the $10aDay Plan is expected to be fully implemented, and their wages in 2015 dollars. These calculations were combined with the estimates developed by Phillips and Resiman (1992) regarding the total cost of employee turnover relative to direct costs. The resulting total turnover cost reduction estimates were $343.1 million by 2025, using the ratio of 0.272 net new employed mothers per child participating in child care. The turnover cost reduction estimate rises to $387.8 million if the ratio of net new employed mother per child rises to 0.5.

Employee Productivity

A number of studies find that access to child care can improve labour productivity.

ABT Associates (2000) report that in the mid-1990s, a group of 21 of the largest corporations in the U.S. — calling itself "The American Business Collaboration for Quality Dependent Care" or "The Collaboration" — invested $125 million to support child and elder care programs for their employees. The Collaboration had invested in over 1,000 projects throughout the U.S. Their study found that 63 per cent of member employees reported improved productivity while using quality dependent care.

30 Role overload is a type of work-life conflict associated with having too much to do at work, and too little time to do it.

Impact Brief One (2010) reported that public employees in New York City who were provided with child care subsidies had a 17.8 per cent decrease in disciplinary action compared to a control group that did not receive the subsidy. Overwhelmingly, those in the subsidy group reported leaving work less often, concentrating better at work, being more productive at work, and using fewer sick days to deal with child care issues.

Shellenback (2004) reports that Freddie Mac witnessed 1,607 visits to its backup daycare centre in 2002. Cost-benefit analysis shows the company saved in total $40,000 in productivity and $73,000 in turnover costs. This translates to $25 per day in higher productivity and $45 per day in lower turnover costs in 2002 dollars. WFD Consulting found that for every $1 investment in backup child care, employers can receive $3 to $4 in productivity and turnover improvements.[31] Brown et al. (2008) also found that reliable ECEC increases working parents' productivity.

To estimate the productivity benefits in this analysis, the Freddie Mac case provided a daily productivity estimate that is translated into 2015 Canadian dollars. The analysis assumes that mothers entering the workforce as a result of the expansion of child care services will enjoy the full productivity gain. Mothers already using child care will experience a 25 per cent boost, while fathers will gain 15 per cent of the increase — the same relative gain from reduction in absences. These estimates result in an increase in productivity of $502.3 to $639.1 million depending on the size of the mothers' labour supply effect.

In comparison, Kershaw et al. (2009) found that "work-life conflict among employees with preschool age children costs the B.C. business community in excess of $600 million per year. These costs include employee turnover, absenteeism and health care premiums."[32]

The estimates calculated specifically for this study find the turnover and absenteeism effects range between $481.1 and $539.7 million annually, while the total effect including productivity, but not reductions in health care premiums, ranges between $992.9 and $1.096 billion annually.

2.4 Benefits to Governments

The benefits that governments gain from funding universal access to quality child care flow from children, parents and businesses. The benefits to children will result in higher tax revenues in the long term and lower expenditures for education, health and criminal justice. Of these the most significant short-to-medium impact on government spending is via lower education related expenditures as a result of reduced rates of special education and grade retention.

31 Elswick (2003).

32 This estimate was based on Duxbury, Higgins and Johnson (2004) who use current dollars cost estimates for 1998-99, 1999-2000, and 2000-01 for various components of the overall costs.

In addition, Belfield (2004b) finds that children who participated in Ohio preschool programs had significant behavioural and cognitive gains that resulted in improvements in kindergarten readiness. He finds that this resulted in an improvement in job satisfaction by kindergarten teachers, and a reduction in staff turnover.[33] Belfield (2006) estimates that expanding a pre-K program by 35 per cent would reduce teacher turnover rates by 12 per cent. Given the estimated costs per exiting teacher of 33 per cent of the salary of the new hire (SBEC, 2000) and the quit rate of 12.3 per cent per year (Statistics Canada Longitudinal Worker File for Canada, 2001-08), the real annual cost of total teacher turnover is around $130 to $142 million for B.C.[34] To be conservative, the 12 per cent cost reduction estimate by Belfield is used even though the expansion in B.C. will be larger, and only kindergarten teachers are included even though the benefits of improved school readiness extend beyond kindergarten. The resulting estimate is for cost savings of around $1.2 million from lower teacher turnover.

Additional potentially avoidable costs to K–12 education systems include costs associated with English Language Learner (ELL) programs. Research indicates that quality early education may improve the English abilities of English language learners, which could reduce the need for future spending in this area (Barnett, 2007; Gormley, 2007; and Magnuson, Lahaie and Waldfogel, 2006). The magnitude of ELL for the early grades of the K–12 system is not known, so the potential impact on the B.C. government's budget could not be calculated, however.

The primary benefit that governments gain via parents are in the form of higher tax revenues as a result of greater economic activity related to the stimulus to the economy from expanding and operating a larger child care system. There is a particularly large positive impact on government revenue from mothers' labour supply and employment effects.

Moreover, the cost of social assistance should decline as more mothers enter the workforce. However, the potential size of this cost reduction must be considered in relation to the No Change scenario. In 2015, the B.C. government introduced the "Single Parent Employment Initiative" (SPEI) that is aimed at helping people on social assistance re-enter the workforce. The program has several cost components for government, including free child care for up to two years. If the program provides free child care to the same number of lone parents on social assistance as would receive fee subsidies via the $10aDay Plan, then implementing the Plan would not reduce the number of expected social assistance cases. However, the current budget for all cost components of the SPEI program is $24.5 million in current dollars over five years or $4.9 million per year. Even if all of the budget was spent on child care (which is unlikely, and not the intent of the program), this budget would not cover the required child

33 Belfield (2004b) estimated that if 40 per cent more students attend preschool, teacher turnover falls by 24 per cent.

34 Labour compensation for elementary and secondary schools in 2015 is $5.348 billion as per the Labour Statistics Consistent with the System of National Accounts. The National Household Survey indicates teachers are 54.7 per cent of employees and have a wage premium of around 10 to 15 per cent above other workers. So the 12.3 per cent turnover rate and 33 per cent new hire cost per teacher implies turnover costs of $130.6 to $142.5 million. Using a share of 1/13 for kindergarten teachers implies turnover costs of $10 to $10.9 million, so the potential 12 per cent turnover reduction would save $1.2 to $1.3 million $2015 for kindergarten teachers alone.

care fee subsidies for those on social assistance, with children under age six, wanting to use child care services to get training or a job. Moreover, the program's funding after 2020, the end of the current five year commitment, is unclear.

