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## **Québec's Childcare Universal Low Fees Policy 10 Years After : Effects, Costs and Benefits**

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The analysis is based on Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY) and Survey on Labour and Income Dynamics (SLID) restricted-access Micro Data Files, which contain anonymized data collected in the NLSCY and the SLID and are available at the Québec Inter-university Centre for Social Statistics (QICSS), one of the Canadian Research Data Centres network. All computations on these micro-data were prepared by the authors who assume the responsibility for the use and interpretation of these data. This research was funded by the Fonds québécois de la recherche sur la société et la culture.

**Abstract:**

More than ten years ago the province of Québec implemented a universal early childhood education and care policy. This paper examines if the two objectives pursued, to increase mothers' participation in the labour market (balance the needs of workplace and home) and to enhance child development and equality of opportunity for children, were reasonable meet. A non-experimental evaluation framework based on multiple pre- and post-treatment periods is used to estimate the policy effects. First, year after year the number of children and their weekly of hours in childcare have increased. More preschool children are in non-parental childcare at a younger age and the intensity of childcare has increased over the years. Second, the policy has significantly increased the labour force participation and annual weeks worked for mothers with at least a child aged 1 to 4 years compared to mothers in the same situation in the Rest of Canada. Third, the evidence presented show that the policy has not enhanced school readiness or child early literacy skills in general, with negative significant effects on the PPVT scores of children aged 5 and possibly negative for children of age 4. Simulations show the bounds of the public benefits in terms of additional net taxes (income taxes less refundable credits and transfers based on household's "net" income). Unless one suppose that mothers in the upper part of the earnings distribution are those who returned early to the labour market after giving birth or a maternity leave, and who have worked more weeks, the effect on governments revenues are modest. The main beneficiary of the larger tax base of a higher labour supply of mothers with young children is the federal government which do not support the significant public funding of the program. The policy has some drawbacks in terms of social efficiency and equity. The structure of the program with its very low \$7/day fee before taxes creates strong incentives for families to use long hours of daycare for children at a very young age, which may not be the best mechanism for children development. The high transfers in-kind (1.9 billion in 2009) to families using subsidized childcare raise the question of their horizontal and vertical equity. The paper concludes on three modifications to the program that could correct some of its weaknesses.

**Keywords:** Childcare policy, mother's labour supply, preschool children and school readiness, treatment effects, natural experiment

**JEL Classification:** H42, J21, J22

## 1. Introduction

Early childhood education and care (ECEC) has become a major concern for policy makers across the world. More than ten years ago the province of Québec embarked on the development of a universal ECEC program with some particularities.

On September 1<sup>st</sup> 1997, the government of Québec implemented a new childcare policy. From that day on, accredited and regulated childcare facilities offered subsidized daycare (\$5 per child per full-day fee policy) for children who were 4 years of age on September 30<sup>th</sup> 1997. The government also promised to progressively decrease (every year) the age requirement for subsidies and increase the number of subsidized \$5/per day daycare spaces, targeting a number of 200,000 for 2006. By September 2000, the low-fee policy applied to all children aged 0 to 59 months (not eligible for kindergarten) and the number of (partly subsidized) regulated spaces increased from 77,000 (available in late 1997) to 210,000 totally subsidized spaces, by end of March 2010 (see Table 1 for these figures).

Families' childcare arrangements changed dramatically over time as the policy favoured regulated subsidized centre-based care (as well as for family-based care under the supervision of not-for-profit centres). This new childcare policy was integrated with other major changes in education policy including full-time publicly-provided kindergarten in a school setting replacing half-day school-based kindergarten with \$5 per day before- and after-school daycare for kindergarten-age and elementary-school children. No such important policy changes for preschool (including kindergarten) children were enacted in the other Canadian provinces over the years 1997 to 2009.

The policy pursued three major objectives: to increase mothers' participation in the labour market, balance the needs of workplace and home and to enhance child development and equality of opportunity for children. These goals are not particular to Québec and have been pursued in several countries since the eighties as ECEC public policies have spearheaded family policy.<sup>1</sup>

Despite the large amount of public funds dedicated to this program (see Table 2) – direct public subsidies to childcare providers increased from \$288 million in fiscal year 1996-1997 to \$2.0 billion for fiscal year 2010-2011<sup>2</sup> – very few studies (reviewed below) have examined whether the objectives have been reasonably met.

It is important to use the Québec experiment as a beacon to form expectations about the longer term effects of such an ECEC policy (as well as anticipate problems that could emerge from a

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<sup>1</sup> The approach is similar to the ones adopted by several European countries. See OECD (2001, 2006) for a review of ECEC policies.

<sup>2</sup> The initial expenditures (school infrastructure, equipment, materials and hiring of new teachers) associated with the passage to full-time kindergarten has been estimated for the first year at 200 million dollars by the Department of Education.

universal low-fees childcare policy if it becomes effective across Canada) as some aspects may ripple to other provinces. For examples, British Columbia has adopted to phased-in over two years a full-day kindergarten for the 5-year-olds beginning with the 2010-11 academic year.<sup>3</sup> Ontario has partly adopted a grand plan on early learning (Pascal, 2009): for the academic year 2010-11 nearly 600 schools currently offer full-day kindergarten, and by 2015-16 all elementary schools should have full-day kindergarten for all 4- and 5-year-olds. Full-day kindergarten will include optional integrated before- and after-school programs (providing a seamless day with fewer transitions for children and families) in which parents can choose to enrol their child for a reasonable fee.<sup>4</sup> The Web site of the Department of Education of these two provinces are convinced that full-day kindergarten will help kids prepare for grade 1 and that they stand a better chance of graduating from both grade 12 and a post-secondary institution. In Ontario the full-day learning is part of the province's plan to reduce poverty.<sup>5</sup>

This study presents estimates of the economic payoffs from this unique large scale “natural” policy experiment in Canada potentially affecting children from all income groups and with a particular relevance for the school readiness of older preschool children. Given that most ECEC policies in the United States are targeted towards disadvantaged children, the results can be very useful to policy makers more interested in universal ECEC programs.

This paper use data from the seven available cycles of Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY) and difference-in-differences methods to tease out the effects of the childcare program This paper answers the following questions on labour supply and use of daycare: what are the effects of the policy on hours in daycare by children's age, mothers' level of education, and year? What are the impacts on mother's labour force participation and annual weeks worked by age of children, mothers' level of education, and year? Because the NLSCY provides a much larger sample than the Survey on Labour Income and Dynamic (SLID), we can estimate the impact of the policy by sub-groups (age of children, mother's education levels), an exercise rarely undertaken; and also observe whether the positive impacts of the policy on labour supply in the earlier studies (see section 3 below) are persisting in the province of Québec. There are several reasons to pursue research on this policy in detail for several sub-groups. First, it is of interest to observe whether the impacts differ by age, particularly for the very young as the policy interacts with parental leave and kindergarten policies. Second, it is important to ask whether the policy of passing

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<sup>3</sup> Provincial funding of \$280 million over three years is being provided, while \$144 million for related construction needs and provision of space was announced in June 2010.

<sup>4</sup> Ontario's full day learning program is projected to cost 1.5 billion dollars at full implementation.

<sup>5</sup> For an ex-ante evaluation of the Ontario plan see Fairholm and Davies (2010).

from publicly financed half-day kindergarten to full-day and pre- and after-school publicly subsidized daycare in 1997 had an impact on the labour supply of mothers with 5-year-olds, in particular; because the government of Ontario is implementing a full-day program (instead of a part-day) for the 4- and 5-year-olds. Finally, it is of interest to observe whether the impacts differ by the mother's level of education. The objective of motivating low-educated mothers to return to the labour market is a long-standing concern of policy makers, because attaching them to the labour market reduces public costs in many areas (welfare, poverty, family security, etc.). Also, there are equity issues around universal type policies (in Québec all families pay the same price, except welfare mothers returning in the labour market who pay reduced fees). Are skilled mothers, who generally in higher income families, more sensitive to the subsidies than low-skilled mothers?

There is a growing body of evidence that some ECEC interventions can lead to both short and long term gains for young children be they cognitive or non-cognitive (emotional outcomes or social skills). However, Baker, Gruber and Milligan (2008) produced quite substantive evidence that Québec policy had a negative impact on diverse behavioral measures of the "well-being" and health of both children (0 to 4 year olds) and parents. In this paper, we focus on the impacts of the policy on cognitive development. Has the policy improved children's school cognitive readiness in Québec? Has the policy diminished "social" gaps (e.g. between children with a low-education mother and those with a high-education mother) in school readiness? How does half-day pre/kindergarten in a public school setting (the policy chosen by the Province of Ontario for 4- and 5-year-olds before 2010) compare with Québec's childcare policy?

Our results show that the large increases in hours of childcare and labour market outcomes (participation and weeks) found in earlier papers until 2002 are also found until 2006-2007. However, we find that there is considerable heterogeneity of the effects across age groups of the children and across the education levels of the mother. For our cognitive measure, the Peabody Picture and Vocabulary Test (PPVT),<sup>6</sup> our evidence does not reveal positive effects of the policy on cognitive development for both 4- and 5-year-olds. For 4-year-olds, we find that the policy decreased the standardized PPVT scores but the effects are not significant except for raw scores; for the 5-year-olds, the decreases are significant, on average approximately by one fourth of a standard deviation. Furthermore, the results for two sub-samples of children based on the mother's education (mothers with a high school education or less, and mothers with a university degree) suggest that the policy did not reduce "social" gaps in school readiness and that the policy effects are sensitive to the mother's education level.

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<sup>6</sup> A receptive vocabulary test (on early literacy skills), an outcome often used as an appropriate measure of cognitive development.

In the last part of the paper, we seek to address the question of the public costs and benefits of the policy. The monetary costs are given by the public funds dedicated to the program. The public benefits are estimated by a simulation, using data drawn from Statistics Canada's Survey of Labour and Income Dynamics (SLID), of the household's changes in their income taxes and transfers by level of government associated to the higher labour supply of mothers. Because of data limitations, (child care expenditures for example are available only from 1999 in the SLID), and other minor policies that may impact taxes and transfers, we do not use a difference in difference approach to estimate the benefits of the policy. We rather assume, (based on the results in this paper and Lefebvre, Merrigan and Verstraete, 2009) that the policy increased the labour supply of mothers with children aged from 1 to 11 years by ten percentage points in 2004 and then proceed to estimate by how much the increased labour supply increased the tax returns and lowered the tax credits of both the federal and Québec provincial government. Because, the estimation methods cannot identify which mothers would leave the labour market in Québec without the policy, the tax-transfers benefits of the policy can only be bounded. We find that even in the best of scenarios, the benefits from increased labour supply for the government of Québec of the childcare policy fall very short of the public costs. Moreover the benefits favour more the federal government.

The rest of the paper proceeds as follows: Section 2 presents the low-fee childcare policy, childcare use and arrangements over its inception and traces the unique evolution of Québec among Canadian provinces in this regard. Section 3 reviews prior research evidence. Section 4 identifies the conceptual issues and lays the framework for the analysis. Section 5 presents results on hours of care. Section 6 contains the empirical results on labour force participation and weeks of work. Section 7 discusses the results of the policy on cognitive scores of the 4- and 5-year-olds. Section 8 presents the estimated impacts of the policy on the changes in household incomes taxes and transfers for both levels of government. Section 9 concludes on the benefits and costs of Québec's childcare policy.

## **2. Québec's low-fee childcare policy, childcare use and arrangements**

On September 1<sup>st</sup> 1997, licensed and regulated childcare facilities under agreement with Québec's Department of the Family (not-for-profit centres, family-based daycare and for-profit centres) started offering spaces at the reduced contribution of \$5 per day per child, for children aged 4 on September 30<sup>th</sup>. On September 1<sup>st</sup> 1998 and on September 1<sup>st</sup> 1999 respectively, the 3-year-olds and 2-year-olds (on September 30<sup>th</sup>) were eligible for the low-fee spaces. On September 1<sup>st</sup> 2000, all children all children aged less than 59 months (not entitled to kindergarten because their fifth birthday is after September 30) became eligible for the low-fee spaces.

For children aged 5 on September 30 1997, full-day instead of part-day kindergarten was offered by all School Boards (some private schools already offered this option). Kindergarten is not compulsory but if a child is enrolled in a public school, he or she must attend class for the full school day and school week. All provinces offer publicly provided free kindergarten for 5-year-olds in a school setting under the auspices of the Department of Education. All programs are for a half-day (2 hours and 30 minutes) during the school year, except in Québec (which is for a full day since the fall of 1997), New-Brunswick, and Nova-Scotia (for British Columbia and Ontario see above). In almost all provinces parents are free to register their child in kindergarten as it is not compulsory; but a very large majority of eligible children do attend kindergarten. In Ontario, most School Boards offer a half-day junior kindergarten for the 4-year-olds. Again, most eligible children attend these kindergartens. In Québec, since the fall of 1997, almost all 5-year-olds attend full-time kindergarten (98% compared to 85% before the policy change) while a large number attend before- after-school subsidized daycare settings (53% according to administrative data for the school year 2003-2004). Although there are differences in policies for kindergarten, the only major *change* in kindergarten policy over the period of our study occurred in Québec. Furthermore, the fact that in Ontario most 4- and 5-year-olds are enrolled in public (pre)kindergarten suggests that this province offers an interesting control group as an alternative to the nine provinces for cognitive scores.

Table 1 presents the evolution of the number of spaces partly or totally subsidized by the government from 1993-1994 to 2009-2010 by type of childcare setting as well as the total number of Québec's children in different age groups by year. We observe that non-profit services are the main beneficiaries of the policy. The yearly increases from 1998 (although low-fee spaces were only for the 4-year-olds) are substantial. The rate of growth of subsidized spaces increased in the second year of the program (childcare facilities and spaces are created throughout the year). Regulated spaces in the network increased from 76,715 (partly at the low-fee) in 1998 to 132,545 (all at low-fee) in 2001; and to 210,019 in 2009, a 173 percentage raises.

Since the introduction of the policy, it is well known that the program has not been able to satisfy all of the increased demand for low-fee spaces. It is difficult to obtain data on the number of children on waiting lists with no access to a subsidized space. Families can turn to private providers of childcare services (non-subsidized and non regulated spaces) and obtain a refundable tax credit for their childcare expenses.<sup>7</sup> To decrease the demand pressure on subsidized spaces, the tax credit was improved two times (2008 and 2009). Since 2009, the maximum expense is \$9,000 per child aged

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<sup>7</sup> In 1994, the Québec's childcare deduction was transformed into a refundable tax credit. The tax credit varied from 75% to 26%, based on family income (26% for household earnings of \$84,040 or over in 2008) and eligible childcare expenses subjected to certain limits.

less than 7 years of age, the credit rate table changed (75% to 44%) and family income enhanced to \$125,000 or over for the lowest rate, to reduce the net-cost<sup>8</sup> difference between private and reduced-contribution childcare services.

In Québec, before September 1997, some subsidies partially covering fixed costs were directed to all licensed and regulated childcare facilities; and low-income families received a fee-subsidy according to eligibility criteria. Table 2 displays the evolution and targeting of spending from 1996 onwards. In 1996-1997, these subsidies amounted to 288 million dollars. Table 2 also shows the budgetary credits for the childcare program by settings as well its transformation from a parent fee-subsidy program to a childcare providers subsidies program. In 2009-2010, subsidies had reached 2 billion dollars practically all directed towards daycare providers. Since January 1 2004, the fee per day has been fixed at \$7 instead of \$5<sup>9</sup> (the raises applied also to services offered within public schools). Nonetheless, the subsidy per space continued soaring because childcare educators obtained much better working conditions. In the first year of the policy (covering only the 4-year-olds and parent fee-subsidy for the other children), the mean subsidy per space was \$3,832. For fiscal year 2009-2010, the subsidy amounts to \$9,061 per space. The mean masks important differences by setting and age of children: not-for-profit centres receive the highest average subsidy per space (\$12,810), followed by for-profit centres (\$11,260\$), and family-based spaces the lowest (\$5,447); the subsidy is higher for children aged less than 18 months as the children/educator ratio is lower).

The National longitudinal survey on children and youth (NLSCY), conducted every two years by Statistics Canada since 1994-1995, asks parents if they use childcare services for the purpose of studying or work and for each mode of childcare used the number of hours per week. Figure 1 presents graphs, for Québec and the Rest of Canada (RofC - for the other nine provinces), of the four principal care arrangements used by parents for children from 1 to 4 years of age for the 7 cycles of the NLSCY. A reference line indicates the third wave of the survey (1998-1999), which correspond to the second and third year of the policy implementation. It appears that a larger percentage of children in Québec are in daycare relatively to other provinces since the policy was initiated (1997). Family-based daycare outside of the child's own home is the most widely used mode of daycare across Canada. Daycare is growing rapidly in Québec relatively to other provinces since 1998. Daycare in the household (by relatives or non-relatives) is slightly higher outside of Québec. Centre-based care,

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<sup>8</sup> In fact, after federal taxes and family transfers, the net cost for a subsidized space for a child under age 5 is \$2.87 per day for a family income up to \$150,000. The enhanced refundable tax credit reduces the net-cost to \$3.31 per day up to a family income of \$125,000, on the hypothesis of child care expenses of \$25 per day per child for 260 days (\$6,500).

<sup>9</sup> After the raises, roughly 85% of total costs were covered by the government subsidy. Since, the percentage has decreased because new spaces have been added and operating cost of subsidized spaces has increased steeply.



including before- and after-school care increases rapidly in Québec compared to the other provinces where this arrangement ranks third. Parental care has decreased considerably over the years in Québec. In the RofC, parental care of the 1-4 years has remained the same at approximately 50% since 1998. To summarize, the figures shows an important shift in daycare use occurring in Québec after the introduction of the daycare policy in 1997 but not in the RofC.

In Canada an important changes in parental leave policy had an impact on childcare used for children under age 1. Since December 2000, the maximum number of parental weeks leave paid by the Employment Insurance program to eligible mothers (and spouses) was increased from 25 to 50. From January 2006, Québec opted-out of this program and created its own enhanced (in terms of earnings maximum and replacement ratios) parental leave program.

Figure 2 graphs the mean hours (non conditional on the use of childcare) children spend in the primary care arrangement by age of the children for Québec and the RofC. From the third wave of the survey, there is a large increase in the average hours children spend in daycare for each age group (1 to 4 years) in Québec compared to the RofC. The drop for children under age 1 after 2000 is related to the new parental leave policies. The 5-year-olds, as expected, spend much less time in childcare than 1-4 years and the rise of hours in daycare is much smaller than for younger children. Before 1998 approximately 15% of 5-year-olds were at home and their hours in daycare were 0. From 1998, practically all 5-year-olds are in kindergarten. However, this does not affect hours in daycare. The slight increase is explained by the \$5 per day before- and after-school daycare policy introduced in 1998. Since year 2000, the 1-4 years have spent much more hours in childcare than the same age's children in the RofC.

Table 3 presents the breakdown of children benefiting from the low-fee childcare by age from year 2000 to 2008, and shows the number of children that have been exposed to those childcare services over the years.<sup>10</sup> The first four columns of the Table 3 indicate a significant regression of entry age in child care and a large progression of the proportion of children having experienced childcare by age four. In 2000, 34% of all children aged 0 to 4 years were in low-fee childcare services, 42% in 2002, 49% in 2004, and 53% in 2006. In 2008 a little more than 50% of the 1 year-olds are in child care and more than 60% of the 2-, 3- and 4-year-olds, compared respectively to 26% and 40% in 2000. To summarize, the Tables and Figures presented so far show important shifts in daycare use, modes, and intensity occurring in Québec after the introduction of the childcare policy in 1997 but not in the RofC.

