

# Child-Care Policy and the Labor Supply of Mothers with Young Children: A Natural Experiment from Canada

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In 1997, the provincial government of Québec, the second most populous province in Canada, initiated a new child-care policy. Licensed child-care service providers began offering day-care spaces at the reduced fee of \$5.00 per day per child for children aged 4. By 2000, the policy applied to all children not in kindergarten. Using annual data (1993–2002) drawn from Statistics Canada’s Survey of Labour and Income Dynamics, the results show that the policy had a large and statistically significant impact on the labor supply of mothers with preschool children.

This analysis is based on Statistics Canada’s Survey of Labor and Income Dynamics (SLID) restricted-access annual (1993–2002) Microdata Files, which contain anonymized data collected in the SLID. The data are available at the Québec Inter-university Center for Social Statistics (QICSS), a center of the Canadian Research Data network. Pierre Lefebvre and Philip Merrigan prepared all computations on these microdata. The responsibility for the use and interpretation of these data is entirely ours. This research was partly funded by CIRANO-Québec’s Department of Finance research partnership, the Social Sciences and Humanities Research Council of Canada, and the Fonds québécois de la recherche sur la société et la culture. Contact the corresponding author, Pierre Lefebvre, at [lefebvre.pierre@uqam.ca](mailto:lefebvre.pierre@uqam.ca).

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## I. Introduction

Several studies have estimated the effect of the price of purchased child care on the labor supply of mothers in the United States, Canada, and Europe. There are wide variations in the estimated price elasticities reported in the studies, from positive to barely significant to substantially negative effects of child-care prices on labor supply. Blau and Tekin (2001) and Blau (2003) survey more than a dozen U.S. studies and some Canadian studies,<sup>1</sup> and they offer explanations as to why estimates are so varied. They conclude that, despite differences in data sources and sample composition (by marital status, age of children, and income), this observed variation in results is largely due to differences in model specification and econometric methodology. In particular, they identify two key problems that can yield biased estimates: the implicit assumption that all nonparental child care has a monetary price (that paid formal child care is always the best option) and the use of household expenditures in day care to estimate the price of child care. Although some studies use selection bias correction methods for two types of selection (labor supply participation and, given labor supply participation, for formal child-care utilization) and corrected child-care expenditures, different and sometimes inappropriate exclusion restrictions to identify the child-care price equation may possibly lead to bias.<sup>2</sup> Examining the American empirical evidence, Blau (2003) and Blau and Currie (2006) conclude that the link between child-care prices and labor supply is weak.

This study uses a unique natural experiment in the Canadian province of Québec to provide convincing evidence that a public policy offering generous child-care subsidies that substantially decrease the price of child-care services together with free full-time kindergarten has a substantial positive effect on the labor supply of mothers with young children.<sup>3</sup> On September 1, 1997, the government of Québec implemented a new policy of day-care subsidies. Accredited child-care facilities would henceforth offer subsidized day care (\$5.00 per child per day) for all children 4 years

<sup>1</sup> For empirical results in the Canadian context, see Cleveland and Hyatt (1996), Powell (1997, 2002), and Michalopoulos and Robins (2000, 2002).

<sup>2</sup> “Specifying an employment model under the assumption that paid care is always the relevant non-maternal childcare option is thus a potentially serious error. The estimated relation between the price of childcare and employment in this specification will be determined, in part, by the proportion of the population using unpaid care. This proportion will change, if the price of childcare changes, and the estimated price effect would not be a valid guide to the employment impact of the price change. This is a version of the Lucas critique: a structural model could account for the fact that price affects behavior only by changing the utility associated with alternatives in which paid care is used, while a reduced form model cannot account for this” (Blau and Tekin 2001).

<sup>3</sup> Québec represents approximately 23% of Canada’s population.

of age as of September 30, 1997.<sup>4</sup> The government also promised to progressively decrease (every year) the age requirement for subsidies and increase the number of subsidized and regulated day-care spaces, targeting a number of 200,000 for 2006 (as compared to 79,000 available in late 1997).

This new policy was combined with other major changes in family policy. The new regime included a new unified child tax benefit contingent on family income (replacing universal child allowances) harmonized with the federal government's child tax benefit, full-time publicly provided kindergarten (in place of half-day kindergarten), and \$5.00 per day before- and after-school day care for kindergarten and grade school children.