Theoretically, the existence of SPEI suggests that the impact on social assistance cases from the introduction of $10aDay child care in B.C. could be anywhere from zero to an impact higher than the 55 per cent reduction found in Quebec (see Section 2.5), given that the $10aDay Plan projects broader access than exists in Quebec. Our analysis assumes a 55 per cent drop, which is conservative given the size of the intervention proposed in B.C., relative to Quebec, and given that the SPEI as currently structured and funded is unlikely to substantially reduce social assistance payments on its own.

Another benefit that governments can expect is via the gains to business from the reduction in employee absenteeism and turnover costs, as well as the boost to productivity, all of which will result in greater corporate income tax revenues. The stimulus to the economy from the development and operation of a larger child care system will also boost corporate tax revenues. Furthermore, some or most of the increase in profits from either or both of the above channels will likely remain in B.C.

Potentially there could also be short-to-medium term savings to health costs. Higgins et al. (2004) estimate that work-life imbalance costs provincial health care systems in Canada $14.1 billion annually because role overload and work-life interferences result in additional, otherwise unnecessary, physician visits, inpatient hospital stays and visits to emergency departments.[35] Kershaw et al. (2009) use these estimates to calculate the potential savings for B.C. from their proposals that included universal child care. They estimate their proposals would reduce public health costs by $300 million annually as a result of work-life balance savings. What share can be attributed to child care alone, however, is less clear. To be conservative none of these potential savings are included in this study.

2.5 Estimating the Benefits of Early Childhood Education and Care

The net benefits of an affordable, high quality child care program to an economy can be illustrated in a number of ways. A multiplier can be estimated that shows the rise in overall economic activity in the short-run per dollar increase in expenditure for that particular program. Alternatively, the present value of the benefits and costs can be estimated and the dollar amount of the net benefits of the program can be calculated, generating a benefit/cost ratio.

35 Duxbury, Higgins and Johnson (2004) use current dollars cost estimates for 1998-99, 1999-2000, and 2000-01 for various components of the overall costs.

The literature on the short-run multiplier effect from child care programs typically find that they have very large multipliers, ranking among the largest of any economic sector (see Table 2.3). Using estimates from Statistics Canada's input-output model for B.C., the child care sector provides an above average direct and indirect GDP multiplier for the B.C. economy: the child care multiplier is 1.9 times larger than the average industry multiplier, a similar margin above non-residential construction, and around 1.6 times larger than other provincial government spending. Furthermore, the child care sector has one of the highest induced multipliers of all sectors in the economy. When the direct, indirect, and induced effects are combined, child care boosts GDP by $1.63 per dollar of increased expenditure as compared with $0.86 for the average industry and $1.04 for other provincial government spending.

TABLE 2.3: MULTIPLIERS OF CHILD CARE IN VARIOUS REGIONS

Reference	Location	Multiplier
MacGillvary and Lucia (2011)	California	2.00 (Type II)
Bartik (2006a)	U.S.	2.78 (state), 3.79 (national)
Pratt and Kay (2006)	New York State	1.35 (Type I), 1.78 (Type II)
Warner et al. (2003)	Tompkins County, NY	1.60 (Type II)
Warner et al. (2004)	New York City, NY	1.91
Warner and Liu (2004)	U.S.	1.49 (Type I), 1.91 (Type II)
Prentice (2008)	Manitoba	1.58

The literature that estimates costs and benefits of quality, affordable child care programs consistently shows that the benefits exceed costs. The extensive Chicago child-parent centres program and two randomised studies — the High Scope/Perry and Carolina Abecedarian programs in the U.S. — show costs repaid several times over for disadvantaged children. Other child care programs, both targeted and universal, show positive albeit smaller net benefits to society per dollar spent. For Canada, Fairholm (2009) found the net present value of benefits to be $2.54 per dollar invested and Cleveland and Krashinsky (1998) estimated high quality child care in Canada would return over $2 per dollar invested. For the U.S., Karoly and Bigelow (2005) estimated that a universal child care program in California would yield benefits of $2 to $4 for every dollar invested, and Belfield (2005) estimated that every dollar invested provides future benefits worth $2.25 for the Louisiana child care system. Kilburn and Karoly (2008) cite an average of 48 preschool programs that have a benefit/cost ratio of 2.36. Bartik et al. (2012) estimate that the earnings gains alone from Oklahoma's universal pre-K program provide a return of $3 or $4 per dollar invested.

Several economists have estimated the returns to universal pre-K using the available data and a range of assumptions (Barnett, 2008b; Bartik, 2011; Bartik, Gormley and

Adelstein, 2012; Karoly and Bigelow, 2005; Lynch, 2007). Some estimates generate returns as high as $7 per dollar invested. Several conclude that pre-K for all can yield a larger net return than a program that serves only low-income children. A benefit-cost analysis for Oklahoma's universal pre-K program finds that earnings increases alone provide a return of $3 to $4 per dollar invested (Bartik et al., 2012).

Notably, after extracting only the long-term benefits (beyond 20 years) to children from a study by Fairholm and Davis (2010) it can be shown that the net present value (NPV) has increased dramatically using a lower discount rate consistent with current economic conditions. As of late October 2016, the Government of Canada long-term bond yield was 1.89 per cent, which is below the expected long-term inflation rate of 2.0 per cent, leading to a negative real interest rate. Using a real discount rate of 0.25 per cent rather than the 3 per cent real discount rate used earlier, the long-term benefits via children expand from $2.43 per hour of child care provided to $4.77 per hour in 2005 dollars. The estimated net cost of the provision of quality child care in that study was $4.11 per hour. The breakeven point between the net present value of costs and benefits is at a real interest rate of 0.82 per cent. As of October 27, 2016, the B.C. government bond maturing on June 18, 2037 had a yield of 2.75 per cent, which represents a real interest rate of 0.75 per cent given long-term inflation expectations anchored at 2 per cent. Therefore, the long-term benefits exceed the operational costs of a new child care system.

TABLE 2.4: LONG-TERM BENEFITS TO CHILDREN EXCEED SHORT-TERM COSTS CONSIDERING CURRENT INTEREST RATES

Net present value (NPV)	Hourly costs/benefits
NPV hourly net costs of regulated child care	$4.10
NPV hourly net benefits children 3% real discount rate	$2.43
NPV hourly net benefits children 0.75% real discount rate	$4.18
NPV hourly net benefits children 0.25% real discount rate	$4.77

Of particular note is the analysis of the Quebec situation conducted by Fortin et al. (2012), which estimated the general economic impacts of the Quebec program. They find that the Quebec government's subsidy of child care, which lowered parent fees to $5 per day in current dollars (later $7 per day) helped to boost the percentage of children in regulated child care from 16 per cent in 1998 to 43 per cent by 2008 for children under age six. They estimated that by 2008 there was a 69,700 increase in the number of working mothers as a result of the program compared with the rest of Canada based on the estimates of Lefebvre et al. (2009) and Lefebvre et al. (2011).