We cannot trace any such elaborate picture relative to the evolution of childcare services for other

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<sup>10</sup> Unfortunately, these administrative data are not publicly available for the years before 2000.

provinces in Canada. Table 4 presents the number of regulated spaces by province for years 2001 and 2006 as well as the number of children receiving subsidies. In 2006, 38% of regulated daycare spaces across Canada are in Québec (200,005 versus 325,753 spaces in the other provinces) where 196,813 children are in a totally subsidized space compared to 155,886 children receiving a total or partial subsidy in the RofC. Table 4 also stresses that Québec has a unique child care regime compared to those existing in the other provinces in terms of provincial funding,<sup>11</sup> monthly (daily) fees and eligibility.

### **3. Prior research evidence early childhood education and care**

#### On mother's labour and use of childcare

Earlier studies find that the Québec experiment of substantial childcare subsidies offered to families with preschool children produced an important increase in the labour supply of the mothers of these children. Lefebvre and Merrigan (2008) use annual data from 1993 to 2002, drawn from Statistics Canada's Survey of Labour and Income Dynamics (SLID), with a sample of *all* Canadian mothers with at least a child aged 1 to 5, and estimate a substantial effect of the policy on a diversity of labour supply indicators (participation, labour earnings, annual weeks and hours worked). In 2002, the effects on participation, earnings, annual hours and weeks worked of the childcare policy are respectively between 8.1 and 12 percentage points, \$5,000-\$6,000 (2001 dollars), 231 to 270 annual hours at work, and 5 to 6 annual weeks at work.

Baker et al. (2008) using the first two cycles (1994-1995 and 1996-1997) and the last two cycles (2000-2001 and 2002-2003) then available of the NLSCY<sup>12</sup>, analyze the impact of Québec's childcare policy on childcare use and maternal work (mothers in *two-parent families only*), of preschool children (0- to 4-year-olds or sub-samples of those children). They also produce estimates showing substantial *mother's employment* effect of the policy and a large increase in non-parental childcare use.

In order to evaluate the potential long-term or life-cycle effects of Québec's universal childcare policy, Lefebvre et al. (2009) estimate both a difference-in-differences (DD) and difference-in-difference-in-differences (DDD) models computed with annual data from the SLID (1996 to 2004) for two groups of Québec's mothers: those with at least a child aged 6 to 11 and no children less than 6, and those with at least a child aged 12 to 17 and no children less than 12; and comparative groups

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<sup>11</sup> In the other provinces, licensed childcare providers may receive one time funding (for the expansion of spaces) or recurring funding (for equipment, infrastructure, administration, salary enhancement grants).

<sup>12</sup> They do not consider the third cycle participants (1998-1999) surveyed during the two years immediately following the phasing-in of Québec's low-fee childcare policy.

of mothers from the RofC and Ontario. They find that the program had substantial dynamic labour supply effects on mothers in Québec, in particular for cohorts of mothers who had a high probability of receiving subsidies from the child's birth to his/her fifth birthday. For example, the results show that the policy increased annual hours worked in 2004 for mothers with at least one child aged 6 to 11 years-old in Québec by 217 hours. Interestingly, Lefebvre and Merrigan (2008) find that the impact of the policy on all mothers with at least one child 1 to 5 years old to be 231 hours in 2002. A striking feature of the results is that they are driven by changes in the labour supply of less educated mothers.

#### On ECEC and child development

There are several observational studies on the effects of maternal employment or early childcare and education on child development (cognitive, behavioural, socio-emotional, and health related). Given our approach, we focus on those using large data sets with a large set of control variables in regression analyses.

First, for studies on *early childcare and maternal employment of children aged 0 to 2*, there is a growing body of empirical results indicating that maternal employment and time spent in childcare during the first year of life can have adverse effects on a child's developmental outcomes (such as verbal, reading and math scores, and indexes of behavioural problems) observed at a later ages (Ruhm, 2004; Waldfogel et al., 2002; Hill et al. 2005). In some articles, early full-time employment is found to be harmful, even after controlling for childcare quality, the quality of the home environment, and maternal sensitivity (Brooks-Gunn et al., 2002; Hill et al., 2002; and for United Kingdom, Gregg et al. 2005).

Second, several studies (Gormley and Gayer, 2005; Gormley et al., 2005; Magnuson et al., 2004, 2005) examine the effect of *preschool programs* on outcomes prior to or at kindergarten entry or later *for children aged 3 to 5* and find significant positive effects on cognitive outcomes (letter-word identification, spelling and applied problems) and measures of school readiness. Longer hours in all types of preschool are associated with more behavioural problems that persist over time. Nonetheless, the cognitive gains for disadvantaged children (whether defined by poverty status, low maternal education, single parent headship, or mothers who do not speak English) are larger and longer lasting. A large-scale UK study following children aged 2 or more who attend center-based preschool shows similar results (Sammons et al., 2002, 2003).

Third, there appears to be an "optimal" minimum age "requirement" before one's child is placed in daycare (O'Brien Caughy et al., 1994; Loeb et al., 2007). The aforementioned studies suggest that this minimum age "requirement" varies between one and two years of age and those long hours children spend in daycare will matter for future outcomes. For disadvantaged children (ages 2-3), 30

hours per week of care for at least 9 months per year (more intensive care) has little detrimental effects on their behaviour, while producing positive effects on their cognitive outcomes. In contrast, the cognitive development of children from wealthier households appears to benefit from daycare outside the home only if it is part-time (between 15 to 30 hours per week for at least 9 months per year). The findings of international evidence (Burger, 2010) indicate that the vast majority of recent early education and care programs had considerable positive short-term effects and somewhat smaller long-term effects on cognitive development; and that in relative terms children from socioeconomically disadvantaged families made as much or slightly more progress than their more advantaged peers.

Fourth, on the question do children learn more in full-day kindergartens than half-day programs,<sup>13</sup> the existing American studies suggests that full-day kindergarten's impact on academic and social outcomes is somewhat mixed, but taken as a whole tends to imply that full-day kindergarten's pros outweigh its cons. One weakness of some studies is their lack of control over student assignment to kindergarten programs<sup>14</sup> and window of observation. Using American longitudinal data (the Early Childhood Longitudinal Study – Kindergarten cohort (ECLS-K), a nationally representative sample of over 8,000 kindergarteners), Lee et al. (2006) found that the full-day kindergarten children learn more in literacy and mathematics over the kindergarten year than those in half-day programs, and that the program is equally effective for children of different social backgrounds (note: this is contrary to findings in most other full-day kindergarten studies, which have found that low-income/at-risk students benefit more from full-day kindergarten than more advantaged peers). Using data from the same survey, DeCicca (2007) find that full-day kindergarten has sizeable impacts on academic achievement during the first year of a program implementation, but the estimated gains are short-lived, particularly for minority children. However, the efficacy of the full-day kindergarten intervention may be contingent upon class size as students in smaller full-day classes benefit more (Zvoch et al, 2008).

Fifth, the quality and effectiveness of care (sensitivity and affective quality of caregiver-child interactions) seems to have positive, but small, effects on cognitive outcomes (Blau, 1999; Duncan, 2003). Of particular interest is Duncan's remark that, when effects of daycare are negative, they are

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<sup>13</sup> The central mechanism of change in the full-day kindergarten environment is the greater instructional window (generally 6 h as opposed to 3 h of daily instruction) that allows teachers more time to use diverse pedagogical approaches (e.g., teacher-directed whole and small group instruction, child-initiated activity) and to present a more comprehensive and challenging curriculum.

<sup>14</sup> White children are more likely to be in half-day programs than full-day ones. Black children are more likely to be in full-day programs than half-day ones; and children in full-day kindergarten are generally less advantaged (lower SES, more likely to be black than white, less proficient in math at start of year) than those in half-day programs.

more pronounced for children who spent all, versus none, of their third and fourth years of life in centre-based care. Moreover, centre-based care is not found to have any significant impact on cognitive outcomes if it was initiated in the early stages of childhood. Finally, this study suggests that children with low initial cognitive skills may benefit most from quality care. Using the same data set as Duncan, Belsky et al. (2007) show that children, whose hours spent in childcare increased between 3 and 54 months of age, scored significantly lower on a vocabulary test in fifth grade. It is the first study with NICHD data that detects such long-term links between experiences in childcare and achievement in school. The authors summarize prior NICHD published work showing that, before the transition to school (at age 4 1/2 years), higher quality childcare was associated with higher levels of pre-academic skills and language scores, whereas more hours in care and increasing hours in care were associated with higher levels of behaviour problems, but not academic skills or language functioning. Thus an important increase in hours spent by children in care may have long-term negative effects on their vocabulary test scores.

There are few Canadian studies on the same topic. Using cycle 1 (1994-1995) of the NLSCY, Lefebvre and Merrigan (2002) show that non-parental care (centre- or family-based), compared to parental care, has no effect on the cognitive development of children, as measured by an index of their social and motor development (for children aged less than 48 months) or by PPVT scores (4- and 5-year-olds). The estimates show that some observable family characteristics such as the mother's education and immigration status have very strong effects on a child's score. Using six cycles of the NLSCY and quasi-experimental estimation methods, Lefebvre, Merrigan and Verstraete (1998) provide evidence that the policy had substantial negative effects on preschool children's (aged 4 and 5 years) Peabody Picture Vocabulary Test scores. The negative effects are found to be stronger for children with mothers who have lower levels of education. This paper updates the 1998 study. We remind the reader that Baker et al. produced quite substantive evidence that the Québec policy had a negative impact on diverse behavioural and health measures of 0 to 4 year-olds and their parents.

#### **4. Econometric modeling**

We investigate the effect of the program on hours in daycare for children of different age groups, and the impact of the policy on the following two labour supply outcomes that are available in the NLSCY: labour force participation and annual number of weeks. A non-experimental evaluation framework based on multiple pre- and post-treatment periods is used to estimate the policy effects. The econometric approach is based on a "difference-in-differences" procedure which is now well established to evaluate natural experiments (Blundell and Costa Dias, 2009; Angrist and Krueger,

1999). The modeling uses a double difference (DD) estimation technique, where treatment groups are Québec’s children and children of the same age in the Rest of Canada (RofC) are the control groups over several years.

The data used for our empirical analysis are provided by the NLSCY which is a probability survey designed to provide information about children and youth in Canada. The survey covers a comprehensive range of topics (family characteristics and total income) including childcare as well as data on parent(s) labour force activities.<sup>15</sup> The NLSCY began in 1994-1995 and data collection occurs biennially. The unit of analysis for the NLSCY is the child or youth. Since the NLSCY objectives are to produce longitudinal and cross-sectional estimates, several populations are targeted. Supplementary Table A1 presents some particularities of the NLSCY that must be emphasized to understand the type of analysis that can be undertaken.

The “post-treatment period” 1998-1999 (cycle 3) will be considered as the first year of the program even though it was originally implemented in late 1997. It is during the cycle 4 (2000-2001) that all children under age 5 years became eligible and that the “constraint” on the number of subsidized spaces was largely loosened.

To estimate the model, we turn to a DD specification, differentiated by period, presented by Francesconi and Van der Klaauw (2007):

$$Y_{it} = \alpha + \theta Q_{it} + \gamma * I(t \geq s) + \beta_3 D_3 Q_{i3} + \beta_4 D_4 Q_{i4} + \beta_5 D_5 Q_{i5} + \beta_6 D_6 Q_{i6} + \beta_7 D_7 Q_{i7} + \Phi X_{it} + \varepsilon_{it} \quad (1)$$

Where  $i$  indexes children and  $t$  years,  $Y_{it}$  represents the outcome (in our case, weekly hours in childcare, mother’s labour force participation and weeks worked, and children aged 4-5 years cognitive scores).  $\varepsilon_{it}$  is an error term.  $X_{it}$  is a vector of socioeconomic control variables and  $\Phi$  is a vector of parameters.  $Q_{it}$  takes the value of 1 if the child lives in Québec, 0 otherwise.  $I()$  is an indicator function,  $\gamma$  represents the effect of a post-policy aggregate (common to both regions) change in the intercept, and  $s$  is the period the policy is “implemented”.  $D_3, D_4, D_5, D_6$  and  $D_7$  are dummy variables taking the value 1 if the observation is from cycle  $j$  and 0 otherwise,  $j=3, 4, 5, 6, 7$ . When interacted with  $Q$ , they represent post-policy periods in Québec. It is important to include a specification where the effects of the policy vary for each post-policy cycle in order to test the hypothesis that each cohort of children was treated differently, bearing in mind that between each time period, from cycle 3 (1998-2000) to cycle 7 (2006-2007) more than 110,000 new spaces were created (an average of 14,000 per year). Furthermore, the total number of hours spent in care varies

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<sup>15</sup> The NLSCY has much larger samples of young children than the SLID, but only two labour supply variables measured identically over the cycles (number of weeks worked in the year preceding the survey and labour participation at the times of the survey).

quite importantly with each cohort, as can be seen in Figure 2. These remarks justify equation (1), where  $\beta_j$ , for  $j=3, 4, 5, 6, 7$  represents a time or cycle-specific effect of the policy.

Different samples are used for the analysis. First, from the data sets of the 7 cycles, we sampled all children aged 0 to 5 years. Children living in foster families are excluded as well as those (very few) with a mother having missing information on the socioeconomic control variables (see supplementary Table A2). Secondly, for labour supply we constructed two sub-samples by level of education of the mothers (with a high school diploma or less, and with a university degree or more). Thirdly, the estimations are conducted for different age groups, for all mothers and single mothers. All estimations were performed with “bootstrap weights” as computed by Statistics Canada for the NLSCY, which take into account the complex survey scheme.

## **5. Results on hours in non-parental child care**

We start by providing evidence on the effect of the program on hours in daycare for children of different age groups. The program could have different effects on hours in daycare for different cohorts because of the gradual way it was implemented. In order to evaluate this program effect, we estimated a DD model as in equation (1) with different policy effects for different cycles. The socioeconomic controls include the sex of the child, the age group of the mothers at child birth (25-29, 30-34, 35 or more with 14-24 the omitted group), family type (step family, single parent with two-parent the omitted group), whether the mother is born in Canada or not, the mother’s highest level of education (less than high school diploma, high school diploma, some postsecondary education, with university diploma or more the omitted group), the presence and number of older or younger siblings or child of the same age, size of community (five groups from rural to 500,000 or more the omitted group), and family income (other than the mother’s earnings) in 2001 dollars.

Table 5 displays, in panel 1 for the full sample, the policy effects on weekly hours in childcare by age (from under 1 to 5 years and for the 1-4 years age group) and children living with a single mother (last column of the Table), for cycles 3, 4, 5, 6 and 7. These groups are then split by education of the mothers and results are found in panels 2 and 3. For children under 1 and for cycles 4 and 5, the effect of the subsidized daycare program is to raise hours in daycare by respectively, 6.1 and 7.6 hours, in both cases significant ( $p<.01$ ). The not significant effects for cycles 6-7 reflects the increasing number of families using the paid 50 weeks maternity-parental leave federal program or the new Québec program implemented since 2006. For ages 1, 2, 3 and 4, the effects increase substantially from cycle 3 to 7, reaching for the 1-4 age group 2.5, 5.9, 8.7 10,4 and 10.7 hours respectively. In research in this area, such effects much be considered very large and represent a sea change in the lives of children. It

is important to note that cycle 3 effects are all smaller than cycles 5 to 7 effects as new spaces were created every year during that time period. It is quite clear then that the cycles 6 and 7 children were exposed to the longest hours in daycare considering the time since birth. As expected there are no significant positive effects for children age 5 years since almost all are enrolled in kindergarten. The two other panels of Table 5 demonstrate that the “cumulative” effect is substantially larger for women in the higher education group. The effects are clearly positive in the later cycles for both groups when children are aged 1 to 4. The results “bounce around” more, probably due to smaller samples, in particular the later samples for the low-education mothers. The effects are large for both education levels in cycle 7, and are very large for single mothers with a university degree and at a very stage in the implementation of the policy in cycles 3 and 4. The same patterns can be observed for children living with a single parent (last column of Table 5). Clearly, the children from cycles 6 and 7, the last in the data set, were more intensely affected by the program than the earlier cycles. The significance of the results for well educated mothers (starting in cycle 4) also suggests these women took an “early advantage” of the policy, probably for career reasons, compared to women in the lower education group. Another way to put it is that high-education women stand the most to lose, in terms of career advancements, from a prolonged absence from the job market.

## **6. Results on labour force participation and weeks worked**

The same DD specification based on (1) as well as the same socioeconomic controls are included to estimate the effects of the program on mother’s labour participation and week worked in the reference year for the same samples (by ages and mother’s education levels). The econometric results are found in Tables 6 and 7.

### Labour Force Participation

The first panel (all mothers) of Table 6 shows that for the 1-4 years group (column 7), all the effects are significant, large and increasing over the cycles, except for cycle 4 (years of an economic downturn). The smallest effect, 0.08, which is 8 points in the participation rate, is in cycle 3. The effect is higher, 0.09, for mothers with very young children (0-1 year). In general, the estimation shows that the effect increases from cycles 4 to 6 reflecting the subsidisation of new places, and in particular between cycles 5 and 6 where the increase is almost more than 5 percentage points for all age groups except the very young children (0-1) for which the effect decreases substantially between cycles 4 and 5 and then increases. The results are consistent with the hypothesis of a positive effect of the policy on participation of mothers with children less than 5. There is also evidence that this effect has been increasing over time.



The case of 5-year-olds is interesting as the effects are generally positive and large in the later cycles but not significant until cycle 7. What is particular of the children from the later cycles is that the number of childcare spaces available is substantially high since birth. Therefore, the significant effects at age five could be due to the availability of subsidized spaces since birth (see Lefebvre et al., 2009). Therefore, simply changing kindergarten policy from a part-time to a full-time system may not be enough to increase labour supply of mothers with 5-year-olds if it is not accompanied with a daycare policy for the very young.

The larger effects are for the mothers with a child aged 1, 2 and 3 years. It is surprising that the strongest effect is for mothers with very young children as the policy included children aged one year or less only by September 2000 (cycle 4). In fact, estimation for cycle 3 shows that the policy has the strongest effect on mothers with the youngest children (0.13 or 13 points). Since the policy provided spaces for the 0-1 year old children in 2000, we expected a smaller effect for this group in cycle 3. It is possible that parents knew that caregivers could eventually provide a subsidized place when the child got older and simply rushed into the labour market after the birth of the child to be in a position to eventually obtain a subsidized space. The fact that new subsidized spaces would eventually open up was well advertised by the government in the early years of the program. The government also publicized the need to get a child in a subsidized daycare setting as early as possible.<sup>16</sup> There was a very strong incentive to assure a place early on to reap benefits from the policy for as many years as possible. This incentive was lower for mothers with children of four or five as the benefits of the new policy lasted for a much shorter time.

For a child under 1 the effects are decreasing over time. This could be due to the new more generous parental leave (50 instead of 25 weeks) federal policy introduced in the years of cycle 4 (from December 2000) and reflecting the changes in Québec' new parental leave policy (cycle 7). The effects for mothers with a child aged 5 years are not significant, except curiously for cycle 7. This is not surprising giving that most mothers with an attachment to the labour market have returned before their youngest child is of kindergarten age.