Fortin et al. estimate that this increase in employment helped to boost GDP by 1.7 per cent and generate $1.585 billion in 2008 dollars in higher tax revenues. Moreover, the employment gains for mothers of children under age six were evenly spread between mothers with and without university degrees. The increase in employment had the

effect of lowering the poverty rate for single mother families from 36 per cent in 1996 to 22 per cent by 2008, and boosted their after-tax income by 81 per cent. The number of single-parent families on social assistance in Quebec declined from 99,000 to 45,000, which helped to lower social assistance payments by an estimated $116 million annually in 2008 dollars. The combined budgetary effect of higher revenues and lower social assistance payments is $1.701 billion in 2008 dollars. The gross cost of the child care subsidies was $1.796 billion in 2008 dollars, which implies that the net cost of the program to the provincial government by 2008 was $95 million in 2008 dollars. However, they also estimated that the costs associated with child care expense deductions decreased by $150 million in 2008 dollars because children in subsidized care are not eligible for this deduction. After including all revenue increases and expenditure reductions, Quebec's net budgetary impact was a gain of $55 million in 2008 dollars.

Ivanova (2015) examined the economic impact of expanded child care for B.C. using the estimates from Fortin et al. (2012) and applying them to the B.C. economy as of 2014. Specifically she estimates there would be 39,200 more working mothers and a 1.7 per cent increase in B.C.'s overall employment rate (ratio of employment to population 15 years and over). B.C. would also experience an increase of $3.9 billion in current dollars or 1.6 per cent in provincial GDP as a result of more mothers working as of 2014. Ivanova notes that the estimate does not include the increased employment of early childhood educators to staff the newly built child care spaces. Ivanova's estimate of the fiscal returns of $10aDay child care in B.C. does not explicitly include provisions for savings in government expenditures as a result of better child care. She estimates that there would be a boost to direct and indirect government revenues of $1.3 billion in current dollars ($630 million in provincial revenues and $668 million in federal revenues) as of 2014.

PHASE 3: IMPACT OF THE $10aDAY PLAN

THE SHORT-TERM ECONOMIC IMPACT on the provincial economy arising from the $10aDay Plan was calculated using Statistics Canada's B.C. input-output (IO) model estimates. IO models provide multipliers used to assess the provincial (or Canadian) economic impact caused by an initial change in final demand expenditure such as a new construction project or increase in government spending, or from an increase in output of a given industry.

The short-term economic impact on the provincial economy arising from the $10aDay Plan was estimated from Statistics Canada's B.C. input-output (IO) model.

The $10aDay Plan was divided into component parts in order to track the impact of these policy changes through the B.C. economy. To that end, the analysis was carried out at a detailed sub-sector level including regulated (non-profit, private, family) and unregulated (license-not-required (LNR) and home child care (HCC) providers). First, each of these sub-sectors were placed into the appropriate North America Industry Classification (NAICS), as defined by Statistics Canada, since the expansion of output by different industries has different impacts on the provincial economy.

For each of the sub-sectors, revenues were calculated based on spaces, utilization, fee and government subsidy/transfer estimates. To make the calculations consistent with the input-output estimates from Statistics Canada — which provides impact estimates for gross output, GDP, government subsidies, employment and income — the model was calibrated to provide the same government subsidy or transfer payment estimate (as a share of gross output) as the input-output model for business services and non-profit sub-sectors within the overall child care sector. Unregulated home child care providers are deemed to be part of the Private Households industry, which means that all income including transfer payments goes into personal income.[36]

36 In the national income accounts, government payments to organizations are named and treated differently depending on whether they are made to businesses or non-profits. Payments from governments to businesses, which reduces the cost of a product, is a product subsidy and directly adds to value added (GDP at basic prices). The same type of payment made to non-profits is called a transfer payment and adds to income. In the detailed IO impact tables, product subsidies are explicitly shown, while transfer payments to the non-profit sector can be estimated based on the detailed commodity output estimates. Transfer payments to the non-profit sector directly lead to higher non-profit consumption that affects gross output.

Statistics Canada's provincial IO model available at the time of this study provides multiplier estimates for 2010. An examination of the IO impact estimates shows that government subsidies to business, and transfer payments to non-profits, play a central role in the impact estimates. Given that the most recent IO estimates are for 2010, they do not reflect policy changes since that time. The most significant, relevant policy change was the introduction of full school-day kindergarten, which substantially changed the level of public subsidies/transfer payments provided to the child care system. To more accurately capture the economic impact of this policy change on the different components of the child care system, subsidies/transfer payments were projected to 2016 under the assumption that the relative subsidy/transfer ratio in each sub-sector remains the same with respect to the number of children in each sector.[37] For 2016 these estimates were constructed based on the most recent utilization rates and the number of licensed child care spaces that the B.C. government reported for 2015/2016, which in turn was based on the Ministry's 2015/16 Annual Service Plan Report. This analysis assumed that the spaces were distributed between age groups and sub-sectors in the same proportion as in the past.

The first set of impact estimates focuses on the effect of the operation of the new system compared with the existing system via the impact on the economy from (1) the injection of money into the system through government subsidies and (2) the withdrawal of money through lower parent fees. The impact estimates start in 2017 with the underlying case being the No Change scenario in which child care spaces or utilization rates remain at 2016 levels through 2035. Under the $10aDay Plan all parts of the system receive subsidies to maintain the existing spaces. All of the expansion of spaces for children under age six is contained in the non-profit sector. By 2025, the full number of required spaces projected by Anderson is achieved and are left at that level in order to illustrate the subsequent effect on the economy. The model assumes an increase in child care utilization rates for regulated child care: the non-profit and private sub-sectors will reach 100 per cent by that year to reflect the higher efficiency of the new system and family child care will experience an increase that is consistent with the gains found by Baker et al. (2008) for Quebec. However, there is crowding out of the unregulated sub-sector as families choose to move from informal care to regulated child care in a manner consistent with the Baker et al. study.