The last column of the first panel presents the results for single mothers and the 1-4 years age group. The effects are not all significant, smaller than for the complete sample, and more erratic from

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<sup>16</sup> The web site of the Department in charge of family policy offers the following advice: "First of all, you must decide whether you want childcare in a facility (childcare centre) or in a home environment. Then find out which childcare establishments are located near your home or place of work. In order to have a wide choice, it is best to start looking ahead of time, even as much as a year in advance. Otherwise, there may not be room in the childcare establishment that suits you best when you need it. If you put your child on a waiting list, it is more likely that she/he will be accepted when the time comes for you to use childcare. Establishments regulated by the Department of the Family generally fill up quickly. This is explained by the establishment's good reputation and the possibility of obtaining places for a reduced monetary contribution or with other forms of financial assistance."

cycle 3 to cycle 7. For the 1 to 5 years group (results not shown here), the estimation shows increasing but less pronounced effects over the years.

Panels two and three present the results for samples based on years of education. The first sample, panel two, considers mothers with a secondary diploma or less education. The estimated effects, as for hours in daycare, bounce around more than in the full sample. A steady increase in the impacts is not as clear as for hours in daycare, but the effects are in general larger for in the later cycles (6-7) and are very strong in particular for university educated mothers with children who are 3 years of age and for university educated single mothers with children who are aged 1 to 4 years; they are, however, a rather small group of mothers. Clearly, the positive effects of the policy, found in former papers, are persisting right up to 2006-2007, which in some sense is not surprising as very little new childcare policies have been implemented across the country, except for very targeted groups.

#### Weeks worked

Table 7 presents the results for annual weeks worked. Weeks worked are particular as the standard labour supply model does not predict a positive effect. An income effect of the policy can decrease weeks worked for those who would work a positive amount of weeks without the childcare policy. For the full sample (first panel), we observe that for the 1-4 year-olds there is a sustained policy effect from cycle 4 to cycle 7. The strongest effects are for mothers with very young children 0 to 3 years, mirroring the effects for participation. As expected, for mothers with a child under the age of 1 the effect decreases over time, with a U-shaped pattern, reflecting the changes in the parental leave policies. For the 2- and 3-year-olds we find a monotone increase from cycles 3 to 7. Curiously for 4-year-olds, the effects are all substantially large and positive but with relatively large standard errors making the coefficients not significant. Finally for the 5-year-olds who are almost all in kindergarten, there are no effects except surprisingly in cycle 7. However, the effects in cycle 7 show that the participation effects were not translated into effects on weeks. It is probable that some income effects reduced work weeks for mothers already in the work force when the policy was implemented. The strongest effects are for the 1- and 3-year-olds as the estimated policy effects are less than 2 weeks in cycle 3 and 7 weeks in cycle 6. The explanation for this is the same as for participation. The results by education and type of household mimic quite closely those found on participation. However, overall for low-education mothers, very few coefficients are statistically significant and in general coefficients change much more from one cycle to another in more haphazardly way. For mothers with a high school diploma or less (second panel) and children aged 1-4 years, the policy also has positive effects but smaller than for the well educated and support for the effects is less

strong for the smaller sub-groups. A clearer picture emerges for this group in cycles 6 and 7, with an increase of respectively 4.3 and 5.3 weeks compared to 0.0 week in cycle 3 and 3.7 weeks in cycle 4.

## 7. Child development

The PPVT test was designed to measure receptive or hearing vocabulary. For the NLSCY, it was used to measure school readiness for children in the 4- and 5-year-olds age groups. The master files present both the PPVT raw (PPVT-Raw) and the PPVT standardized (PPVT-SD) scores. However, Statistics Canada has used different methodologies to standardize the scores.<sup>17</sup> The released measurements for cycles 1 to 3 were standardized within cycle (with slight variations in the methodology), while in cycles 4 to 7 scores were standardized over the grand population of all tests over the first 5 cycles of data. Cycles 1 to 3 would in essence look similar from one time to the next as they are standardized by age groups to have the same mean of 100 and standard deviation of 15. This type of standardization is common for analysis of domains within a cycle; however it provides limited insight for in-between cycle analysis. Realizing this limitation, Statistics Canada introduced in cycle 5 a less restrictive normalization technique where the expected age performance is benchmarked against all children of that age over time versus those measured at the same time. The scores are still adjusted by age group to have a mean of 100 and a standard deviation of 15 but computed over 5 cycles, and they are less susceptible to sampling variation as 5 samples have been used to determine the norm. For robustness and to facilitate analysis of changes through time (to capture true population differences over time and not simply differences resulting from sampling error), we have re-standardized (using Statistics Canada smoothing routine) the PPVT-Raw scores using all the 7 cycles in the NLSCY. It should be noted that the standardization was done separately for the PPVT and the EVIP (the acronym for the French adaptation of the test). This should be of no concern as our estimates are based on differences in *changes* of scores over time between the children of Québec, more than 80% French speaking, and those from the RoC or Ontario. We also perform regression analysis with PPVT-Raw scores. In all estimations, there are controls for children taking the test in French (English) in the other provinces (Québec). Only children who understood English or French well enough to follow instructions were given the test.

We sampled all children aged 4 and 5 from the data sets of all 7 cycles. Children living in foster families are excluded as well as those (very few) with a mother with missing information on the socioeconomic control variables (see supplementary Tables A4 and A5). Children with a missing PPVT score are also excluded. Secondly, we constructed two sub-samples by the level of education

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<sup>17</sup> The score is adjusted for the age (the smoothing technique is applied by 2-month age groups) and the language in which the children passed the test (English or French).

of the mothers: low-education (with a high school diploma or less) and high-education (with a university degree or more). Supplementary Table A4 for Québec and Table A5 for the RofC present the mean values of variables used in the regressions. These statistics show that mothers in both regions are very similar except for education in Québec in cycle 2, where better educated mothers are over-sampled, and immigration status (there are less immigrant mothers in Québec) for all cycles.

### Estimation results

We must point out that this paper is not about the evaluation of the effects of childcare on the development of children but an evaluation of the effects of a low-fee for long-hours in daycare policy on development. Non-experimental studies that attempt to estimate the effects of childcare on outcomes are plagued by problems of identification and spurious correlation. First, because most children who are in daycare have working mothers, regression methods have difficulty disentangling the effects of non-parental daycare relative to parental daycare from the effects of a working mother relative to a mother staying at home. Second, because using childcare is a choice, it is a function of unobservable preferences that can also determine the cognitive performance of children. For example, mothers who stay home with their child may in general prefer spending long hours with their child which could be beneficial to the child. On the other hand, some mothers with very low levels of human capital do not work and do not use childcare and it is well-known that on average, children with low-skilled mothers score poorly on cognitive tests. Panel data can alleviate the bias due to spurious correlation but the identification problems remain. The program could have different effects on hours in daycare for different cohorts because of the gradual way it was implemented. In order to evaluate this program effect, we estimated a DD model as in equation (1) with different policy effects for different cycles.

We first discuss the results of the policy on PPVT scores for the 4-year-olds. The estimates of equation (1), by Ordinary Least Squares with standardized or raw scores, without and with covariates, are found in Table 8A (first panel 1).<sup>18</sup> The results show very small and non significant effects with covariates; and for cycles 6 and 7, larger significant effects for the raw scores (column 5) and for both measures with non covariates. The cycle 7 estimate is rather large and negative, but not significant. When we separate the sample by the education level of the mothers, the negative effects become much larger for children with low-educated mothers, reaching a level of -6.0 and significant in cycle 6; strangely the cycle 7 estimate for this group is positive at 1.03, however the sample size for children drops from 87 in cycle 6 to 50 in cycle 7. The coefficients for children with university educated mothers (column 3) is usually small, positive or negative, and never significant. Using 4-

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<sup>18</sup> Table 8B supposes that the post policy period begins with cycle 4 (2000-2001) of the survey. The results are similar.

year-olds Ontarians as a control group does not alter the test results, even if it does alter the sign and/or size of the effects (column4). Therefore, clearly the policy has no positive effect on these children, and if there is one, it would be negative and for children with low-education mothers large enough for policy makers to worry about.

Turning to 5-year-olds, in the second panel of table 8, we find sizable negative and significant effects for models with and without covariates, and with the raw and standardized scores. The same is true when we separate the samples by the level of education of the children's mothers.

We find a negative effect of the policy with a parameter estimate of -4.90 ( $p < .01$ ) for cycle 4 (2002-2003). This is a very large effect (almost one third of a standard deviation of the dependent variable). As a comparison, the *ceteris paribus* "effect" of a mother moving from a high school degree to a university degree is approximately 3. For the other cycles, the estimated parameters are smaller and statistically significant, although, there is not a clear downward trend over time. Results for the raw scores with covariates as well as those without covariates for both measures are similar but higher to the results with the standardized scores and covariates (Table 8, columns 5-7). For cycle 7 (2006-2007) and the full sample, the estimation with covariates provides us with estimates of -3.60 ( $p < .05$ ) for the standardized scores and -6.14 ( $p < .01$ ) for the raw scores. The negative effects are observed for both high- and low-education mothers (columns 2 and 3), but are slightly higher for the sample of children with mothers low-education, although they are less precisely estimated. The specification with only Ontario (Table 8A, column 4) as the control group gives almost the same results as with all nine provinces. Therefore, the picture is not quite what it should be for a policy that seeks to increase early literacy skills and better prepare children for school.

#### "Who Am I?" and Age equivalent number knowledge tests scores

From cycle 4, the NLSCY has introduced two new tests for the 4- and 5 year-olds. The "Who Am I" scale represents the overall score for two direct measures. The assessments measure the child's understanding and use of conventional symbols and relevant early learning skills (nonverbal language). The tasks in the *copying scale* access the development of ability to conceptualize a given figure; the *symbol scale* tasks focus on the understanding that symbols have particular meanings. For cycles 6 and 7, the NLSCY has standardized the raw score by age within cycle (the norm being the respondents from cycles 4 and 5) and cannot be compared over time. Moreover the take-up rate is lower than for the PPVT (response rate of 90% in all cycles): 79% for 4-5 years longitudinal children and 76% for cross-sectional 5 year-olds.<sup>19</sup> Table 9 presents in the first panel the scores (raw and age

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<sup>19</sup> Nonetheless the NLSCY User Guide states: "All the evidence indicates that the test has good validity and should provide data users with information about the child's developmental level. This assessment is not free of non-

standardized) for four samples (Canada, RofC here excludes Ontario, Québec and Ontario). On a cycle basis the scores indicate that Québec's children of both ages generally lag compared to their peers in the other provinces.<sup>20</sup>

The age equivalent number knowledge assessment (response rate of 90-91% in all cycles) measures the child's intuitive knowledge of numbers by assessing their understanding of the system of whole numbers. Panel two of Table 9 presents the distribution of levels for cycles 4 and 7, and the standardized scores for cycles 6 and 7. Again, the scores suggest that Québec's children have lower test scores than their peers in the other provinces.<sup>21</sup>

### Discussion

In summary, the effects of the program are found to be negative for 5-year-olds and less convincingly negative for 4-year-olds. The results for sub-samples of children (mothers' level of education) suggest that the policy did not reduce "social" gaps in school readiness. In fact, the estimates show the negative estimated impacts of the policy are larger for children with a less educated mother.

We propose three major explanations for our results when compared to former studies on the impact of ECEC on preschool cognitive achievement. First, most studies that attempt to evaluate the impact of additional daycare are plagued by endogeneity or spurious correlation problems which is not the case in our study.

Second, rarely can we observe variations in hours of non-parental care for young children of the magnitude observed after the implementation of the program. For example and according to the NLSCY data for primary childcare, in 1994, 45% of all children aged 1 to 4 were in childcare and 68% for more than 21 hours per week (excluding 0 hour); in 2002; 70% of children of the same age are in childcare and 78% for more than 21 hours; in 2006, 74% were in childcare and 83% for more than 21 hours per week. Not only are more children in daycare but they are there for much longer hours.

Third, although more children are now in regulated types of daycare, which is supposed to be helpful or at a minimum not harmful, two major studies (ISQ, 2004; Japel et al., 2005) show that the average quality in Québec's subsidized daycare network is at best satisfactory and in many cases low or not acceptable, particularly for children in lower-income families. Supplementary Table A5

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response bias. One can speculate why the component response is worse for this assessment compared to the PPVT and Number Knowledge tests. Perhaps this assessment was too difficult for some eligible children."

<sup>20</sup> A p-value of adjusted Wald test of difference on estimated mean (not presented here) indicates significant difference for some cycles among samples.

<sup>21</sup> A Kolmogorov-Smirnov equality-of-distributions test (un-weighted data) indicates for almost all distribution a significant difference between Québec children and children of same ages in the other samples.

summarizes the results of the 2004 study on educational quality by characteristics of daycare and overall quality: family-based, for-profit-centre and childcare for infant services are of rather fair quality and, except for non-profit centres, childcare services are largely unsatisfactory or fair in terms of overall quality. Part of this is explained by the rush to implement the program, build up new settings and create new spaces to respond to the excess demand for spaces, which forced the government to accept daycare workers with no specific training in ECEC.<sup>22</sup>

It would therefore be recommended to any province intending to follow Québec's footsteps to be weary of offering long hours to parents at very low prices. Since it is important to offer high-quality daycare services, it would be advised to implement slowly such programs, starting in low-income neighbourhoods, where experimental studies have proven their efficacy when providing high quality services. This would also give some time to the proper educational facilities to start offering programs that better prepare workers for the daycare industry.

## **8. Incomes taxes and transfers changes of the policy by level of government**

In this section we present simulations of the fiscal benefits of the policy for the year 2004. This year is chosen because since 2005 a generous transfer policy to low income families was implemented and could have had some impacts on labour supply. By increasing the labour supply of mothers with young children, the Québec government has increased the tax base for both the provincial and federal government. Also, given that tax credits decrease with 'net' family income, both federal and provincial transfers will be lower because of the policy. As explained below, we suppose the policy increased the participation rate of mothers with children who have at least one child aged 1 to 11 years by 10 percentage points. We use the SLID to compute the fiscal impacts of retiring from the labour market, an equivalent number of working mothers. We choose to remove mothers that have positive earnings.<sup>23</sup> We proceed by simulating income taxes and credits for our sample of mothers using the software written by Milligan (2008), retire the equivalent of 10% of mothers and we then recomputed the families taxes and transfers for these women given that their

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<sup>22</sup> According to administrative data from the Department of Family, in 2001 (2006): 42% (28%) of not-for-profit centres do not respect the ratio of two out of three 'qualified' educators; 25% (11%) of for-profit centres do not respect the very less stringent ratio of 1/3; overall, 40% (33%) of educators have no specific qualification in ECEC. A person is considered as having qualification if she has a university diploma (17%; generally they are directors of centres) or training in ECEC at the university level (6%)/(7.2%), a post-secondary "non-university" degree (37%)/(43%), or a secondary school diploma or vocational training in ECEC (40%)/(44.6%). In 2001, family-based educators have less formal qualification: 45% have a high-school diploma or less, 84% have no specific training in ECEC; and only an average of 7.7 years of experience in childcare occupations. For latter years we have no statistics on qualifications of the self-employed educators in family-based childcare.

<sup>23</sup> Using only those mothers which make more than \$10,000 per year in earnings changed very marginally the results. One can assume that mothers with less than \$10,000 are not in the labour market because of the policy, and would otherwise pay few income taxes.

annual earnings are set to 0. The question is which women should we retire? Our intuition was that the benefits for the government are a positive function of the earnings of the mothers we retire from the market. Therefore, the benefits from this policy for the government can be bounded. If we chose to remove mothers with very low earnings, our lower bound would be smaller. To prove this we perform the first simulation by retiring the mothers with the lowest earnings. We then redo the simulation, retiring the lowest 10 percent of a sample excluding the five lowest earners of the earlier sample. We repeat this 97 times<sup>24</sup> before we get to the final simulation where we retire the top earners of the distribution (always corresponding to 10% of our sample).

The results from our simulations appear in the Figures 5A to 5H. Figure 5A presents a graph that shows the aggregate reduction of provincial transfers to families in Québec created by the increased participation rate. The amounts range from approximately 10 to 50 million dollars. The decrease is not monotonic because the income range where the transfers stop decreasing at the family range is around 60,000 dollars. Hence, wealthy families with both high-income earners receive approximately the same amount of credits whether the mother works or not.<sup>25</sup> Figure 5B presents the same numbers for federal transfers. The decrease is monotonic because transfers hit a floor at much higher income levels at the federal level. The amounts range from approximately 40 million to almost 120 million dollars. The family credits for low-income families in Québec are higher as of 2005, thus the aggregate savings from transfers are probably higher since 2005. Therefore, the credits decreased between 60 and approximately 140 million dollars at the combined level of governments (Figure 5G).

The increased provincial taxes, appearing in Figure 5C, range from about 50 million to 450 million at the provincial level (Figure 5C), and from 50 to 550 million at the federal level (Figure 5D) and are monotonic in both cases. Therefore, overall gains from the taxes on incomes range from 100 to 1000 million dollars (Figure 5H). And, the total savings for the provincial government, including increased taxes and decreased transfers, are between 50 million and 450 million dollars (Figure 5E), while they are between 100 and 650 million dollars at the federal level (Figure 5F), so between 150 and 1.1 billion dollars for both levels.

Because the net cost of the program (families' paid approximately 324 million in fees) in 2004 is approximately 1.4 billion dollars, the fiscal gains from the policy, even in the best case scenario are relatively small for the government of Québec. For more realistic cases, the gain is very small. For

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<sup>24</sup> The simulations have been done retiring one mother at a time. But, for divulgation results, Statistics Canada's analyst at the Research Data Center imposed that at least five mothers should be retired each time which explain the 97 number.

<sup>25</sup> There is potentially a glitch in the calculator for some tax credits in Québec. For childcare expenses, the calculator considers that they all give a refundable credit, which is not the case (for example, the \$7 day fees are excluded from this credit in Québec).



example, if it is the median wage earners who are, enticed by the policy, rejoining the labour market, then the fiscal gains for the provincial government are less than 200 million dollars. One can add possible gains from inducing mothers on welfare to move in the labour market, and fiscal gains associated to getting childcare workers to report their earnings rather than working in the black market (daycare workers do not pay considerable amounts of taxes) but even then the policy seems very costly. Two main reasons explain this result. The program, because it makes childcare so cheap, has a 100% take-up rate, so that almost all children in daycare are in 7\$ per day care. Second, the costs of daycare have exploded because of the unionization of daycare workers and their very strong bargaining power (public opinion supports the program and the childcare workers) which has increased the wages of daycare workers substantially, and the role government in financing not-for-profit centre-based infrastructures.

Surely, some private gains have been achieved. Families with a mother who would have worked without the policy have seen their disposable income increased by the policy. Although by not much as a generous provincial tax credit and federal deduction for childcare expenses were available before the policy (the credit and deduction are even more generous now) and which considerably reduced the net price to approximately 11\$ for a middle income family (Baril, Lefebvre, and Merrigan, 2003). For families with a mother who does find work because of the policy, gains will depend on the earnings from the job.

## **9. Conclusion**

This paper has presented evidence on the effects of Québec's universal low-fee childcare policy as well as full-time kindergarten for the 5-year-olds implemented since September 1997. Three strong results stand out over the years.

First, a very large majority of children aged 1 to 4 years are in childcare and most of them in subsidized centre-based and family-based care. Compared to the RofC, the policy has increased year after year the number of children and weekly hours in childcare. More preschool children are in non-parental childcare at a younger age and the intensity of childcare has increased over the years.

Second, the policy has significantly increased the labour force participation and annual weeks worked for mothers with at least a child aged 1 to 4 years compared to mothers in the same situation in the RofC. For children under 1 the effects, significant and large in the earlier cycles, are overall not significant in the later cycles because of parental leave policies. For 5-years-olds, the effects are significant in the last cycle, showing that simply introducing full-time kindergarten compared to part-

time was not sufficient to increase labour supply. Therefore, the policy increased substantially the labour supply of mother's with young children, one of the policy goals in 1997.

Third, evidence presented has produced negative effects on the PPVT scores of children aged 5 and possibly negative for children of age 4, living with a less educated or a high educated mother. There is no evidence, up to now, that it has enhanced school readiness or child early literacy skills in general, the other major goal of the policy. Our intuition for this result is that children are simply spending too much time, especially when they are under age 3, in daycare for the policy to have any positive effect. This is explained by the structure of the program which creates strong incentives for families to use long hours of daycare for children at a very young age and for all other pre-K ages. For example, the daily fee (\$5 per day per child from September 1997 to 2004, and \$7 since January 2004) is the same for all age groups despite the fact that daycare costs are much higher for the very young.<sup>26</sup> Services are available 10 to 12 hours (depending on the setting) per day, 260 days a year. The government asks daycare providers to make sure parents use daycare services every day of the week (unless the child is sick): if a space is not occupied full-time the subsidy may be reduced. In other words, even if a family would like to pay for a full week despite wanting the service part-time, a child cannot be enrolled for only three days or five half-days per week. Furthermore providers themselves prefer to offer full-time full-week spaces because it is easier to manage.

Of course, we have looked at only one measure of development (abstracting from comments on the 'Who Am I' and number knowledge scores). However, it has been shown to be a consistently good forecaster of schooling achievement in numerous studies. Unfortunately, the data do not permit thorough analysis on the long-term impacts of the policy as only one longitudinal cohort followed after children are older than 5 (4-year-olds in cycle 3) was subjected to the treatment and it lasted only one year.

We conclude by emphasizing that we are estimating the effects of a particular complex daycare policy on the cognitive development of children who are 4 and 5 and not the effects of childcare per se. Therefore, there is no inconsistency with other type of studies that find positive effects of childcare on developmental outcomes. However, this policy, because of its structure, substantially increased hours spent in daycare settings evaluated to be of medium or low quality on average. We surmise that these factors could explain the negative effects found by our regression analyses. Moreover, Belsky et al. (2007) have shown that an important increase in hours spent by children in care has long-term negative effects on their vocabulary test scores. Thus, our results can "bridge" the gap between the short- and long-term.

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<sup>26</sup>The public subsidy provided to not-for-profit centres providers for a child aged less than 18 months is approximately \$60 per day and \$45 per day for a child aged from 18 to 59 months.

### Costs of the policy

For fiscal year 2004-2005, the public cost was 1.4 billion dollars (Table 2). The program provided 178,000 childcare subsidized spaces (Table 1). On the basis on 260 days per year at \$7/day, families paid 324 million dollars, approximately 19% of the total cost. For fiscal year 2009-2010, the figures are respectively 1.9 billion dollars, 375 million dollars and the contribution to total cost equal to 16%. With the 7\$ daily fee frozen to its 2004 value, a larger part of the cost of the policy is covered by public funds. It is interesting to compute the evolution of costs of Québec's childcare policy relatively to the province's GDP (in current Canadian dollars): they increased from 0.16 percentage points in 1996 to 0.71 percentage points in 2009. Thus the policy's costs, in terms of GDP, have more than quadrupled in ten years. Abstracting from the construction costs of new childcare spaces, which have dropped dramatically since the number of newly created spaces cycle-by-cycle has substantially receded (from a peak of +42% between 1998-1999 and 2000-2001 to +16% between 2002-2003 and 2004-2005), the main source of rising costs undoubtedly comes from the salaries paid to the children's educators and to the rest of the staff running the regulated childcare facilities whose numbers have followed the increases in spaces.

### Benefits

The simulations have shown the bounds of the public benefits in terms of additional net taxes (income taxes less refundable credits and transfers based on household's 'net' income). Unless one suppose that mothers in the upper part of the earnings distribution are those who returned early to the labour market after giving birth or a maternity leave, and who have worked more weeks, the effect on governments revenues are modest. This is also linked to earnings of mothers. In 2004, according to data from the SLID, mothers with at least one child aged 1 to 10 years and with labour earnings of \$10,000 or more, the median earnings were \$35,000. By education levels, the median earnings for mothers with a university diploma or more, a high school diploma or less and between the two levels are respectively, \$47,500, \$21,000 and \$29,000.

Advocates of highly subsidized childcare would see two types of social benefits in the fact that more mothers of preschool children are attached to the labour market. First, the labour force participation decision of mothers is a particularly difficult decision because it is sensitive not only to the cost of childcare but also to its quality, availability, convenience, reliability, and security. A regulated and subsidized network may respond to these considerations. For mothers work affords exit from welfare, financial security, experience leading to higher earnings, empowerment, a social network and a bargaining power in family decisions. Secondly, the public subsidies create services

jobs in local communities, jobs with medium skills and “fair” wages. For year 2008 (2001), the centre-based childcare services provided 27,929 (17,365) jobs, mostly educators jobs; and self-employment for 13,693 (9,893) family-based providers who employed 3,295 (1,970) assistants, if a family-based services have more than 6 children to care. More than 95% of these 45,000 (29,228) jobs are occupied by women.

### Social equity and efficiency

Two further considerations can be raised concerning social equity and efficiency. Transfers in kind to families using subsidized childcare, which is the way the Québec’s policy function, raise the question of their horizontal and vertical equity. Using data from the SLID and the NLSCY for year 2002, Grenier (2005) has imputed the value of the in-kind subsidy (after considering incomes taxes to finance the program) by income quartiles of families and their use of childcare by type for families with a child aged 0 to 4 years. Some of his results are summarized in Table A6. The subsidy is higher for higher-income families, although they pay much more income taxes, and their use of the costlier subsidized childcare services increases with income quartile. In his Innis Lecture on equity and equality given to the Canadian Economic Association, Duclos (2006) uses Grenier’s results as one of his examples and concludes:

“The child-care subsidy system thus fails both in terms of vertical and horizontal equity in the income support dimension. Furthermore, and as discussed above, such a preference-based subsidy system also fails in the dimension of freedom to choose. It first horizontally penalizes the freedom of choice of those families that would otherwise prefer those childcare arrangements that are not subsidized by the state. Since those families have on average a lower level of disposable income, that *freedom-to-choose* penalty is also on average larger for those with less well-being in the income dimension. Hence, extending the consideration of well-being to other dimensions *reinforces* the conclusion that Quebec’s current child-care subsidy is both vertically and horizontally inequitable in the income dimension (p. 1001).”

The fact that after federal taxes and family transfers, the net cost for a subsidized space for a child under age 5 is \$2.87 per day for a family income up to \$150,000 dollars reinforces Duclos conclusion.

The policy financial incentives of the program and the day-to-day operations of childcare by providers favour the use of long hours of daycare for children at a very young age. This may not be the best mechanism for children development. And, it may contradict partly the objective of the new parental leave policy that permits parents to spend more time with new-borns with higher benefits than the federal policy, since we observe that a significant proportion of children under the age of 1 are in childcare (Table 3).

### New directions for the policy

On the basis of this analysis, we propose three modifications to the program. First, that every year the fee should be indexed on the increase of the costs of the program. A more radical proposal would

be to charge different fees according to the ages of children (0 to 17 months and 18 months or more) because they imply different cost. Another option would to stop subsidizing childcare for the under the age of one.<sup>27</sup> It would financial impose a restraint on the use of long hours of childcare for very young children and reflects more the social cost of the subsidized spaces. Second, and consequentially, the network should offer more part-time and part-day spaces, options many parents would prefer. Third, the Department of Education should develop gradually a full-time kindergarten in a school setting for the 4-year-olds with before- and after-school childcare (Ontario has already a part-time kindergarten for the four years and will transform it to full-time). Evidence on public kindergarten shows that even if it is not mandatory, families generally choose to enroll their children. Such a policy would offer an option to children from disadvantaged families who do not use childcare and if they do are more likely to use lower-quality childcare, being in double jeopardy as to their development (Japel et al. 2005).

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<sup>27</sup> The Québec parental Insurance Plan paid almost 1 billion dollars in 2009 in pay benefits to eligible workers - salaried and/or self-employed - taking maternity leave, paternity leave, parental leave or adoption leave. It is designed to support new parents, encourage them in their desire to have children and support them as they devote more time to their children in their first months. However, in 2008, 22% of the children aged less than one year (18,500) are in subsidized childcare (see Table 3).

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**Table 1 : Number of childcare regulated spaces and subsidized<sup>1</sup> spaces for preschool children on March 31<sup>st</sup> by setting and number of children aged less than one year, 0 to 4 years and 5 years on July 1<sup>st</sup>, Québec, 1994-2010**

Year	Spaces in not-for-profit network <sup>1</sup>		Spaces in for-profit centre <sup>2</sup> under agreement (not subsidized) <sup>3</sup>	Total number of spaces at a reduced fee <sup>4</sup>	Total number of children [less than 1 year], 0-4 years and (5 years)	Fertility rate: Québec/ Rest of Canada
	Centre	Family-based				
1994	33,452	15,253	(15,665)	64,370	[90,417] 480,098 (90,603)	1.62/1.68
1995	34,545	17,871	(18,366)	70,782	[87,258] 473,113 (96,973)	1.61/1.66
1996	36,708	19,479	(19,842)	76,029	[85,130] 460,657 (99,415)	1.54/1.63
1997	36,101	20,328	17,629 (4,806)	74,058	[79,724] 445,143 (98,853)	1.49/1.56
1998	36,977	21,761	17,979 (5,587)	76,715 <sup>5</sup>	[75,674] 428,297 (94,674)	1.47/1.55
1999	39,436	32,816	23,861 (585)	96,113 <sup>5</sup>	[73,599] 412,161 (91,453)	1.47/1.54
2000	45,793	44,882	23,270 (1,208)	113,545 <sup>5</sup>	[74,157] 399,426 (89,358)	1.45/1.49
2001	51,988	55,979	24,578 (705)	132,545 <sup>5</sup>	[71,664] 381,522 (87,111)	1.50/1.51
2002	58,525	62,193	24,629 (976)	145,624	[72,522] 373,264 (83,582)	1.47/1.50
2003	63,339	75,355	24,740 (1,620)	163,434	[72,083] 368,920 (79,015)	1.50/1.53
2004	68,274	82,044	27,530 (1,907)	177,848	[74,287] 371,028 (76,105)	1.50/1.53
2005	72,057	87,192	30,131 (2,457)	189,380	[75,207] 373,406 (76,130)	1.54/1.54
2006	74,573	89,011	33,034 (3,487)	196,618	[77,765] 379,658 (74,768)	1.65/1.59
2007	75,934	88,645	34,027 (4,538)	198,606	[82,847] 389,661 (75,590)	1.69/1.66
2008	77,165	88,771	35,230 (4,751)	201,166	[85,406] 400,676 (75,241)	1.74/NA
2009	77,864	91,582	36,377 (6,954)	205,823	[88,352] 416,043 (76,789)	1.73/NA
2010	79,547	91,607	38,865 (11,173)	210,019	NA	NA

Sources: Department of Family for number of spaces; Québec's Institute of Statistics for number of children by age.

1. This designation applies more strictly from September 1997. 2. From 1999 to 2003, the government froze the number of for-profit childcare centres under agreement, which also offered spaces at the \$5 per day fee; few new spaces were added for this arrangement during this period. 3. Figures in parenthesis represent spaces in day care centre without an "agreement," that are not subsidized but are licensed and regulated. Those centers are free to choose their daily fee. 4. The reduced (\$5 per day fee) program began on September 1997 for the children aged 4 by September. By January 1 2004, the daily fee was raised to \$7. 5. The \$5 per day fee policy was extended to the 3-year-olds on September 1998, the 2-year-olds on September 1999 and to children of all ages not eligible for kindergarten on September 2000 (fifth birthday after 30 September).



**Table 2: Québec's budgetary credits for the childcare program in millions of dollars by fiscal year (April to March), 1996-1997 to 2010-11**

Fiscal year	Not-for-profit network	For-profit centres	Parent fee-subsidy for day care and special grants in millions of \$	Total subsidies <sup>1</sup>	Subsidy per space in \$
	Centre and family-based childcare				
<b>1996-1997</b>	160	6	122	288	3,888
<b>1997-1998</b>	150	5	129	294	3,832
<b>1998-1999</b>	334	56	80	470	4,890
<b>1999-2000</b>	505	110	27	642	5,654
<b>2000-2001</b>	695	138	11	844	6,376
<b>2001-2002</b>	872	148	1	1,020	7,004
<b>2002-2003</b>	1,019	187	≈ 0	1,206	7,379
<b>2003-2004</b>	1,099	211	≈ 0	1,310 <sup>2</sup>	7,366
<b>2004-2005</b>	1,162	224	≈ 0	1,386 <sup>2</sup>	7,319
<b>2005-2006</b>	1,178	252	≈ 0	1,493 <sup>2</sup>	7,593
<b>2006-2007</b>	1,288	287	≈ 0	1,612 <sup>2</sup>	8,114
<b>2007-2008</b>	1,310	312	≈ 0	1,692 <sup>2</sup>	8,411
<b>2008-2009</b>	1,370	344	≈ 0	1,796 <sup>2</sup>	8,826
<b>2009-2010</b>	1,542	373	≈ 0	1,903 <sup>2</sup>	9,061
<b>2010-2011</b>	1,594	413	≈ 0	2,007 <sup>2</sup>	NA

Sources: For total subsidy, Expenditure Budget (annual), Québec's Treasury Board; for number of spaces, Table 1. The funding includes one-time grants (e.g. start-up), recurring operating grants, special needs funding, and other grants. 2. Including interest and capital charges for not-for-profit centres and government contributions to the retirement plan of employees in all centres. Since January 1<sup>st</sup> 2004, the fee per day has been fixed at \$7 instead of \$5.

**Table 3: Breakdown of children in Québec attending the subsidized (\$5/\$7 per day) day care spaces by age on March and by total number of children by age on July 1<sup>st</sup>, 2000-2008**

	Age of children							
	<1	1	2	3	4	1-4	5 <sup>1</sup>	Total
March 2000								
Number of children	74,157	74,902	78,902	83,488	88,699	325,269	Nr	Nr
Total in day care (1)	12,228	19,379	28,519	36,432	37,790	125,443	3,323	140,994
% in Day care	16.5	25.9	36.5	43.6	42.6	38.6	Nr	Nr
March 2001								
Number of children	71,664	73,957	74,641	78,119	83,123	309,840	Nr	1.07
Total in day care (2)	12,731	22,799	32,349	37,243	41,283	133,674	3,865	150,270
Ratio (2)/(1)	1.04	1.18	1.13	1.02	1.09	1.07	1.16	Nr
% in Day care	17.8	30.8	43.3	47.7	49.7	43.1	Nr	Nr
March 2002								
Number of children	72,522	72,649	74,774	75,244	78,597	301,364	Nr	Nr
Total in day care (3)	14,262	26,360	35,966	40,051	40,192	142,569	2,667	159,498
Ratio (3)/(1)	1.17	1.36	1.26	1.10	1.06	1.14	0.80	1.16
% in Day care	19.7	36.3	48.1	53.3	51.1	47.3	Nr	Nr
Setting								
March 2003								
Number of children	72,083	73,542	73,452	75,581	75,847	298,422	Nr	Nr
Total in day care(4)	14,630	27,105	37,100	41,390	41,590	147,105	2,740	164,455
Ratio (4)/(1)	1.20	1.40	1.30	1.14	1.10	1.17	0.82	1.19
% in Day care	20.3	36.9	50.5	54.8	54.8	49.3	Nr	Nr
March 2004								
Number of children	74,287	73,319	74,207	73,853	75,579	296,958	Nr	Nr
Total in day care (5)	14,920	36,780	39,990	44,330	43,965	165,136	2,179	182,235
Ratio (5)/(1)	1.22	1.90	1.40	1.22	1.16	1.31	0.66	1.32
% in Day care	20.0	50.2	53.9	60.0	58.2	55.8	Nr	Nr
March 2005								
Number of children	75,207	75,087	74,012	74,723	74,372	298,199	Nr	Nr
Total in day care (6)	16,358	40,480	42,413	46,221	45,420	174,534	2,161	193,653
Ratio (6)/(1)	1.34	2.10	1.49	1.27	1.20	1.39	0.65	1.39
% in Day care	21.8	53.9	57.3	61.9	61.1	58.5	Nr	Nr
March 2006								
Number of children	77,765	74,848	74,938	74,140	75,245	299,171	Nr	Nr
Total in day care (7)	17,349	42,612	44,542	48,067	46,765	181,986	2,167	201,502
Ratio (7)/(1)	1.41	2.20	1.56	1.32	1.24	1.45	0.65	1.46
% in Day care	22.3	56.9	59.4	64.8	62.2	60.8	Nr	Nr
March 2007								
Number of children	82,847	78,457	75,403	75,430	74,613	303,903	Nr	Nr
Total (8)	18,114	42,582	45,273	49,733	47,746	185,334	1,972	205,420
Ratio (8)/(1)	1.48	2.20	1.59	1.34	1.26	1.48	0.59	1.49
% in Day care	21.9	54.3	60.0	65.9	64.0	61.0	Nr	Nr
March 2008								
Number of children	85,406	83,703	79,296	76,176	76,096	315,270	Nr	Nr
Total in day care (9)	18,518	44,293	46,731	49,976	48,858	189,848	2,294	210,670
Ratio (9)/(1)	1.51	2.28	1.64	1.37	1.29	1.51	0.69	1.53
% in Day care	21.7	52.9	58.9	65.6	64.2	60.2	Nr	Nr

Sources: Analysis of the Report of Activities submitted by the subsidized childcare services, 2000-2008, Department of Family; Québec's Institute of Statistics for number of children by age, and authors' calculations. 1. About half are 6-year-old kindergarten children and about half of the 5-year-old children are not in (eligible for) kindergarten. Nr: not relevant.

**Table 4: Number of children in regulated child care spaces by province (estimates) 2001 and 2006, number of children receiving subsidies, provincial allocation, median fees, break-even point for fee subsidy, and number of children aged 0 to 5 years, 2006**

Province	Centre and family-based full- and part-day child care for preschool-aged children (0-5) [0-4 in Québec]	Number of children in regulated child care receiving subsidies	Provincial allocation (fee subsidy + one time funding + recurring funding) for regulated child care 2005/2006 Millions \$	Median monthly (daily) parent fees, infant to preschool	Break-even point of eligibility for fee subsidy (net income 2005/06), 2 parents, 1 or 2 children	Number of children aged 0-5
Province/Year	2001	2006	2006	2006	2006	2005
Newfoundland & Labrador	3,632	5,017	1,459	12,3	\$975-\$455 (\$45-\$21)	28,900
Prince Edward Island	3,697	3,394	843	4,7	\$642-\$424 (\$30-\$20)	7,900
Nova Scotia	11,314	13,093	2,804	23,7	(\$27-\$23)	50,900
New Brunswick	5,820	13,163	3,868	22,5	\$547-\$467 (\$25-\$22)	43,800
Québec	132,545	200,005	196,618#	1,493	\$213 (\$7)	434,800
Ontario	118,110	158,727	109,813	534,1	\$783-\$541	822,000
Manitoba	14,130	19,473	10,830	86,3	\$560-\$230	76,900
Saskatchewan	4,106	7,805	3,672	22,8	\$390-\$275	67,100
Alberta	41,011	47,587	11,932	72,5	\$575-\$400	228,400
British Columbia	36,383	54,007	10,665	176,1	\$750-\$550	233,200
Canada	370,748	522,371	352,504	2,448	-	1,993,900

Sources: Friendly, Beach and Turiano (2007, 2002); and Tables 1 and 2 for Québec.