Table 3.1 summarizes the revenue impact arising from the increased subsidies and reduced fees paid by parents. For each of three main sub-sectors there is an immediate negative revenue shock associated with the decline in fees to $10 per day. Over time, as utilization rates rise, the negative impact on overall fee revenues decreases and there is an offsetting increase in subsidies/transfer payments from the provincial government. The net effect is an increase in overall revenues of over $1.7 billion by

37 The IO estimates were rebalanced to reflect the change in worker wages and subsidies/transfers to the child care sector by government since the IO year of 2010. For example, the IO estimates were adjusted to reflect the higher wages included in the $10aDay Plan, which lowers the employment multiplier.

2025.[38] These revenue changes flow through the provincial economy, resulting in higher GDP and employment.[39]

TABLE 3.1: REVENUE IMPACT VIA NEW SUBSIDIES/FEES

Operational: revenues	2020	2025	2030
	$2015 millions		
Product subsidies	1,143.1	1,867.9	1,868.4
Gross fees	-196.0	-160.8	-160.8
Other sales	-0.6	4.4	4.4
Total revenue	946.5	1,711.5	1,711.9
Including: Regulated (non-profit, private, family) and unregulated (license-not-required and home child care).			

The change in the level and mix of income has different effects on different parts of the child care system. Using direct, indirect and induced IO multipliers to calculate the effects for each sub-sector, the net direct impact on GDP at basic prices is an increase of approximately $1.5 billion by 2025, and the impact stays near that level through 2030 (see Table 3.2). Throughout the implementation period, the increasing participation of children in child care results in a related increase in other purchases, such as equipment, food, etc. The resulting net indirect impact on the economy via these purchases is $300 million. Since most of the costs associated with child care are related to labour costs, the indirect effect is relatively small. The induced effect reflects the increase in labour income associated with the direct and indirect effects. Since labour is a large component of overall child care costs, the net induced effect is quite large compared with other industries.

TABLE 3.2: GDP IMPACT ON VIA NEW SUBSIDY/FEES

Operational: GDP at basic prices	2020	2025	2030
	$2015 millions		
Direct	848.7	1,496.9	1,497.3
Indirect	172.3	300.3	300.3
Induced	358.5	644.2	644.4
Total	1,379.5	2,441.4	2,442.0
Including: Regulated (non-profit, private, family) and unregulated (license-not-required and home child care).			

38 By design the projected number of child care spaces and attendance are left at 2025 levels, when the full implementation is achieved, in order to highlight the short-term effect on the economy from the implementation and operation of the Plan.

39 The impact estimates are in real 2015 dollars and only reflect the impact on the B.C. economy. There are spillover effects into other provinces that are not included.

The injection of money into the child care sector for the operation of the larger system will also result in more employment. Using direct, indirect and induced IO employment multipliers, the employment effects can be calculated.[40] There are estimated to be 19,400 net new workers via the direct employment effect, as shown in Table 3.3, as a result of the increase in spending and activity for the operation of the new child care system. Employment will increase by an additional 4,300 workers via the indirect effect as suppliers respond to the increase in demand from the child care sector by expanding their production. The increase in spending by households as a result of the direct and indirect channels will boost employment by an additional 4,900 by 2025. Overall there is a gain of 28,600 jobs for the B.C. economy from the impact on the provincial economy from the increased spending associated with the operation of the new system.

TABLE 3.3: EMPLOYMENT IMPACT VIA NEW SUBSIDIES/FEES

Operational: Employment	2020	2025	2030
	(FTE)		
Direct	10,900	19,400	19,400
Indirect	2,400	4,300	4,300
Induced	2,700	4,900	4,900
Total	**16,100**	**28,600**	**28,600**

Including: Regulated (non-profit, private, family) and unregulated (license-not-required and home child care).

In addition to the impact on the economy from the operation of the new system, there will be additional stimulus via the needed construction expenditure. The impact is summarized in Table 3.4. The total GDP impact is in the range of $28.8 million, which reflects leakages out of the provincial economy from this activity compared with the expansion of the child care services. The employment effect is 340.

40 Similar to the rebalanced of the IO GDP impact estimates made necessary by the large changes in subsidy/transfer payments, the employment multipliers also need adjustment because of the much higher wages proposed by the $10aDay Plan of between $20 and $30 per hour. Higher wages mean the direct job multiplier per dollar spent will be less than the IO estimates provided by Statistics Canada for 2010.

TABLE 3.4: CONSTRUCTION EXPENDITURE IMPACT

	2017	2025
	$2015 millions	
Construction spending	33.5	33.5
GDP at basic prices	$2015 millions	
Direct	14.1	14.1
Indirect	8.0	8.0
Induced	6.7	6.7
Total	28.8	28.8
Employment	FTE	
Direct	190	190
Indirect	90	90
Induced	60	60
Total	340	340

Each child participating in child care is expected to result in 0.272 mothers working full time (using 0.5 FTE per part-time job).[41] This rate of work is below what was found by Baker et al., but it allows B.C. to catch up to the employment rate evident in Quebec in recent years. This is a very conservative assumption because the B.C. child care system is projected to provide for a larger share of children than is currently provided in the Quebec system. Table 3.5 summarizes the estimated impact from the direct increase in mothers' labour supply and the follow-on increase in household expenditures, projecting an increase of $1.959 billion by 2025 ($3.601 billion if the 0.5 mothers per child in child care found by Baker et al. in Quebec is used). The bulk of the increase is realized from the regulated sub-sector owing to the increased utilization and the expansion in the non-profit sector. There is a small negative impact on the overall labour supply effect as the unregulated child care providers are partly crowded out.

TABLE 3.5: TOTAL LABOUR SUPPLY EFFECTS

	2020	2025	2030
GDP at basic prices ($2015 millions)	995.2	1,958.8	1,958.8
Employment (FTE)	12,600	24,800	24,800

41 Based on the literature on mothers' labour supply effects, the impact on mothers' labour force and hours worked would be larger than the increase in employment. In this analysis only the impact on employment was used and the impact on labour force and hours were not estimated.

There are a number of other factors that will influence the economy as a result of the expansion of the non-profit child care system, and their impacts are summarized in Table 3.6. There will be a reduction in government spending resulting from lower rates of grade retention, special education and teacher turnover. While these effects will benefit the government's budget balance, they will cause negative effects on the economy via multiplier effects from reduced provincial education spending. Including the direct, indirect and induced effects the net impact on GDP is $32.6 million by 2025, rising to $49.6 million by 2030. The negative impact on employment is 400 by 2025, rising to 600 by 2030.