Notes: # Number of subsidized spaces with a daily fee of \$7. ## Assuming an average daily child care fee of \$43: 10% of net income over \$20,000 and additional 20% over \$40,000. If net income is \$20,000, contribution is \$0; if net income is \$40,000, contribution is \$8; if net income is \$60,000, contribution is \$31; if net income is \$70,000, contribution is \$42.

**Table 5: Estimated effects of the policy on weekly hours in daycare by children's age and mothers' level of education and cycle p-value of bootstrapped standard errors)**

Treatment parameters of equation 1	Age of children							
	Under 1	1	2	3	4	5	1-4	1-4
	1. All children							Single mothers
$\beta_3$ (cycle 3)	-0.3 (1.09)	1.4 (0.96)	3.3 (1.61)**	2.7 (1.37)*	2.2 (1.64)	-2.5 (0.95)***	2.5 (0.70)***	8.5 (2.40)***
$\beta_4$ (cycle 4)	6.1 (1.34)***	3.8 (1.37)***	8.2 (1.44)***	6.5 (1.33)***	5.5 (1.84)***	-1.4 (1.15)	5.9 (0.78)***	4.7 (2.47)*
$\beta_5$ (cycle 5)	7.6 (1.70)***	7.8 (1.57)***	10.9 (1.73)***	8.6 (1.65)***	7.3 (1.51)***	1.0 (1.14)	8.7 (0.82)***	10.4 (2.59)***
$\beta_6$ (cycle 6)	-0.3 (1.29)	10.2 (1.49)***	12.1 (1.85)***	10.3 (1.81)***	9.3 (2.16)***	-2.5 (1.27)*	10.4 (0.94)***	11.1 (2.97)***
$\beta_7$ (cycle 7)	0.6 (1.35)	7.5 (1.55)***	10.5 (1.70)***	12.6 (1.44)***	12.5 (1.83)***	0.4 (1.55)	10.7 (0.84)***	10.4 (2.63)***
Observations	11,361	18,460	11,744	15,052	11,334	20,691	56,590	7,215
	2. Children of mothers with a level of education equal to a secondary diploma or less							
$\beta_3$ (cycle 3)	0.0 (1.64)	0.6 (1.42)	6.2 (2.67)**	0.5 (2.71)	-3.7 (2.49)	2.7 (1.26)**	1.0 (1.25)	6.1 (3.02)**
$\beta_4$ (cycle 4)	3.2 (2.09)	3.3 (2.30)	3.8 (2.07)*	2.4 (2.29)	1.2 (3.55)	-1.3 (1.75)	2.8 (1.42)*	2.5 (2.82)
$\beta_5$ (cycle 5)	11.5 (3.28)***	3.7 (2.52)	10.4 (2.93)***	6.6 (3.24)**	1.1 (2.54)	1.2 (1.63)	5.8 (1.45)***	6.1 (3.38)*
$\beta_6$ (cycle 6)	0.3 (1.87)	10.6 (2.60)***	15.0 (2.82)***	7.3 (3.19)**	2.5 (3.65)	-2.6 (1.73)	8.6 (1.66)***	7.7 (3.89)**
$\beta_7$ (cycle 7)	4.3 (2.93)	10.6 (3.26)***	9.2 (3.66)**	11.1 (2.76)***	11.7 (3.75)***	3.4 (4.12)	10.9 (1.74)***	8.5 (3.89)**
Observations	3,448	5,711	3,617	4,805	3,525	6,545	17,658	3,470
	3. Children of mothers with a university degree or more							
$\beta_3$ (cycle 3)	0.5 (1.76)	2.3 (1.55)	1.5 (2.38)	4.4 (2.08)**	3.9 (2.68)	-3.1 (1.80)*	3.1 (1.11)***	14.1 (4.61)***
$\beta_4$ (cycle 4)	7.3 (2.10)***	6.3 (2.22)***	9.1 (2.25)***	8.4 (1.87)***	4.8 (2.44)**	-1.9 (2.06)	7.1 (1.14)***	8.9 (4.47)**
$\beta_5$ (cycle 5)	8.3 (2.50)***	9.9 (2.33)***	10.8 (2.36)***	10.3 (2.36)***	10.6 (2.44)***	-1.1 (2.02)	10.4 (1.25)***	18.8 (4.29)***
$\beta_6$ (cycle 6)	-1.1 (1.63)	9.6 (2.04)***	9.3 (3.02)***	12.9 (2.47)***	12.9 (2.91)***	-3.4 (2.22)	11.0 (1.33)***	19.8 (4.36)***
$\beta_7$ (cycle 7)	-0.1 (1.82)	6.2 (2.17)***	9.1 (2.34)***	15.0 (1.96)***	10.3 (2.60)***	-2.1 (2.01)	10.2 (1.20)***	15.7 (4.27)***
Observations	5,377	8,648	5,663	7,174	5,406	9,521	26,891	1,898

Note: Level of significance: \* at 10%; \*\* at 5%; \*\*\* 1%.

**Table 6: Estimated marginal effects of Québec's childcare policy on mother's labour force participation in reference year by age of children and education level of mothers (p-value of bootstrapped standard errors)**

Parameters of equation 1	Age of Children							
	Under 1	1	2	3	4	5	1-4	1-4
1. All children								Single mothers
$\beta_3$ (cycle 3)	0.13 (0.04)***	0.06 (0.03)**	0.09 (0.05)**	0.12 (0.04)***	0.03 (0.04)	0.01 (0.03)	0.08 (0.02)***	0.22 (0.06)***
$\beta_4$ (cycle 4)	0.17 (0.04)***	0.12 (0.04)***	0.12 (0.04)***	0.11 (0.04)***	0.13 (0.05)***	-0.01 (0.04)	0.12 (0.02)***	0.11 (0.06)**
$\beta_5$ (cycle 5)	0.10 (0.05)**	0.14 (0.04)***	0.08 (0.04)**	0.10 (0.05)**	0.07 (0.04)*	0.04 (0.04)	0.10 (0.02)***	0.09 (0.06)
$\beta_6$ (cycle 6)	0.10 (0.05)**	0.15 (0.04)***	0.12 (0.05)**	0.18 (0.05)***	0.10 (0.05)*	0.08 (0.05)	0.14 (0.03)***	0.04 (0.07)
$\beta_7$ (cycle 7)	0.05 (0.05)	0.14 (0.04)***	0.10 (0.05)**	0.19 (0.04)***	0.10 (0.05)**	0.14 (0.05)***	0.13 (0.02)***	0.12 (0.07)*
Observations	11,336	18,436	11,663	14,885	11,261	20,579	56,245	7,169
2. Children of mothers with a level of education equal to a secondary diploma or less								
$\beta_3$ (cycle 3)	0.04 (0.07)	0.06 (0.05)	0.15 (0.10)	0.10 (0.08)	-0.03 (0.09)	-0.10 (0.05)*	0.07 (0.04)*	0.20 (0.08)**
$\beta_4$ (cycle 4)	0.08 (0.08)	0.12 (0.08)	0.12 (0.08)	0.06 (0.06)	0.14 (0.10)	-0.08 (0.07)	0.11 (0.04)***	0.10 (0.07)
$\beta_5$ (cycle 5)	0.06 (0.09)	0.12 (0.08)	0.02 (0.08)	0.04 (0.08)	-0.02 (0.08)	-0.06 (0.06)	0.04 (0.04)	0.00 (0.09)
$\beta_6$ (cycle 6)	-0.01 (0.07)	0.09 (0.07)	0.24 (0.08)***	0.04 (0.09)	0.03 (0.10)	-0.03 (0.08)	0.10 (0.05)**	-0.09 (0.08)
$\beta_7$ (cycle 7)	0.10 (0.10)	0.25 (0.08)***	0.11 (0.09)	0.09 (0.08)	0.10 (0.10)	0.12 (0.10)	0.14 (0.04)***	0.01 (0.10)
Observations	3,434	5,702	3,594	4,743	3,501	6,501	17,540	3,454
3. Children of mothers with a university degree or more								
$\beta_3$ (cycle 3)	0.24 (0.06)***	0.07 (0.04)**	0.06 (0.06)	0.13 (0.05)***	0.06 (0.06)	0.03 (0.05)	0.08 (0.03)***	0.33 (0.11)***
$\beta_4$ (cycle 4)	0.24 (0.06)***	0.16 (0.06)***	0.15 (0.05)***	0.16 (0.05)***	0.08 (0.07)	0.04 (0.06)	0.14 (0.03)***	0.20 (0.13)
$\beta_5$ (cycle 5)	0.12 (0.07)	0.16 (0.05)***	0.12 (0.06)*	0.15 (0.07)**	0.13 (0.06)**	0.06 (0.05)	0.14 (0.03)***	0.30 (0.13)**
$\beta_6$ (cycle 6)	0.14 (0.07)**	0.14 (0.05)***	0.03 (0.07)	0.30 (0.06)***	0.11 (0.07)*	0.11 (0.06)*	0.14 (0.03)***	0.46 (0.11)***
$\beta_7$ (cycle 7)	0.07 (0.07)	0.13 (0.05)***	0.08 (0.08)	0.28 (0.05)***	0.05 (0.07)	0.12 (0.06)*	0.13 (0.03)***	0.40 (0.12)***
Observations	5,368	8,640	5,6253	7,102	5,380	9,470	26,747	1,884

Note: Level of significance: \* at 10%; \*\* at 5%; \*\*\* 1%

**Table 7: Estimated marginal effects of Québec’s childcare policy on mother’s weeks at work in reference year by age of children and education level of mothers (p-value of bootstrapped standard errors)**

Parameters of equation 1	Age of Children							
	Under 1	1	2	3	4	5	1-4	1-4
1. All children								Single mothers
$\beta_3$ (cycle 3)	-1.4 (1.87)	1.1 (1.32)	0.1 (2.31)	1.9 (1.75)	-1.7 (1.86)	-1.9 (1.57)	0.5 (0.94)	7.2 (2.62)***
$\beta_4$ (cycle 4)	5.8 (2.01)***	7.0 (1.74)***	1.8 (1.92)	3.8 (1.71)**	3.5 (2.34)	-1.4 (1.89)	4.0 (1.05)***	4.3 (2.74)
$\beta_5$ (cycle 5)	6.4 (2.18)***	8.4 (1.99)***	1.9 (2.10)	4.2 (2.27)*	2.6 (1.93)	0.2 (1.81)	4.2 (1.06)***	3.2 (3.00)
$\beta_6$ (cycle 6)	4.2 (2.07)**	6.6 (1.92)***	3.4 (2.27)	7.5 (2.25)***	3.9 (2.46)	2.8 (2.27)	5.1 (1.20)***	2.5 (3.22)
$\beta_7$ (cycle 7)	0.6 (2.22)	3.0 (1.93)	4.3 (2.56)*	7.4 (1.97)***	3.5 (2.35)	5.0 (2.17)**	4.4 (1.15)***	4.4 (3.36)
Observations	11,297	18,386	11,657	14,096	11,272	20,581	56,221	7,169
2. Children of mothers with a level of education equal to a secondary diploma or less								
$\beta_3$ (cycle 3)	-2.1 (3.09)	2.0 (2.14)	3.4 (4.43)	-1.3 (3.20)	-4.4 (3.43)	-6.3 (2.64)**	0.0 (1.85)	7.1 (3.91)*
$\beta_4$ (cycle 4)	1.6 (3.26)	5.0 (3.24)	3.5 (3.29)	1.9 (3.06)	4.4 (4.30)	-3.8 (3.13)	3.7 (1.91)*	5.6 (3.45)
$\beta_5$ (cycle 5)	3.2 (3.89)	5.7 (3.6)	-0.2 (3.61)	2.2 (3.88)	-0.6 (3.41)	-4.0 (3.09)	1.9 (1.90)	-0.3 (4.06)
$\beta_6$ (cycle 6)	0.9 (3.21)	4.9 (3.5)	8.0 (3.57)**	3.8 (4.31)	1.3 (4.40)	-1.6 (3.90)	4.3 (2.12)**	-1.1 (3.92)
$\beta_7$ (cycle 7)	5.0 (4.73)	6.4 (4.26)	5.0 (4.30)	5.2 (3.87)	5.1 (4.51)	2.8 (4.40)	5.3 (2.14)**	-0.1 (4.58)
Observations	3,418	5,679	3,591	4,751	3,501	6,504	17,522	3,449
3. Children of mothers with a university degree or more								
$\beta_3$ (cycle 3)	1.0 (2.94)	1.8 (1.79)	-1.8 (3.07)	2.1 (2.48)	0.1 (2.77)	-0.1 (2.32)	0.6 (1.32)	11.3 (5.35)**
$\beta_4$ (cycle 4)	7.0 (3.10)**	9.0 (2.56)***	2.2 (2.65)	5.9 (2.37)**	2.1 (3.39)	0.3 (2.76)	4.8 (1.47)***	5.8 (5.93)
$\beta_5$ (cycle 5)	5.9 (3.15)*	10.5 (2.68)***	2.1 (2.96)	6.1 (3.41)*	6.2 (2.96)**	1.2 (2.68)	5.9 (1.59)***	14.1 (6.06)**
$\beta_6$ (cycle 6)	4.7 (2.87)	6.3 (2.62)**	0.1 (3.33)	11.3 (2.87)***	4.3 (3.17)	3.4 (3.07)	5.1 (1.64)***	16.4 (5.75)***
$\beta_7$ (cycle 7)	0.3 (2.92)	2.4 (2.6)	2.9 (3.28)	9.8 (2.67)***	0.7 (3.31)	5.4 (3.02)*	3.8 (1.63)**	14.8 (5.95)**
Observations	5,356	8,622	5,621	7,109	5,384	9,472	26,736	1,885

Note: Level of significance: \* at 10%; \*\* at 5%; \*\*\* 1%

**Table 8A: Impact of Québec’s childcare policy on PPVT scores of 4-year-olds and 5-year-olds children by mother’s education and selected samples (p-value of bootstrapped standard errors)**

Treatment Parameter(s)	PPVT Standardized and covariates				PPVT-RAW and covariates	No covariates	
	All	Secondary diploma or less	University diploma or more	Québec and Ontario		PPVT-SD	PPVT-RAW
4-year-olds							
$\beta_3$	-0.370 (1.259)	0.375 (2.525)	-0.893 (1.829)	-0.389 (1.217)	-0.448 (1.633)	0.052 (1.322)	-0.177 (1.724)
$\beta_4$	-0.821 (1.616)	-1.953 (2.912)	0.606 (2.491)	1.660 (1.793)	4.181 (2.169)*	-1.908 (1.750)	3.003 (2.352)
$\beta_5$	-0.691 (1.480)	-3.266 (2.525)	0.126 (2.261)	1.154 (1.599)	1.779 (1.896)	-2.038 (1.607)	0.300 (2.054)
$\beta_6$	-2.392 (1.651)	-5.998 (2.859)**	0.471 (2.316)	-1.348 (1.757)	-6.219 (2.143)***	-3.159 (1.861)*	-7.099 (2.380)***
$\beta_7$	-2.449 (1.657)	1.029 (3.125)	-3.316 (2.302)	-1.769 (1.795)	-6.365 (2.105)***	-2.622 (1.713)	-6.584 (2.181)***
N	10,297	3,103	5,020	4,485	10,313	10,297	10,313
5-year-olds							
$\beta_3$	-2.405 (1.021)**	-2.376 (1.755)	-3.278 (1.542)**	-2.528 (1.055)**	-3.654 (1.275)***	1.925 (1.088)*	-2.920 (1.370)**
$\beta_4$	-4.901 (1.354)***	-3.229 (2.333)	-4.828 (1.865)***	-4.412 (1.520)***	-1.902 (1.723)	-5.066 (1.472)***	-1.835 (1.873)
$\beta_5$	-3.239 (1.262)**	-3.587 (2.168)*	-3.190 (1.909)*	-3.626 (1.416)**	-9.452 (1.546)***	-3.891 (1.381)***	-10.061 (1.702)***
$\beta_6$	-4.110 (1.496)***	-5.569 (2.586)**	-3.744 (2.169)*	-4.255 (1.601)***	-5.927 (1.871)***	-4.582 (1.662)***	-6.500 (2.092)***
$\beta_7$	-3.600 (1.690)**	-2.088 (3.181)	-3.699 (2.268)	-4.352 (1.763)**	-6.139 (2.094)***	-3.482 (1.842)*	-5.979 (2.298)***
N	18,784	5,775	8,797	7,824	18,810	18,784	18,810

Note: All the controls presented in the table of descriptive statistics are included as covariates. In the no covariate case they are excluded, except the policy variables which appear in the present table, a dummy for the province of Quebec and dummy variables for English speaking children in Québec and French speaking children in the Rest of Canada, and a constant. Level of significance: \* 10%; \*\* 5%; \*\*\* 1%.

**Table 8B: Impact of Québec’s childcare policy on PPVT scores of 4-year-olds and 5-year-olds children by mother’s education and selected samples (p-value of bootstrapped standard errors)**

Treatment Parameters	PPVT Standardized and covariates				PPVT-RAW and covariates	No covariates	
	All	Secondary diploma or less	University diploma or more	Québec and Ontario		PPVT-SD	PPVT-RAW
4-year-olds							
$\beta_4$	-0.719 (1.522)	-2.031 (2.755)	0.884 (2.320)	0.752 (1.649)	4.305 (2.072)**	-1.922 (1.643)	3.052 (2.240)
$\beta_5$	-0.589 (1.386)	-3.346 (2.353)	0.400 (2.127)	0.967 (1.495)	1.903 (1.787)	-2.053 (1.506)	0.350 (1.938)
$\beta_6$	-2.290 (1.552)	-6.076 (2.718)**	0.746 (2.105)	-0.820 (1.658)	-6.096 (2.034)***	-3.174 (1.762)*	-7.049 (2.268)***
$\beta_7$	-2.347 (1.552)	0.951 (2.991)	-3.040 (2.099)	-1.020 (1.692)	-6.241 (1.980)***	-2.637 (1.594)*	-6.535 (2.040)**
N	10,297	3,103	5,020	4,498	10,313	10,297	10,313
5-year-olds							
$\beta_4$	-4.163 (1.176)***	-2.569 (2.052)	-3.778 (1.552)**	-4.336 (1.296)***	-0.775 (1.511)	-4.475 (1.287)***	-0.934 (1.643)
$\beta_5$	-2.501 (1.069)**	-2.931 (1.874)	-2.140 (1.618)	-2.602 (1.190)**	-8.327 (1.312)***	-3.301 (1.177)***	-9.162 (1.448)***
$\beta_6$	-3.376 (1.353)**	-4.918 (2.356)**	-2.700 (1.899)	-3.428 (1.459)**	-4.805 (1.699)***	-3.993 (1.516)***	-5.604 (1.914)***
$\beta_7$	-2.864 (1.542)*	-1.428 (2.984)	-2.649 (1.997)	-3.014 (1.623)*	-5.015 (1.910)***	-2.896 (1.687)*	-5.085 (2.102)**
N	18,784	5,775	8,797	7,851	18,810	18,784	18,810

Note: All the controls presented in the table of descriptive statistics are included as covariates. In the no covariate case they are excluded, except the policy variables which appear in the present table, a dummy for the province of Quebec and dummy variables for English speaking children in Québec and French speaking children in the Rest of Canada, and a constant. Level of significance: \* 10%; \*\* 5%; \*\*\* 1%.



**Table 9: Estimated mean of ‘Who Am I?’ overall scale and age equivalent number knowledge test scores by age of children and cycle**

Test and scores	4-year-olds				5-year-olds			
	Overall scale Who Am I? <sup>1,2</sup>							
	Canada	RofC	Québec	Ontario	Canada	RofC	Québec	Ontario
Raw score C4	23.6	23.3	21.9	25.1	29.5	29.4	28.6	30.2
Raw score C5	21.8	22.8	22.0	20.8	26.0	25.3	24.6	27.3
Raw score C6	21.1	20.3	18.4	23.0	28.6	27.9	26.4	30.1
Raw score C7	19.5	19.2	17.9	20.6	27.5	27.8	26.2	28.0
Age standardized C6	101.7	99.2	94.1	107.2	104.2	101.8	96.6	109.5
Age standardized C7	97.4	96.7	93.1	100.6	100.6	101.6	96.4	102.0
Age equivalent number knowledge <sup>3,4,5</sup>								
	Canada	RofC	Québec	Ontario	Canada	RofC	Québec	Ontario
Levels C4								
0.	6.33	3.88	13.4	4.21	1.48	1.00	1.82	1.71
1.	57.79	60.48	69.41	47.98	29.80	30.91	36.75	24.4
2.	35.33	35.6	17.19	46.42	63.63	64.60	57.92	66.37
3.	0.01	0.00	0.0	1.39	5.09	3.5	3.51	0.07
Levels C7								
0.	12.08	9.07	19.93	10.70	2.59	2.10	1.16	3.87
1.	72.96	74.91	73.24	70.89	50.47	49.46	60.67	45.64
2.	14.80	15.61	6.83	18.42	46.02	47.55	38.05	49.07
3.	0.00	0.00	0.0	0.00	0.01	0.01	0.12	0.01
Age standardized C6	99.2	99.8	95.1	100.8	98.7	98.6	93.0	101.7
Age standardized C7	98.9	99.5	94.4	100.8	98.4	100.0	95.0	98.8
Raw score-SD C6	9.5	9.7	8.3	9.9	13.6	13.6	11.9	14.4
Raw score-SD C7	9.3	9.4	8.0	9.9	13.4	13.9	12.3	13.6

RofC: all provinces except Québec and Ontario. CX: cycle of the NLSCY. All scores are weighted by transversal weights.

1. Overall scale: This scale represents the overall score for the direct measures. This assessment measures the child's understanding and use of conventional symbols and relevant early learning skills. Summing the value of each of the 10 individual items derived this score. Each individual items score ranges from 10 to 40 (from scribble to clear symbols).

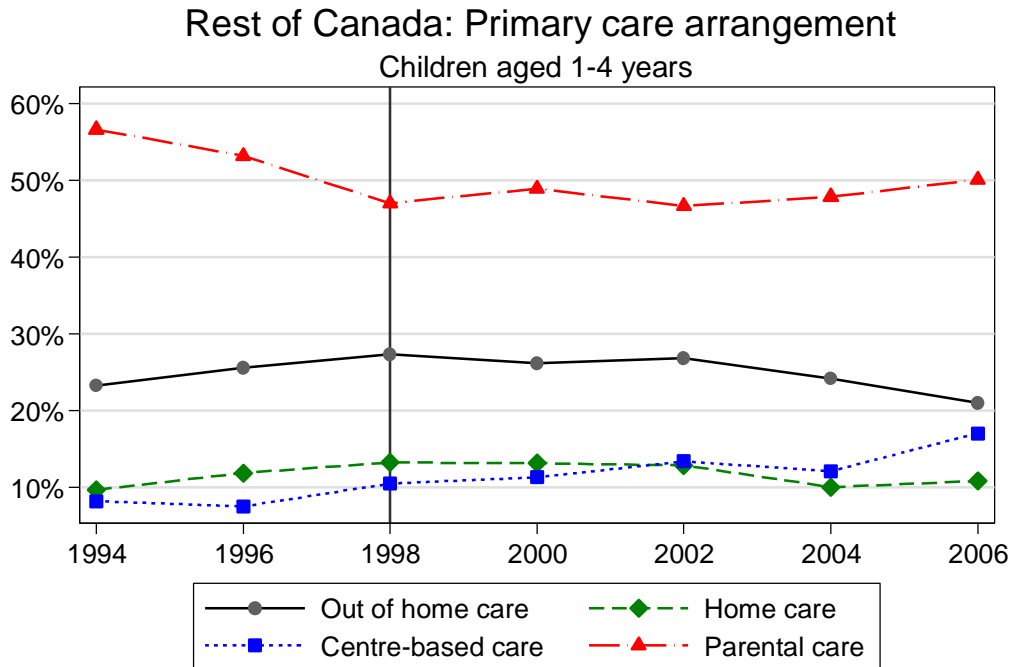
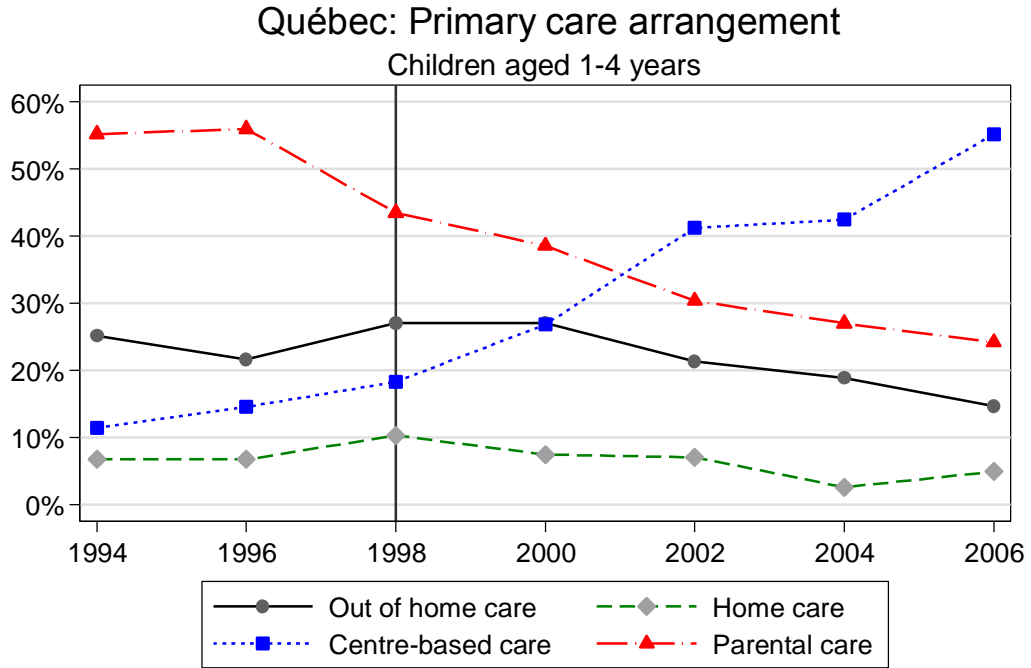
Copying scale: These tasks access the development of ability to conceptualize a given figure. Symbol scale: These tasks focus on the understanding that symbols have particular meanings.

2. Age standardized score: To obtain the norms, each record was weighted by its cross-sectional weight divided by the average cross-sectional weight of records from the same cycle. The children in the norm sample were assigned standard scores so the mean of the standard scores was 100 and the standard deviation was 15 for all age groupings. This standardization was done for each age in months.

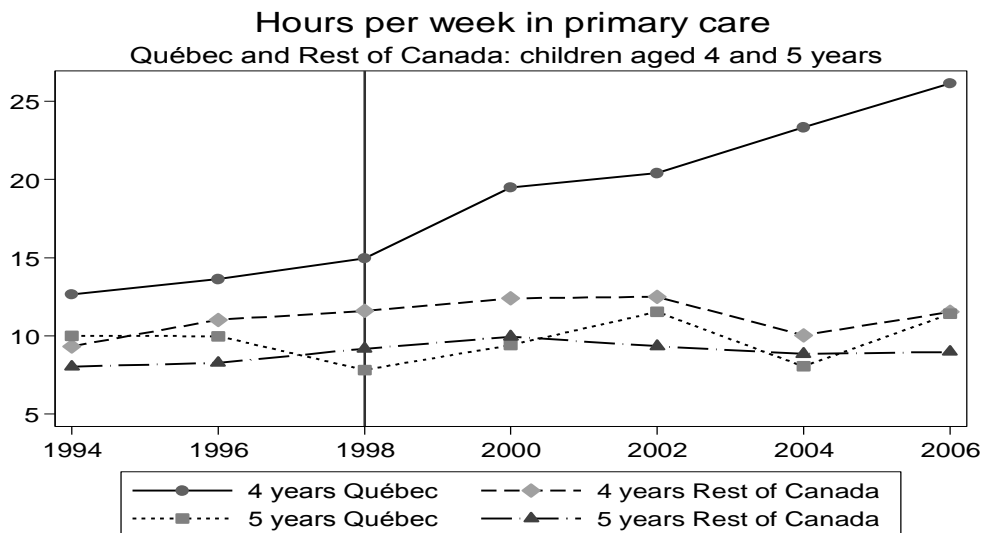
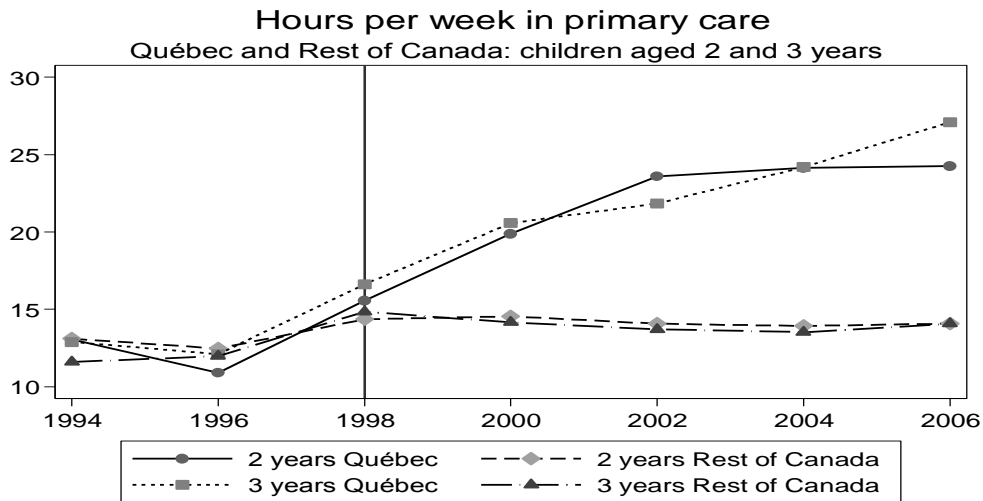
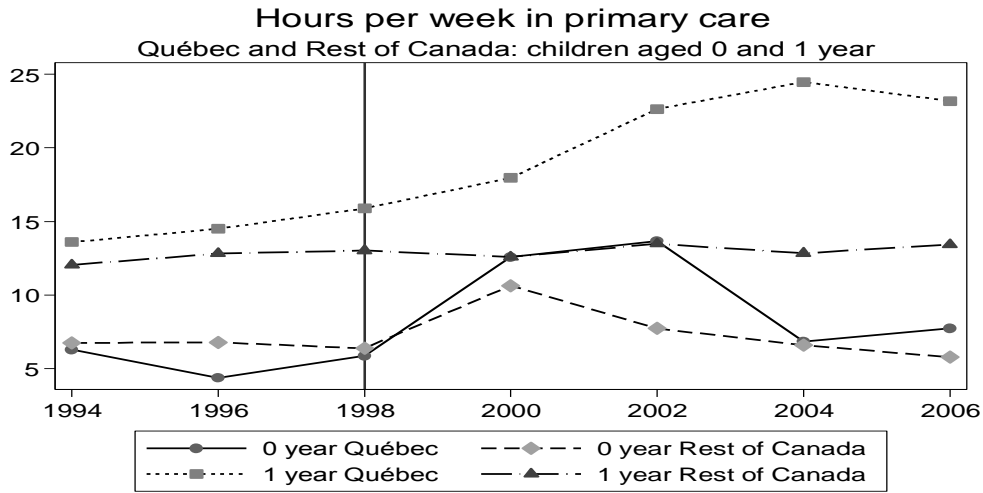
3. Age equivalent number knowledge: This assessment measures the child's intuitive knowledge of numbers by assessing their understanding of the system of whole numbers. *Level 1* represents the proportion of correct responses for the pre-dimensional level. There are 5 items in this level. To reach the age equivalent of this level the child has to get a proportion of at least 0.6 (i.e. get 3 out of 5 correct responses). *Level 2* represents the proportion of correct responses for the uni-dimensional level. There are 7 items in this level. To reach the age equivalent of this level the child has to get a proportion of at least 0.6 (i.e. get 4 out of 7 correct responses). *Level 3* represents the proportion of correct responses for the bi-dimensional level. There are 8 items in this level. To reach the age equivalent of this level the child has to get a proportion of at least 0.6 (i.e. get 5 out of 8 correct responses). 0 Indicates that the child has not reached the pre-dimensional level; 1 indicates that the child has reached the pre-dimensional level (4 year old equivalent); 2 Indicates that the child has reached the uni-dimensional level (6 year old equivalent); 3 Indicates that the child has reached the bi-dimensional level (8 year old equivalent).

4. A 30-point raw age-standardized score was also assigned to each child. Standardized scores allow for comparisons of scores across age groups. The norms used for the standardization have been built using Number Knowledge 30-point raw scores from Cycle 4 and Cycle 5. To obtain the norms, each record was weighted by its cross-sectional weight divided by the average cross-sectional weight of records from the same cycle. The children in the norm sample were assigned standard scores so the mean of the standard scores was 100 and the standard deviation was 15 for all age groupings. This standardization was done for each age in months. 5. Although the Number Knowledge test is made up of 22 items, a child who goes through the whole questionnaire is asked 30 questions, since some items have a) and b) parts. The 30-point raw score is simply the total number of correct answers among those 30 questions.

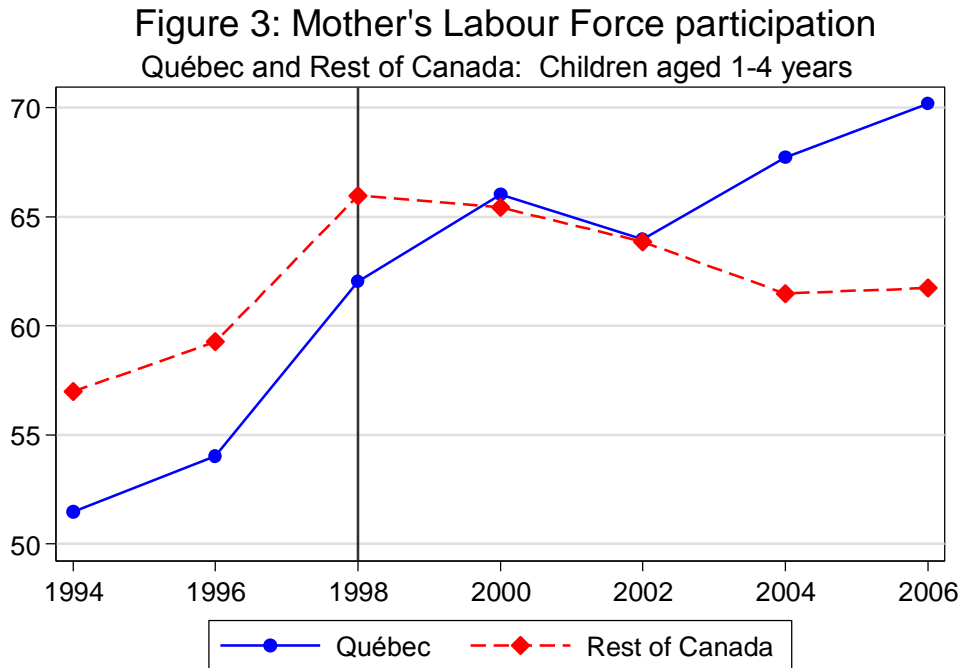
**Figure 1: Primary care arrangements of children aged 1-4 years, Québec and Rest of Canada, 1994-2006**



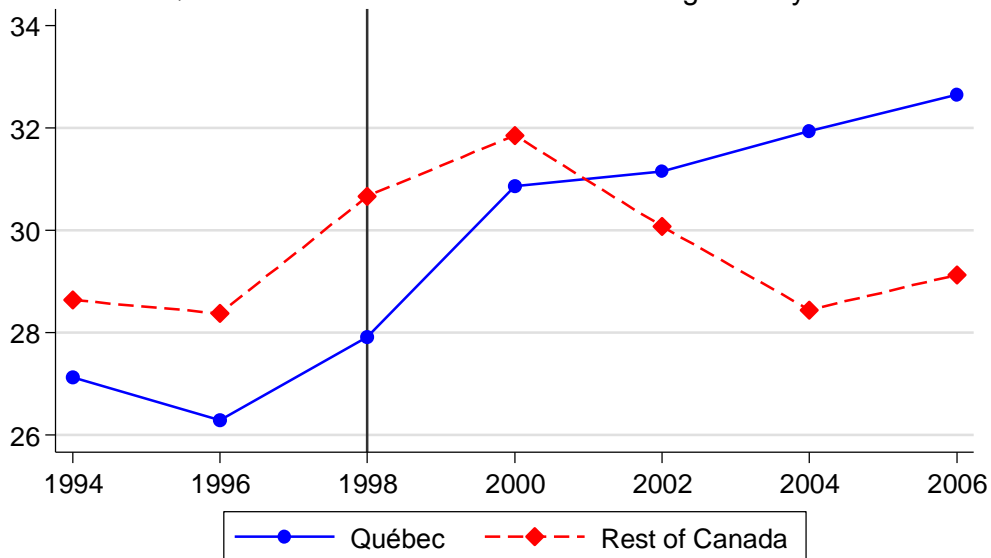
**Figure 2: Mean hours per week spent in primary care arrangements (non conditional on care) by age of children, Québec and Rest of Canada, 1994-2006**



**Figure 3: Mother's labour force participation with at least one child aged 1 to 4 years, Québec and Rest of Canada (C), 1994-2006**