The large decline in child care fees will have an impact on household budgets. Parents who already have children participating in child care will receive a major boost to their household disposable income. Also, there will be a net gain to parents who shift from the informal to the regulated child care sector. These gains will be partly offset by parents shifting from relatives at an effective cost of zero to the regulated child care system. On balance, there is a net gain to the household sector of around $260 million. These gains will flow through the economy in an analogous way to the induced effect described above, causing a boost to GDP of approximately $170 million by 2025 and creating 1,700 jobs.

TABLE 3.6: OTHER FACTORS

	2020	2025	2030
Reduced education spending ($2015 millions)	**-11.6**	**-24.6**	**-37.4**
GDP impact ($2015 millions)	-15.4	-32.6	-49.6
Jobs impact (FTE)	-200	-400	-600
Reduced social assistance spending ($2015 millions)	**-42.4**	**-82.6**	**-82.6**
GDP at basic prices	-7.2	-14.0	-14.0
Jobs impact (FTE)	-100	-100	-100
Household budget effect (net impact $2015 millions)	**269.5**	**259.0**	**259.0**
GDP impact ($2015 millions)	179.1	172.1	172.1
Jobs impact (FTE)	1,800	1,700	1,700
Productivity, turnover, absenteeism (net impact $2015 millions)	**830.2**	**979.5**	**1008.1**
GDP impact ($2015 millions)	1056.3	1232.9	1258.2
Jobs impact (FTE)	12,200	14,200	14,500

There are also productivity, turnover and absenteeism effects that increase business profits, but the impact on GDP will depend on whether or not those additional profits are spent in the provincial economy. A best guess of the impact is constructed by assuming that that 37.5 per cent of this gain is directed toward higher employment and 37.5 per cent for higher investment (of which 34 per cent is machinery and 66 per cent construction), and the remaining 25 per cent is used to pay higher dividends and corporate income taxes and

increase retained earnings. In this case the result will be an increase of over $1.2 billion in GDP and over 14,000 jobs. However, these effects do not include the impact on the business income via higher GDP from the other stimulus channels.

Given the magnitude of the program, there is a sizable impact on the provincial economy from all of the above channels including the stimulus from the increase in government spending, mothers' labour supply effect, the productivity channel, etc. As summarized in Table 3.7, real GDP in rises by $5.787 billion by 2025 and $5.768 billion by 2030. Compared with the most recent C_4SE B.C. provincial outlook, GDP is projected to increase by approximately 2.0 per cent by 2025, and 1.8 per cent by 2030. There is also a large impact on employment from all of the above channels, with overall B.C. employment increasing by around 69,000 jobs by 2025 through 2030, which boosts B.C. total employment by 2.8 per cent by 2025, and 2.7 per cent by 2030.

TABLE 3.7: TOTAL IMPACTS AND MULTIPLIERS

	2020	2025	2030
Total GDP impact ($2015 millions)	**3,616.4**	**5,787.4**	**5,767.5**
% of GDP	1.3%	2.0%	1.8%
Total employment impact	42,700	69,100	68,900
% of employment	1.7%	2.8%	2.7%
Employment multiplier			
Child care	14.0	15.3	15.3
Construction	10.2	10.2	
Total	**36.3**	**36.4**	**36.9**
GDP multiplier			
Operations	1.2	1.3	1.3
Construction	0.9	0.9	
Total	**3.1**	**3.0**	**3.1**

Source: C_4SE BC Outlook, and calculations by author.

Given the various channels that affect the economy outside the typical input-output impact assessments, the multiplier effects are quite large. The GDP multiplier is estimated at 3.0 and the employment multiplier for 2025 is 36.4 jobs per million dollars, which includes the impact associated with the projected reduction in education and social assistance costs for government as well as the projected benefits to employers from productivity increases and reduced employee turnover and absenteeism. Notably, the exact multiplier can vary depending on the assumptions made regarding the productivity effects, the size of the social

assistance effect and whether or not the corporate profit channel is included. Assumptions about the latter were not included in order to estimate conservatively.[42]

In light of the plan's scale and potential impacts, it should be rolled out slowly so as not to exacerbate short-term inflation and cost pressures and to ensure that sufficient numbers of qualified early childhood educators are available so the program delivers quality child care. Given that the plan includes a very large supply effect via mothers' labour supply, the risk of an inflationary erosion to the gains of the $10aDay Plan are reduced.

Table 3.8 summarizes the estimated impacts on overall government expenditures arising from implementation of the $10aDay Plan. Overall, net government spending is projected to increase to $1.794 billion by 2025, and falling to $1.748 billion by 2030. These estimates include the potential savings to government via reduced social assistance and education spending.

On the other hand, Table 3.9 summarizes the estimated impacts on government revenues using the conservative assumptions discussed above. Overall, net government revenues are projected to increase by $1.952 billion by 2025 and $1.933 billion by 2030.

TABLE 3.8: IMPACT ON OVERALL GOVERNMENT SECTOR EXPENDITURES

Increase in government spending	2020	2025	2030
	$2015 millions		
Construction spending	33.5	33.5	0
Total subsidies	1,143.1	1,867.9	1,868.4
Spending including construction	1,176.6	1,901.5	1,868.4
Reduced education spending	-11.6	-24.6	-37.4
Reduced social assistance	-42.4	-82.6	-82.6
Total government spending increase	**1,122.6**	**1,794.3**	**1,748.4**

TABLE 3.9: IMPACT ON OVERALL GOVERNMENT SECTOR REVENUES

Increase in government revenues	2020	2025	2030
	$2015 millions		
Construction spending	9.4	9.6	0.0
Child care operations	732.1	1,388.5	1,388.7
Reduced education spending	-6.3	-13.6	-20.6
Social assistance	-2.9	-5.7	-5.7
Household budgetary effect	73.7	71.7	71.7
Productivity enhancements	428.7	501.9	498.6
Total government revenue increase	**1,234.7**	**1,952.4**	**1,932.5**

42 Including the profit channel could boost the GDP and employment impacts by 0.2 per cent and 0.2-0.3 per cent respectively.