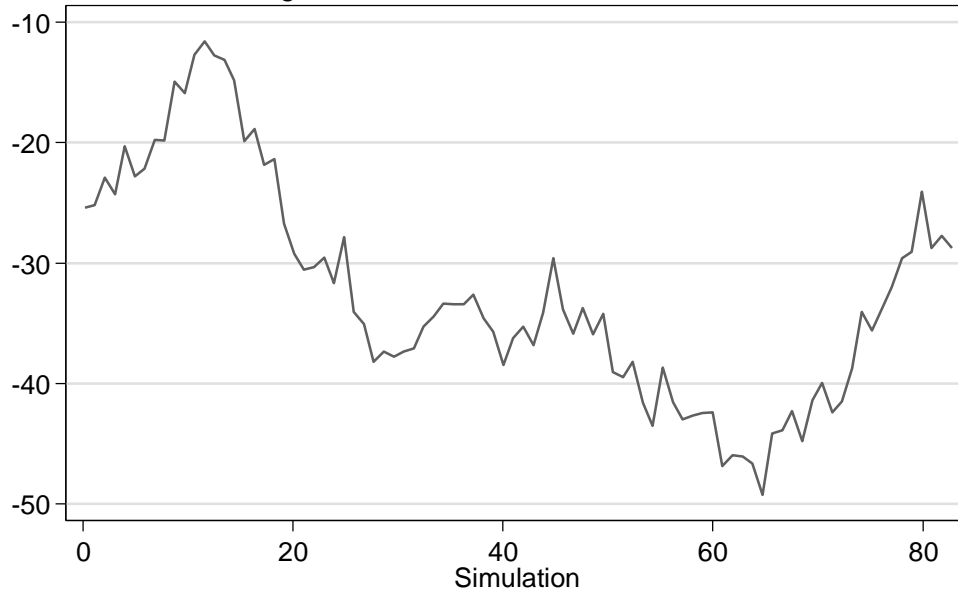


**Figure 4: Mother's Mean weeks worked in reference year Québec and Rest of Canada: Children aged 1-4 years**



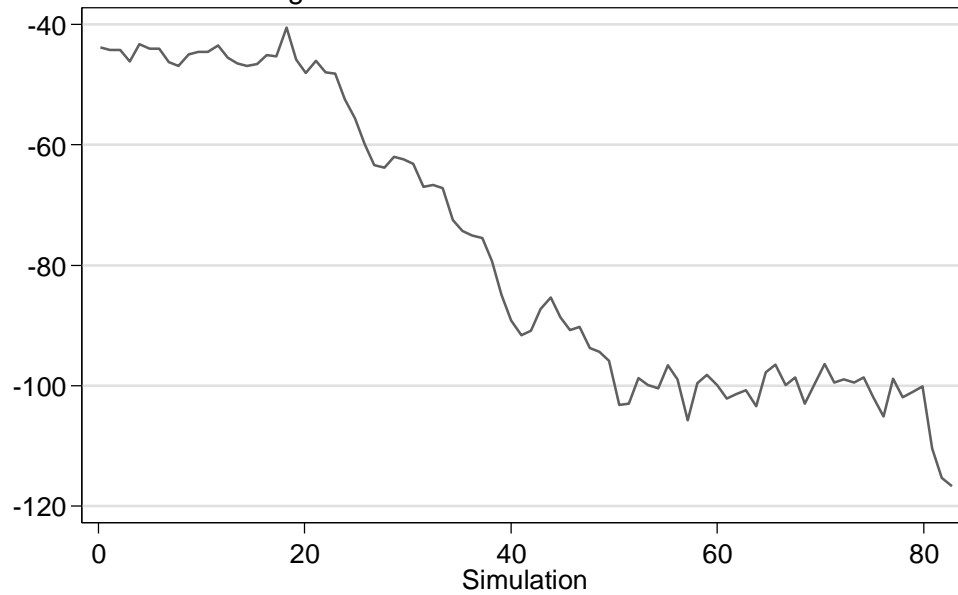
Sample is not conditional on participation  
Source: NLSCY

**Figure 5A: Québec Government**  
Changes in total tax credits and transfers 2004



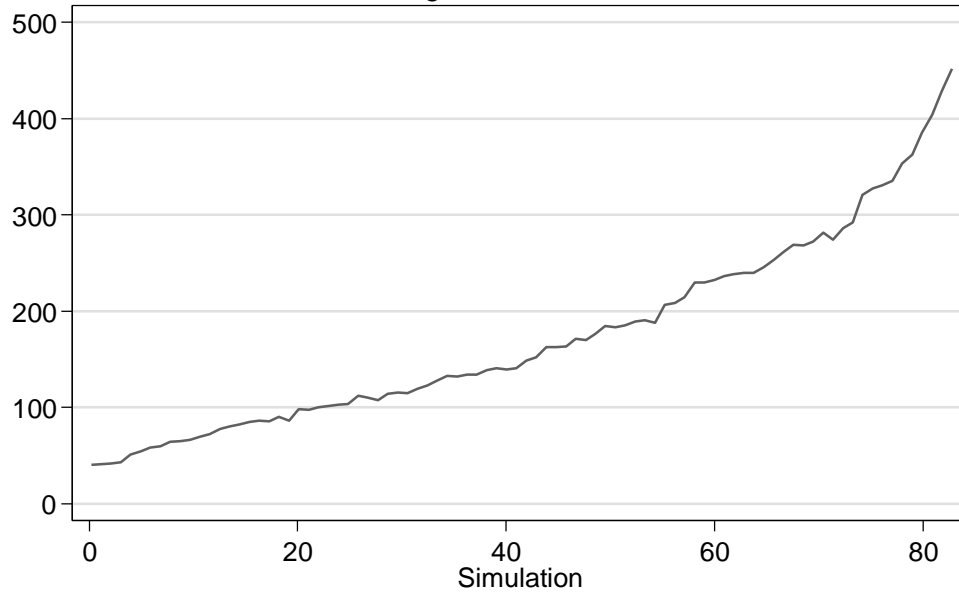
Source: from SLID data set and tax calculator

**Figure 5B: Federal Government**  
Changes in total tax credits and transfers 2004



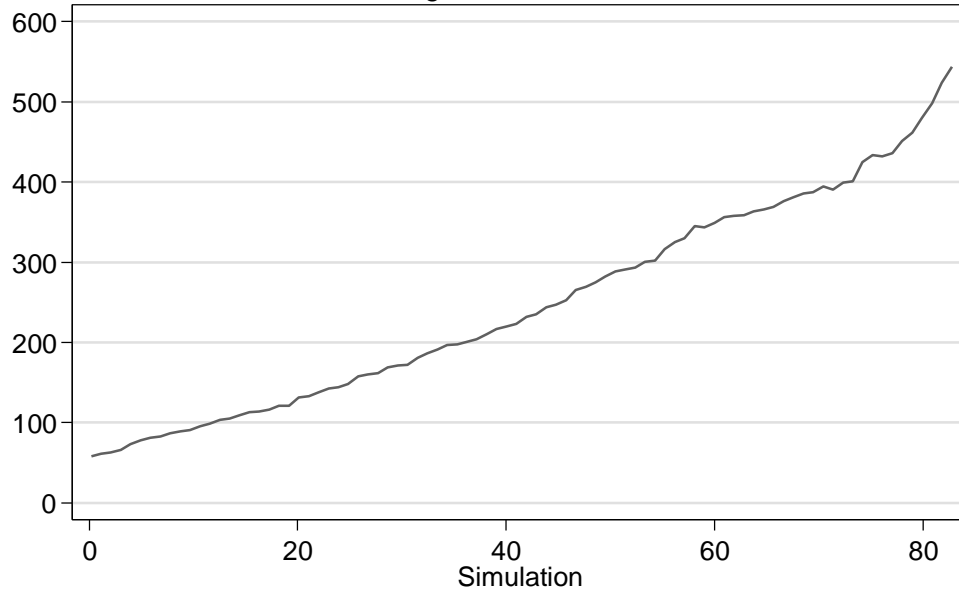
Source: from SLID data set and tax calculator

Figure 5C: Québec Government  
Changes in income taxes



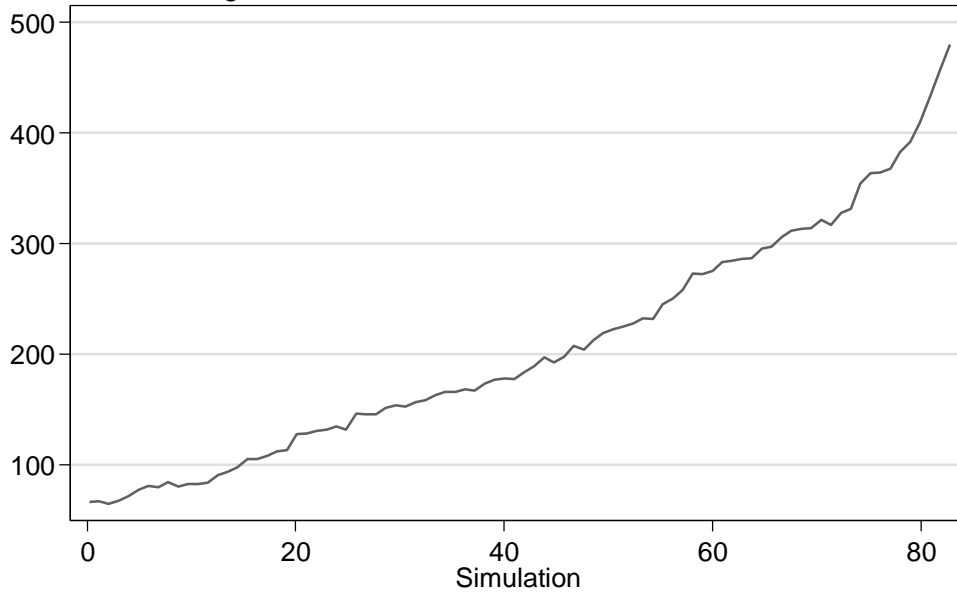
Source: from SLID data set and tax calculator

Figure 5D: Federal Government  
Changes in income taxes



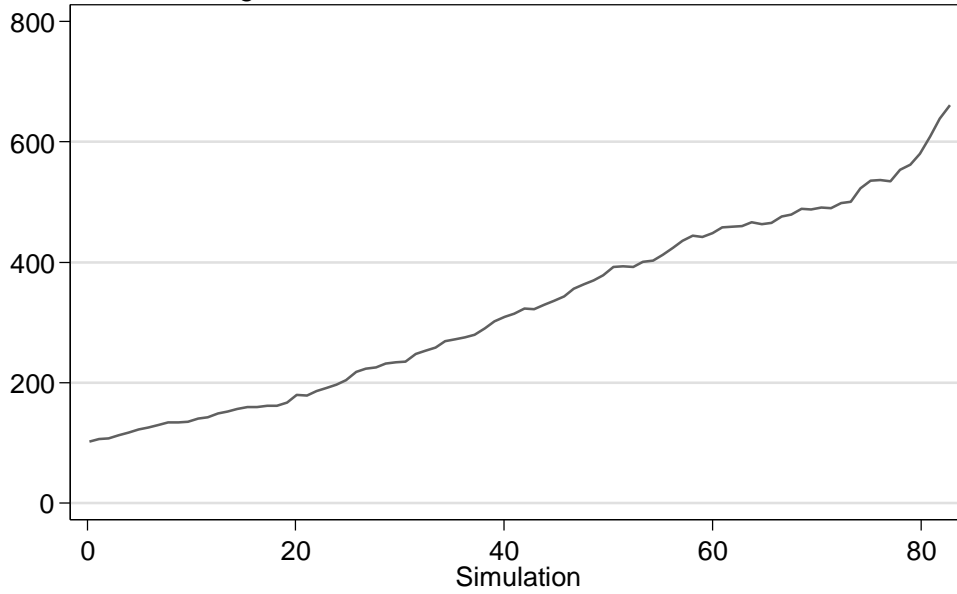
Source: from SLID data set and tax calculator

**Figure 5E: Québec Government**  
Changes in total tax credits, transfers and income taxes



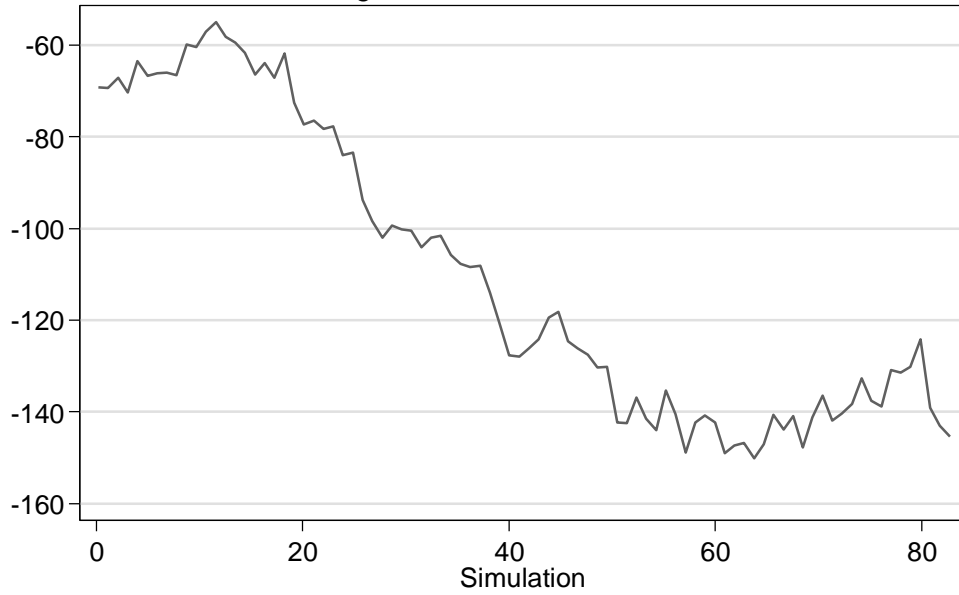
Source: from SLID data set and tax calculator

**Figure 5F: Federal Government**  
Changes total tax credits, transfers and income taxes



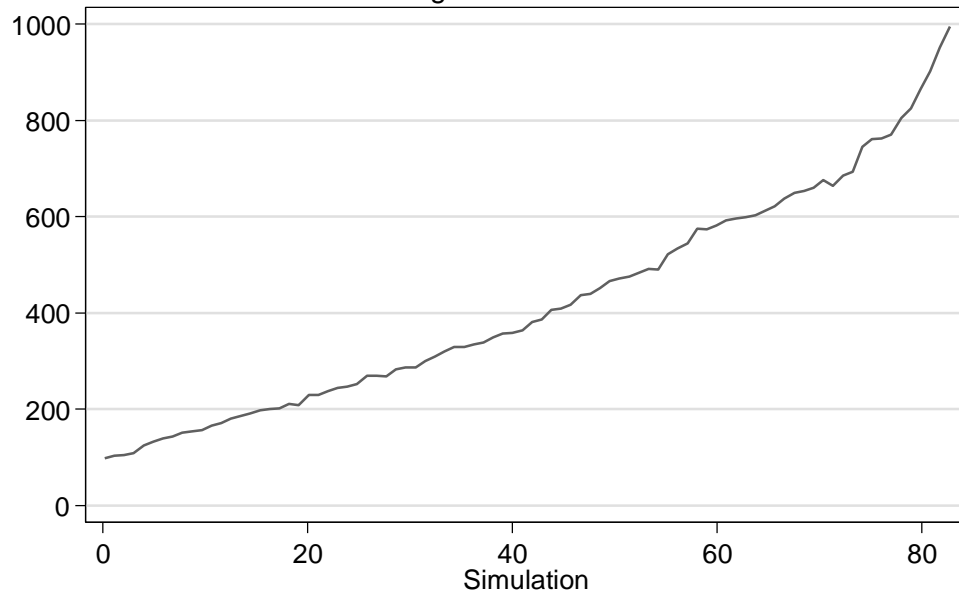
Source: from SLID data set and tax calculator

Figure 5G: Québec and Federal Government  
Changes in tax credits and transfers



Source: from SLID data set and tax calculator

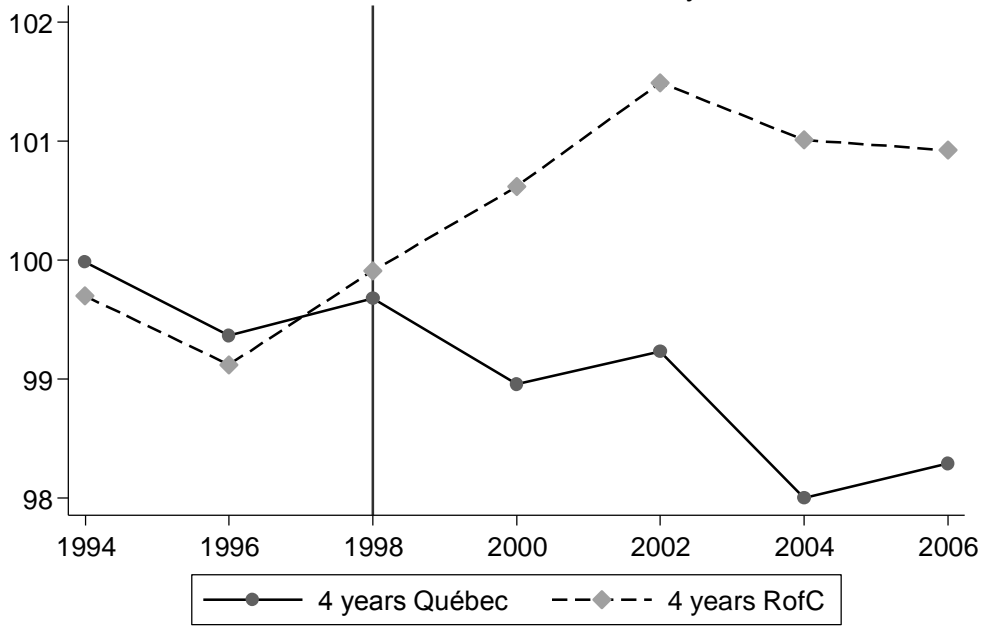
Figure 5H: Québec and Federal Government  
Changes in income taxes



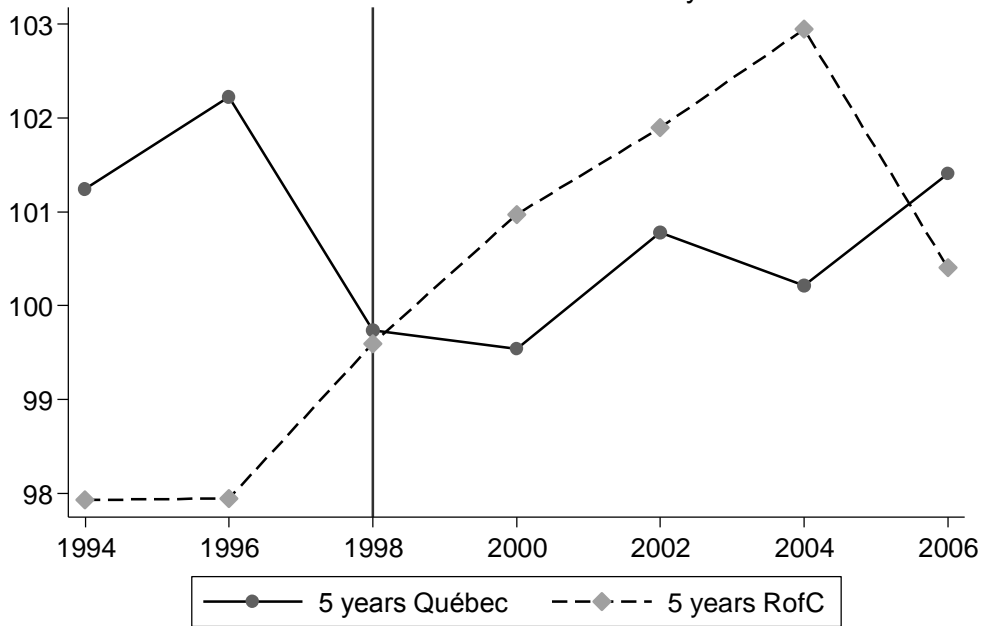
Source: from SLID data set and tax calculator



Mean Standardized PPVT Scores  
Québec and Rest of Canada: 4 years



Mean standardized PPVT Scores  
Québec and Rest of Canada: 5 years



**Table A1: Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY)**

In Cycle 1 (1994-1995), a sample of 22,831 children aged 0 to 11 was selected in each of the 10 provinces making up the first longitudinal sample.<sup>1</sup>

In Cycle 2 (1996-1997), to reduce the response burden on families with several eligible children, the number of children selected was limited to two per family. Therefore, some children were dropped from the original sample (16,903 children remained in the longitudinal sample). Furthermore, a new initiative was added to the main longitudinal survey – ‘Understanding the Early Years’ (UEY) - which focused on a sample of children, aged 0 to 11 months and 1 year to be followed until the age of 5, the Early Childhood Development (ECD) cohort. A total of 4,153 children were included in this second longitudinal cohort, approximately 2,000 children each of age 0 and 1, and also the new siblings of Cycle 1 longitudinal children who were already in the sample. This was the only cycle in which siblings from the original cohort were selected.<sup>2</sup>

In Cycle 3 (1998-1999), a new third longitudinal cohort of children aged 0 and 1 was created, which repeated the UEY initiative which added “the readiness to learn” aspect of children entering the school system to its preoccupations. It was determined that a large sample of 5-year-olds was required to meet these analytical goals. Simultaneously, it was decided that a larger sample of 1 year olds would meet those objectives once they were 5 year olds in Cycle 5. Approximately 2,000 children aged 0 to 11 months, 7,944 1 year olds and an additional sample of 7,052 5 year olds were added to the preceding longitudinal cohorts.