Thus, the overall government sectors' budget is projected to achieve a surplus of $158 million in 2025, rising to $184.2 million by 2025 and $201.7 million by 2035, as shown in Table 3.10.[43]

TABLE 3.10: IMPACT ON OVERALL GOVERNMENT SECTOR BUDGETARY BALANCE

Government revenues less expenditures	2020	2025	2030
	$2015 millions		
Construction spending	-24.1	-23.9	0.0
Child care operation	-410.9	-479.4	-479.6
Education spending	5.3	11.0	16.8
Social assistance spending	39.5	76.8	76.8
Other channels	502.4	573.6	570.2
Total budgetary balance impact	**112.1**	**158.1**	**184.2**

Finally, it's important to highlight that the implications of the new program for the overall government sector's budgetary balance varies depending on the assumptions used. The scenario outlined above reflects conservative assumptions. If, for example, the corporate profit channel is included it would add around $300 million in total government sector revenues by 2025. Moreover, if mothers enter the paid labour force at a rate similar to the rate found for Quebec by Baker et al., the overall government sector's budget balance would improve by an additional $595.1 million.

Furthermore, a scenario under which parent fees are assumed to be $20 per day, rather than the $10 per day proposed in the Plan, illustrates the potential trade-off between the cost of the system to governments and parents and the extent of the socioeconomic benefits to society. The analysis used results from the reform of the Swedish child care system over the 2001 to 2003 period, because it represented a change in fees in a similar range in Canadian dollar terms.

The results of the analysis are summarized in Appendix II. Both the $10aDay Plan and the $20 per day scenario are projected to realize positive government budget balances, although the $10aDay Plan requires a higher level of direct government spending and contributes $205 million less to the projected overall budget balance. However, the $10aDay Plan results in a higher number of children utilizing child care, more mothers returning to work and a larger increase in overall GDP and jobs.

43 Overall government sector includes federal, provincial, municipal and Canada Pension Plan.

Summary of Key Findings

This study estimates the short-term socio-economic impacts arising from the implementation and operation of the proposed $10aDay Child Care Plan for the province of British Columbia.[44] The analysis considers several impacts on the provincial economy, including the economic effects from the construction and operation of the new system and the resulting increase in mothers' labour supply. The analysis also illustrates the impact on the government sector's revenues and expenditures.

Based on the assumptions outlined throughout this report, the implementation of the $10aDay Child Care Plan is projected to generate sufficient overall government sector revenues to pay for the additional government spending required to build and operate the system.

In summary, based on the assumptions outlined throughout this report, the implementation of the $10aDay Child Care Plan is projected to generate sufficient overall government sector revenues to pay for the additional government spending required to build and operate the system. The underlying assumptions are conservative, particularly related to the projected increase in mothers' labour supply.

This analysis also projects substantial benefits to employers and households throughout the implementation period, and beyond. Full implementation of the $10aDay Plan will have a significant and positive impact on GDP and jobs. The increase to GDP is estimated at close to 2.0 per cent or $5.787 billion on full implementation, which is more than 3.0 times the total cost increase to government associated with the Plan (including both construction and operational costs). Increased employment on full implementation is in the range of 2.8 per cent, or 69,100 net new FTE jobs, which is an employment multiplier of 36.4 jobs per million dollars of spending. Both of these multipliers are well above the benefits the province conventionally expects to receive from other investments.

Moreover, it is likely that these gains will provide particularly significant benefits to lone mothers, and help many families to leave social assistance, which will reduce income inequality.

The study also compared the economic impacts of the $10aDay Plan to a scenario that charges parent fees at $20 per day. Both approaches are projected to realize positive government budget balances, although the $10aDay Plan requires a higher level of direct government spending and the projected overall budget balance is lower. However, the $10aDay Plan results in a higher number of children utilizing child care, more mothers returning to work and a larger increase in overall GDP and jobs.

Although the analysis focuses on the near-term implications of the $10aDay Plan, research indicates that the benefits should increase over time, as children who benefit from high quality, affordable child care enter adulthood healthier, better educated and less likely to be involved in the criminal justice system—all of which

44 See www.10aDay.ca for more information about the $10aDay Plan.

contribute to higher earnings, higher tax revenues for governments and reduced government spending.

Finally, the analysis confirms that the projected benefits to government are shared between the B.C. and federal governments. The province is responsible for child care and the increased expenditures associated with the Plan, while the federal government receives a higher portion of the revenues because of its generally higher tax rates. Thus, it is reasonable to anticipate a cost-shared approach to financing the $10aDay Plan, with the federal government contributing at a level that is commensurate with its expected gain in revenues.

APPENDIX I: SHORT-TO-MEDIUM TERM BENEFITS TO CHILDREN

This section contains an analysis of the short-to-medium benefits to children from quality early childhood education and care (ECEC) that was used in the assessment of the impact on education spending. Costs of providing ECEC, as well as hours, are estimated. The benefits via participating children are calculated. Benefits to participants in early learning and their parents are calculated mainly using the same methodology as outlined in Fairholm (2009). Higher educational quality in the new system was taken into account by adjusting for child-staff ratios and the percentage of staff with an early childhood education degree.

TABLE A-1: DETAILED COST AND BENEFITS OF THREE CHILD CARE PROGRAMS

Costs and benefits per participant	High Scope/ Perry Preschool	Chicago Child-Parent Centres	Carolina Abecedarian
	(per participant, present value, 2002 constant dollars, 3% real discount rate)		
Program costs	15,844	7,384	35,864
Program benefits	138,486	74,981	135,546
Child care	946	1,829	-
K12 education savings	8,812	5,377	8,836
Child welfare settings	-	850	-
Adult education settings	363	-	-
College	-1,113	-615	-8,128
Participant earnings	38,892	30,638	43,253
Smoking health	-	-	17,781
Crime savings	90,246	36,902	-
Welfare savings	340	-	196
Maternal earnings, age 26 to 60	-	-	73,608
Benefits/costs	8.74	10.15	3.78

Source: Temple and Reynolds (2007)

Benefits To Children

The benefits to children from ECEC are approximated through several steps. First, key results from the Carolina Abecedarian program are selected for the estimation of ECEC costs and benefits. Second, the above results are adjusted to reflect the Canadian situation. This is done to make it possible to estimate benefits from quality ECEC to an average Canadian child rather than a disadvantaged child in the U.S. (these benefits are called the "adjusted Abecedarian benefits"). Third, adjusted Abecedarian benefits are converted to reflect B.C. ECEC benefits by making an adjustment for differences in ECEC quality. These quality adjustments are undertaken for the current and proposed early learning system. Fourth, ECEC benefits are converted to hourly terms.

Benefits from the Abecedarian Program

There are a large number of studies that have examined the benefits of quality ECEC. Studies that follow a randomized experimental approach are the gold standard of research and provide unbiased estimates as to the benefits of ECEC. Of the two main experimental studies of ECEC costs and benefits, the Carolina Abecedarian study is preferable to the High/Scope Perry pre-school study, since the Carolina Abecedarian study is more recent and analyzes full-day rather than part-day ECEC. Some of the results of the Carolina Abecedarian program are used to calculate ECEC short-term benefits via participating children (see Table A.2).

TABLE A.2: CAROLINA ABECEDARIAN RESULTS

	Participants	Controls
Grade retention rate (held back one or more grades)	31%	55%
Years in special education	1.0	1.5
Math score (Woodcock Johnson)	93	82

Adjusted Abecedarian Benefits

The Carolina Abecedarian program deals with disadvantaged children, while B.C. ECEC deals with all children. Since many articles have shown that disadvantaged children benefit more from quality ECEC, the Carolina Abecedarian results are adjusted downwards. To determine by how much to adjust the results downwards, estimates from Loeb et al. (2007) on ECEC score increases for disadvantaged and all children are used (see Table A.3). Dividing the average score increases for disadvantaged children (very low income) by the average score increase of all children gives an adjustment factor of 0.55. The adjustment factor is applied to the percentage achievement difference between Carolina Abecedarian participants and controls. The resulting Abecedarian adjustments are listed in Table A.4.

The adjusted difference is then multiplied by Canadian data for the various results (retention, etc.)[45] and the resulting value of a change in the results in order to give benefits per B.C. participant (see Table A.4). This gives a slight underestimate of the benefits from ECEC since the control group includes both participants and non-participants.

TABLE A.3: ECEC SCORE INCREASE

	Math	Verbal	Average
Score increase—all	1.116	1.196	1.156
Score increase—very low income	2.015	2.191	2.103

The benefits for all age cohorts from zero to five are calculated. The reduction in the need for special education is significantly larger than the benefit from a reduction in grade retention rates. These estimates do not include the benefits associated with the reduction in criminal justice and health costs and the increase in educational attainment and earnings associated with quality child care participation in the early years. These additional benefits begin to appear during the teenage years, but are most significant in adulthood.

TABLE A.4: ADJUSTMENTS TO REFLECT AVERAGE VERSUS DISADVANTAGED COHORTS

	Participants	Control	Difference	Adjusted Difference
Grade retention rate	31%	55%	-44%	-24%
Years in special education	1	1.5	-33%	-18%
Math score (Woodcock Johnson)	93	82	13%	7%

45 Source for grade retention rates: Guèvremont et al. (2007), source for years of special education: http://www.tdsb.on.ca/wwwdocuments/about_us/environmental_scan_2007/docs/3-OurStudents080731.pdf

APPENDIX II: SENSITIVITY ANALYSIS

This appendix contains a sensitivity analysis to illustrate the implications for B.C. from charging parent fees at $20 per day rather than $10 per day.

Compared with existing fees, a reduction to either $10 or $20 per day represents a significant drop in child care fees for parents. For example, median fees were $995 per month for infants and $925 per month for toddlers in 2015. A $10 per day fee represents a decline of 78.9 per cent for infants and 77.3 per cent for toddlers, while at $20 per day, the decline in fees would be 56 per cent for infants and 54 per cent for toddlers.[46]

There are a number of important considerations when modelling the alternative scenario. First, the $20 per day scenario assumes that all families with lower incomes who would have received full funding under the $10aDay Plan will also receive full funding in the alternative scenario. Second, similar to the $10aDay Plan scenario, the analysis assumes that the B.C. government will fund sufficient regulated spaces for all children requiring child care. The third key assumption is with respect to the price sensitivity of B.C. parents.

As discussed in Section 2.2 on the benefits to parents, Canadian parents are very price sensitive to changes in child care fees. Most Canadian studies show own-price elasticities of child care utilization in the range of -1.0, which means that a 10 per cent increase in fees will lead to a 10 per cent drop in the utilization of formal child care services. The high degree of price sensitivity of Canadian parents is likely related to the high fees they currently face and the large share of their household budgets devoted to child care costs. Since these estimates of own-price elasticity are calculated using existing fees, it is likely that they do not represent the degree of price sensitivity of B.C. parents when fees are much lower. For example, in Quebec the demand for child care continued to rise despite the increase in fees from $5 to $7 per day in current dollars. Therefore, the sensitivity analysis considers the likelihood that B.C. parents' price sensitivity will change once fees are lowered to the $10–$20 per day range and rationing is eliminated.[47]

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46 Using 21 days per month the monthly fee would be $210 at $10 per day and $420 at $20 per day.

47 The point on the demand curve will change when fees are $10 per day compared with $45, so the marginal change in demand will be different for the same percentage change in price. Typically demand curves are more price inelastic at low prices, and more price elastic at high prices.

In Quebec's case, it is not clear if all excess demand has been eliminated, so it is difficult to estimate price elasticity in this low-fee scenario and apply it to B.C. Therefore, the analysis reviewed the international research for evidence from countries that experienced reforms at a similar price point and child care utilization rate as the proposed difference between the $20 and $10 per day child care. And, in order to exclude the lowest family income quartile, the analysis requires an examination that differentiates demand by family income levels. The results of this review highlighted the Swedish reform of 2002–2003, and some of the analysis associated with that reform.[48]

Lunlin et al. (2007) estimated the average hourly child care fee before and after the reform. Translating this estimate into Canadian dollars using the Canada/Swedish exchange rate in 2001 and 2003, and the average hours of care of 9.2 hours per day, produces a Canadian dollar fee per day equivalent of $20.34 before the reform and $10.67 after the reform in current dollars. Brink et al. (2007) estimated the response of different income cohorts to the reforms. They found that the lowest quartile experienced the largest impact, and the impact on those in the median cohort was smaller. The upper quartile did not experience a significant response to the change in parent fees. Using Brink et al.'s estimates, the price elasticity was calculated to be in the range of -0.1 to -0.12 for child care utilization.

Using the upper level of this estimate, and applying it to B.C.'s proposed universal child care system with parent fees changed from $10 to $20 per day, suggests that an additional 21,135 new FTE stand-alone spaces will require capital funding from the provincial government by 2025, compared with the No Change scenario (or 9,050 less than the $10aDay Plan).[49] As with the $10aDay Plan, the analysis assumes that the average cost is $10,000 per space. With 2,348 new FTE spaces constructed each year, total construction expenditures are $23.5 million per year from 2017 to 2025. Each year the construction expenditures will result in a $20.2 million increase in GDP and 200 more FTE jobs compared with the No Change scenario. However, the projected impact under the $10aDay Plan is higher, providing an additional $8.6 million in GDP and 100 jobs per year through 2025.