In Cycle 4 (2000-2001), the longitudinal children introduced in Cycle 2 are now 4 and 5 year olds; it is the last contact cycle for these children. A new fourth longitudinal cohort of children, aged 0 to 11 months (2,358) and 1 (2,673), was surveyed by Statistics Canada. As in the previous cycle, there were not enough 5 year olds (introduced in Cycle 2) to meet the analytical goals of the “readiness to learn” objectives. A supplemental sample of 4,395 5 year olds was selected across Canada.

In Cycles 5 (2002-2003) and 6 (2004-2005), new fifth and sixth longitudinal ECD cohorts of children aged 0 and 1 were selected for longitudinal purposes.<sup>3</sup> Over all cycles, about 25 percent of children are from Québec and about 40 percent from Ontario. Two western provinces have a significant number of children of the same ages, British Columbia (10%) and Alberta (10%), but we considered they are too few children to serve as a comparison group. It should be noted that although five new longitudinal cohorts were introduced in the survey in Cycles 2 to 6, these 0 and 1 year olds are surveyed only three times until they are aged 4 or 5.

In Cycles 7 (2006-2007), a seventh longitudinal ECD cohorts of children aged 0 and 1 were selected for longitudinal purposes (4,015 respondents for a response rate of 80.7%). A new top-up of 2- to 5-year-old children were selected at Cycle 7. At the end of Cycle 7 collection, there were 4,691 0- to 5-year-olds responding children. The response rate was 80.8%. Cross-sectional weights were produced for this population at Cycle 7.

1. A child's effective age at a cycle is with respect to December 31 of reference year: thus, 0-year-olds are born in 1993 and 1-year-olds are born in 1994.

2. When the first ECD cohort of babies was selected at Cycle 2, the rule was a maximum of one child per household, except for twins, in which case both were sampled. At Cycle 5, the rule changed to one child per household without exception.

3. At Cycle 6, the only ECD children present were those introduced as babies in Cycles 4, 5 and 6, and a top-up sample of new 2 to 5 year olds, in provinces other than Québec and Ontario. At the end of Cycle 6 collection, there were 4,684 responding ECD children and households.

**Table A2: Characteristics of the mothers and families with at least one child aged 1 to 4 years, Québec and other provinces, cycles 1-7**

Characteristics	Cycle 1 1994	Cycle 2 1996	Cycle 3 1998	Cycle 4 2000	Cycle 5 2002	Cycle 6 2004	Cycle 7 2006
<b>Québec</b>							
In labour force	51.6	54.4	63.7	65.7	64.1	69.1	70.0
Weeks worked	27.3	26.4	28.9	30.8	31.2	32.4	32.5
Secondary school or less	34	31	27	33	34	35	22
Beyond high school	25	24	25	20	17	12	15
University degree or more	41	46	48	48	48	53	63
14-24 years at birth	20	22	22	26	25	23	18
25-29 years at birth	40	37	35	35	34	38	41
30-34 years at birth	30	30	32	27	28	26	27
35 years or more at birth	10	11	12	12	13	15	13
Not born in Canada	8	9	8	11	11	14	15
Single parent	13	13	12	14	10	14	15
Step family	2	1	1	2	2	2	1
Two-parent	85	86	87	84	88	84	84
Child is a girl	50	50	50	50	50	50	50
One older child	34	35	39	41	36	38	38
Two older children or more	16	16	18	15	16	16	16
No younger child	73	76	79	77	75	79	79
Younger children	27	24	21	23	25	21	21
>499,999 inhabitants	55	60	58	58	55	56	61
100,000 to 499,999 inhabitants	12	6	6	7	5	5	7
30,000 to 99,999 inhabitants	8	10	10	10	7	7	11
30,000< inhabitants	8	11	10	9	18	18	7
Rural	17	13	14	16	14	13	13
Other income than earnings	51,349	49,529	56,908	60,448	61,925	59,943	63,681
Number (un-weighted)	1,530	1,409	2,096	1,733	1,228	1,004	1,026
<b>Rest of Canada (other provinces)</b>							
In labour force	57.0	59.6	66.7	65.6	64.0	62.6	61.9
Weeks worked	28.6	28.5	31.0	31.9	30.1	29.1	29.2
Secondary school or less	33	30	26	32	33	31	26
Beyond high school	28	29	27	21	13	12	13
University degree or more	39	41	47	47	54	57	61
14-24 years at birth	20	18	18	20	19	19	18
25-29 years at birth	36	34	32	32	32	28	28
30-34 years at birth	31	35	34	32	32	34	35
35 years or more at birth	14	14	17	16	17	18	19
Not born in Canada	21	20	14	20	23	24	24
Single parent	16	14	13	13	11	11	13
Step family	1	1	1	1	1	1	1
Two-parent	83	85	86	86	88	88	86
Child is a girl	49	49	49	49	49	48	49
One older child	36	35	38	41	39	38	36
Two older children or more	21	22	18	16	19	19	18
No younger child	74	74	74	75	77	78	77
Younger children	26	26	26	25	23	22	23
>499,999 inhabitants	42	42	42	46	42	41	48
100,000 to 499,999 inhabitants	21	22	22	21	15	15	21
30,000 to 99,999 inhabitants	7	8	9	9	8	9	10
30,000< inhabitants	13	14	14	13	24	25	9
Rural	17	12	12	11	11	10	12
Other income than earnings	56,901	55,808	63,852	70,709	70,900	67,504	70,724
Number (un-weighted)	6,531	5,897	9,194	8,181	5,739	5,653	6,570

Source: Authors' compilation from the NLSCY Micro Data Files.

**Table A3: Characteristics of the children, mothers and families, 4- and 5-year-olds, Québec, cycles 1 to 7**

Characteristics	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7
	Four-year-olds							Five-year-olds						
Samples	322	260	314	247	363	211	189	271	223	1352	565	550	247	207
Weighed	85,586	82,778	65,192	78,395	65,581	61,338	60,122	83,912	87,709	75,433	74,940	69,773	63,112	66,645
PPVT-R Std	99.99	99.37	99.68	98.96	99.23	98.00	97.7	101.24	102.22	99.74	99.54	100.78	100.21	101.40
English in Québec	0.06	0.05	0.08	0.12	0.05	0.07	0.11	0.11	0.03	0.09	0.09	0.11	0.08	0.06
Child is a Girl	0.46	0.50	0.49	0.49	0.49	0.48	0.54	0.50	0.49	0.48	0.51	0.49	0.46	0.52
Age in months	54	54	54	58	56	52	52	66	67	66	68	61	64	63
Single Parent	0.08	0.12	0.11	0.19	0.14	0.15	0.12	0.13	0.19	0.15	0.15	0.13	0.13	0.12
Step family	0.04	0.03	0.02	0.04	0.03	0.06	x	0.06	x	0.05	0.03	0.03	0.02	0.04
14-24 years old	0.20	0.21	0.19	0.21	0.31	0.30	0.19	0.23	0.14	0.21	0.25	0.25	0.28	0.17
25-29 years old	0.43	0.40	0.38	0.39	0.33	0.33	0.41	0.44	0.45	0.37	0.31	0.34	0.35	0.31
30-34 years old	0.29	0.28	0.36	0.30	0.23	0.23	0.23	0.22	0.34	0.31	0.30	0.29	0.26	0.37
35 years old or more	0.08	0.12	0.07	0.11	0.12	0.14	0.17	0.11	0.07	0.11	0.13	0.13	0.10	0.15
Not born in Canada	0.08	x	0.06	0.09	0.09	0.09	0.13	0.11	0.06	0.08	0.10	0.12	0.08	0.14
Primary education	0.17	0.09	0.10	0.13	0.18	0.19	0.13	0.26	0.15	0.16	0.17	0.17	0.18	0.15
Secondary diploma	0.18	0.21	0.13	0.23	0.23	0.19	0.08	0.15	0.15	0.14	0.18	0.21	0.17	0.09
Post-secondary	0.21	0.24	0.24	0.22	0.16	0.11	0.28	0.29	0.20	0.27	0.19	0.21	0.11	0.13
University diploma	0.43	0.46	0.52	0.42	0.43	0.52	0.51	0.30	0.50	0.43	0.47	0.41	0.54	0.63
One older child	0.36	0.29	0.34	0.54	0.33	0.31	0.40	0.32	0.29	0.35	0.38	0.39	0.35	0.36
At least 2 older	0.16	0.12	0.15	0.13	0.17	0.11	0.19	0.15	0.18	0.17	0.14	0.18	0.16	0.16
No younger child	0.56	0.60	0.65	0.71	0.55	0.66	0.69	0.53	0.54	0.57	0.61	0.65	0.62	0.58
Younger children	0.44	0.40	0.35	0.29	0.45	0.34	0.31	0.47	0.46	0.43	0.39	0.35	0.38	0.42
Children of same age	0.03	x	0.05	0.04	x	x	0.00	0.00	x	0.02	0.05	0.02	0.02	0.02
Neither Brother/Sister	0.00	x	0.05	0.00	0.03	0.06	0.00	x	x	0.01	0.00	0.00	0.00	0.00
Inhabitants >=500,000	0.51	0.54	0.55	0.63	0.50	0.62	0.60	0.50	0.53	0.60	0.62	0.54	0.53	0.65
100,000 to 499,999	0.11	0.07	0.07	0.06	0.08	0.05	0.07	0.12	0.07	0.06	0.05	0.08	0.03	0.07
30,000 to 99,999	0.08	0.13	0.10	0.10	0.12	0.04	0.13	0.10	0.07	0.10	0.04	0.10	0.08	0.08
30,000< inhabitants	0.11	0.13	0.13	0.07	0.15	0.17	0.05	0.09	0.12	0.10	0.13	0.17	0.20	0.06
Rural	0.19	0.13	0.15	0.14	0.15	0.12	0.15	0.19	0.19	0.14	0.11	0.11	0.16	0.14
Family income (2001\$)	55,322	54,407	57,328	63,016	68,599	63,772	71,683	51,426	51,799	59,399	68,432	64,774	62,042	65,143

Source: Authors' compilation from the NLSCY Micro Data Files, cycles 1 to 7.

**Table A4: Characteristics of the children, mothers and families, 4- and 5-year-olds, Rest of Canada (nine other provinces), cycle 1 to 7**

Characteristics of child, mother and family	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7
	Four-Year-Olds							Five-Year-Olds						
Samples RofC	1354	1064	1107	909	1588	1162	1207	1262	1008	4171	3285	2882	1361	1374
Ontario							277							383
Weighed RofC	261,268	263,258	203,075	238,202	224,687	215,100	216,931	261,451	269,172	233,377	224,733	235,567	229,693	221,223
PPVT-R Std RofC	99.70	99.12	99.91	100.62	101.49	101.01	101.40	97.93	97.94	99.59	100.97	101.90	102.94	100.40
English in Québec	0.02	0.02	0.02	0.01	0.03	0.03	0.05	0.02	0.03	0.03	0.02	0.02	0.01	0.02
Child is a Girl	0.51	0.50	0.49	0.49	0.49	0.49	0.48	0.49	0.51	0.48	0.49	0.50	0.50	0.49
Age in months	54	54	54	58	54	52	52	66	66	65	69	61	63	64
Single Parent	0.14	0.16	0.19	0.13	0.15	0.10	0.11	0.15	0.15	0.14	0.13	0.14	0.13	0.11
Step family	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.04	0.03	0.04	0.02	0.02	0.03
14-24 years old	0.19	0.16	0.17	0.20	0.18	0.19	0.16	0.21	0.19	0.19	0.19	0.19	0.19	0.15
25-29 years old	0.37	0.33	0.34	0.29	0.36	0.30	0.28	0.39	0.44	0.34	0.34	0.32	0.30	0.30
30-34 years old	0.30	0.37	0.34	0.36	0.31	0.34	0.41	0.29	0.26	0.33	0.34	0.34	0.32	0.34
35 years old or more	0.14	0.14	0.14	0.15	0.15	0.17	0.15	0.11	0.11	0.13	0.14	0.16	0.20	0.21
Not born in Canada	0.19	0.19	0.18	0.19	0.14	0.25	0.21	0.19	0.20	0.18	0.16	0.21	0.22	0.26
Primary education	0.11	0.10	0.09	0.09	0.11	0.08	0.08	0.15	0.13	0.11	0.09	0.10	0.09	0.09
Secondary diploma	0.23	0.18	0.17	0.17	0.23	0.25	0.15	0.16	0.16	0.19	0.17	0.23	0.23	0.15
Post-secondary	0.29	0.28	0.29	0.23	0.14	0.13	0.10	0.30	0.30	0.29	0.23	0.14	0.14	0.11
University diploma	0.37	0.43	0.44	0.51	0.53	0.54	0.68	0.39	0.41	0.41	0.51	0.53	0.54	0.66
One older child	0.39	0.37	0.34	0.52	0.41	0.39	0.37	0.38	0.33	0.44	0.37	0.37	0.37	0.38
At least 2 older	0.20	0.20	0.18	0.11	0.17	0.21	0.15	0.19	0.21	0.33	0.17	0.18	0.19	0.20
No younger child	0.59	0.58	0.57	0.64	0.63	0.65	0.63	0.54	0.55	0.55	0.56	0.58	0.60	0.61
Younger children	0.41	0.42	0.43	0.36	0.37	0.35	0.37	0.45	0.45	0.45	0.44	0.42	0.40	0.39
Children of same age	0.02	x	0.02	0.02	0.03	0.04	0.03	0.01	0.01	0.01	0.04	0.02	0.02	0.05
Neither Brother/Sister	0.01	x	0.01	x	0.00	0.01	0.01	0.01	0.00	0.03	0.00	0.01	0.01	0.01
Inhabitants >=500,000	0.39	0.45	0.38	0.45	0.37	0.40	0.49	0.41	0.39	0.42	0.43	0.39	0.39	0.51
100,000 to 499,999	0.21	0.22	0.23	0.22	0.16	0.16	0.20	0.21	0.23	0.22	0.26	0.16	0.15	0.20
30,000 to 99,999	0.07	0.07	0.09	0.10	0.09	0.10	0.10	0.08	0.07	0.10	0.08	0.10	0.09	0.07
30,000< inhabitants	0.14	0.13	0.16	0.13	0.28	0.25	0.11	0.13	0.19	0.14	0.13	0.26	0.27	0.09
Rural	0.19	0.11	0.13	0.10	0.10	0.09	0.10	0.17	0.11	0.12	0.11	0.09	0.10	0.13
Family income (2001\$)	59,620	58,9575	65,553	77,122	71,385	69,409	78,610	57,598	56,675	66,654	72,957	71,438	70,906	76,454

Source: Authors' compilation from the NLSCY Micro Data Files, cycles 1 to 7.

**Table A5: Mean scores of educational quality by dimension and overall characteristics of care by settings and age of children, Québec, 2003#**

Characteristics	Non-profit centre		Family-based	For-profit centre	
	Infant daycare (0-18 months)	Preschool daycare (18 months to age 4)	Home daycare (0-5 years)	Infant daycare (0-18 months)	Preschool daycare (18 months-5 years)
Mean Scores by dimension (from 1.00 to 4.00)(Poor to Very Good) <sup>1</sup>					
1. Physical characteristics	2.91F	2.89F	2.65F	2.33L	2.47L
2. Structure and variation in activities	3.02G	3.02F	2.76F	2.66F	2.69F
3. Interaction between educators and children	3.12G	2.85F	2.76F	2.76F	2.54F
4. Interaction between educators and parents	3.38G	3.18G	2.97F	2.96F	2.83F
Percentage distribution of settings by overall quality <sup>2</sup>					
Unsatisfactory	3.4	5.5	20.9	28.5	37.4
Fair	36.0	52.7	60.0	62.1	51.9
Good or Very Good	60.6	41.8	19.1	9.5	10.7

Source: Québec Survey on the Quality of Educational Daycare in 2003, Québec's Institute of Statistics, 2004.

1. Very Good: 3.50 to 4.00; Good (G): 3.00 to 3.49; Fair (F): 2.50 to 2.99; Low (L): 2.00 to 2.49; Poor: 1.50 to 1.99; Very Poor: 1.00 to 1.99.

2. Unsatisfactory: 1.00 to 2.49; Fair: 2.50 to 2.99; Satisfactory: 3.00 to 3.49.

# To obtain a representative portrait of the situation in the day care network a survey was conducted on government-regulated day care service providers across Québec in the spring of 2003. A representative sample of the survey's target population was chosen consisting of 905 children from some 650 establishments selected at random from the list of day care service providers. The survey covers the following topics: Physical arrangement of facilities; Organization of activities; Interactions between childcare providers, children and parents; General characteristics of personnel and establishments.

**Table A6: Probabilities of childcare use in percentage by quartiles of household income and types of care, children 0-4-year-olds, 2002**

Quartile of disposable income	Centre-based \$6180 <sup>1</sup>	Family-based \$3672 <sup>1</sup>	Other \$0 <sup>2</sup>	No childcare \$0 <sup>1</sup>	Total
1 <sup>st</sup> quartile	22	5	16	57	100%
2 <sup>nd</sup> quartile	33	14	17	36	100%
3 <sup>rd</sup> quartile	41	14	20	25	100%
4 <sup>th</sup> quartile	41	16	27	16	100%

Source: Mathieu Grenier 2005.

1. Mean subsidy. 2. Under estimated because does not takes into account that families with childcare receipts may have a tax deduction at the federal level and a refundable tax credit from Québec.