To finance the operation of the new child care system, net new provincial government subsidies totalling $1.414 billion are required by 2025. Overall revenue in the child care sector by 2025 will increase by $1.528 billion compared to the No Change scenario. The result of these changes is an increase in provincial GDP of $2.156 billion by 2025. An additional 25,500 FTE jobs are created as a result of the operation of the new child care system.

After including the other channels of stimulus — such as household budgetary effect, mothers' labour supply effect, productivity, turnover, absenteeism, education and social assistance spending changes — the full impact on GDP is $5.061 billion by 2025, which represents 1.7 per cent of GDP. The employment impact is in the range of 61,000 and 2.5 per cent of total

48 The Swedish reform differentiated fees by income levels up to a maximum.

49 An additional 22,164 spaces are required compared with 2015 levels, but the estimated increase in spaces for children 0–5 is 1,028 from the gain in overall child care spaces as per the 2015/16 Service Plan, so the increase in spaces from the No Change scenario is 21,135 or 2,348 per year from 2017 to 2025.

employment in 2025. As Table B.1 shows, these results are lower than those projected under the $10aDay Plan: GDP is lower by $727 million in 2025, and employment is lower by 8,200.

The above estimates do not include the potential gain from the profit channel, which could increase GDP by $649.6 million and 7,500 jobs in 2025.

The impact on the overall government sector's budgetary balance is summarized below and compared to the impact under the $10aDay Plan. Both scenarios are projected to realize positive overall government budget balances. However, the $20 per day scenario will contribute an additional $205 million to the government budget balance in 2025, relative to the $10aDay Plan. Notably, direct government expenditures under the $20 per day scenario — which includes the construction costs and operating subsidies described above, offset by reduced education and social assistance spending — are $458 million less in 2025 than the expenditures under the $10aDay Plan.

Clearly there are trade-offs between the $10aDay Plan and an approach that charges parent fees of $20 per day. From the perspective of this economic analysis, one trade-off relates to the impact on the economy versus the impact on the government's budgetary position. Relative to the $20 per day scenario, the $10aDay Plan requires a higher level of direct government spending, and the projected overall budget balance is lower. On the other hand, the $10aDay Plan results in a higher number of children utilizing child care, more mothers returning to work, and a larger increase in overall GDP and jobs.

TABLE B.1: TOTAL IMPACT FROM ALL CHANNELS IN 2025

	$10aDay Plan	$20 per day	Difference
Total GDP ($2015 millions)	5,787.4	5,060.7	-726.7
% of B.C. GDP	2.0%	1.7%	-0.3%
Total employment	69,100	61,000	-8,200
% of B.C. employment	2.8%	2.5%	-0.3%
Government spending increase	$2015 millions		
	1,794.3	1,336.1	-458.1
Total government revenue	1,952.5	1,699.8	-252.7
Total government budget balance	**158.1**	**363.7**	**205.5**

Source: Calculations by author and C_4SE BC Provincial Forecast

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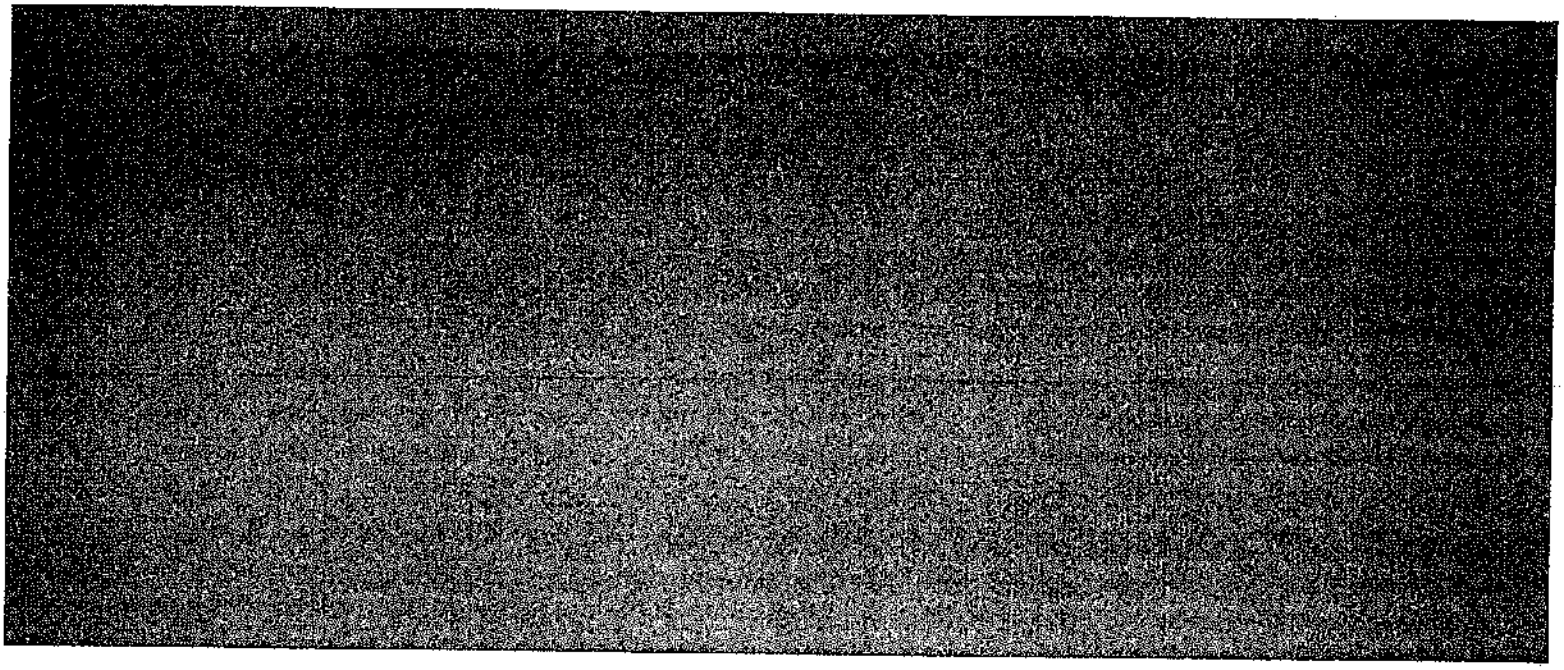

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