The policy had two principal objectives: to fight family poverty by increasing mothers' participation in the labor market and to enhance child development and equality of opportunity for children. These goals have been pursued in many jurisdictions since the 1980s as early childhood education and day care have spearheaded family policy.<sup>5</sup>

Despite substantial public funding of this program—direct subsidies to child-care services increased from \$209 million in fiscal year 1995–96 to \$1.6 billion in 2006–7—there are very few studies that examine whether the objectives of this policy have been achieved. This article uses annual data (1993–2002) drawn from Statistics Canada's Survey of Labour and Income Dynamics (SLID) to estimate the effect of the policy on the labor supply behavior of Québec mothers with preschool children (1–5 years of age). We investigate the impact of the policy on the following labor supply outcomes: labor force participation, annual number of weeks and annual number of hours worked, annual earned income, and full-time participation for mothers who declared having a job during the reference year. A nonexperimental evaluation framework based on multiple pre- and post-treatment periods is used to estimate the policy effects. We compare Québec mothers (the treatment group) with mothers having children of similar ages in the other provinces of Canada (the comparison group) over several years.

Our econometric results support the hypothesis that the child-care policy, together with the transformation of public kindergarten from part-time to full-time, had a large and statistically significant impact on the labor supply of Québec mothers with preschool children. For example, we find that, in 2002, the policy increased the participation rate of mothers

<sup>4</sup> All sums are in Canadian dollars.

<sup>5</sup> The Québec approach mimics those of a number of European countries. See OECD (2001) for a survey of early childhood education and care policies and Blau and Currie (2006) for a wider discussion, including related American initiatives.

with at least one child aged 1–5 years by 8 percentage points and that hours and weeks worked (per year) increased by 231 and 5.17, respectively.

Following up on an earlier draft of the present article, Lefebvre and Merrigan (2005a, 2005b) employ a data set taken from the first five available cycles of Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY). They find that the Québec policy had a significant impact on labor force participation and annual number of weeks at work for all mothers with at least one preschool child aged 1–5 (with the results also holding in age-based subsamples).<sup>6</sup> Subsequently, Baker, Gruber, and Milligan (2005) used the first two cycles (1994–95 and 1996–97) and the last two cycles (2000–2001 and 2002–3) of the NLSCY,<sup>7</sup> with a slightly different methodology,<sup>8</sup> to show a similarly positive impact on labor supply (labor force participation).

The SLID has several advantages over the NLSCY. First, the sampling framework and methodology are designed (as the name of the data set suggests) to obtain precise income and labor force statistics of working-age individuals, while the NLSCY focuses on child outcomes and the unit of sampling is the child. Second, SLID data are annual, thus providing 10 years of data rather than the NLSCY's five cycles and therefore permitting a better identification of possibly different pre-policy trends in labor supply across regions. As explained in Meyer (1995), this is crucial for studies using difference-in-differences (DD) methodologies. Third, the SLID provides more measures of labor supply as well as better measures of hours worked and earnings than does the NLSCY. Finally, the multiple years of post-1997 data can better capture the effects over time of the policy as more subsidized child-care places were added each year from 1998 to 2002. This last point is made clearer later in the article in the Methodological section.

Other natural experiments provide the same insight on publicly provided incentives and mothers' employment. For example, in the United States, Gelbach (2002) analyses the impact of public kindergarten, an in-kind subsidy to parents, on a sample of single mothers with a youngest child who is 5 years old.<sup>9</sup> His instrumental variable estimates indicate that

<sup>6</sup> The NLSCY (biennial since 1994–95) has much larger samples of young children than the SLID, but only two labor supply variables are measured identically over the cycles (number of weeks worked in the year preceding the survey and labor force participation at the time of the survey).

<sup>7</sup> They do not consider the third cycle (1998–99), containing children surveyed during the 2 years immediately following the phasing in (September 1997) of the Québec policy.

<sup>8</sup> The authors also focus on the impacts of the policy on diverse behavioral outcomes measuring the "well-being" of young children aged 0–4 years.

<sup>9</sup> The study exploits the fact that the month-of-birth requirement for entry to kindergarten changes from one state to another.

access to freely provided kindergarten increases the probability of employment as well as other labor supply measures. For Norway, Schone (2004) exploits the introduction of a new family policy program that creates some work disincentives. From January 1999 on, all parents with 1- and 2-year-olds who did not use publicly subsidized day care became entitled to a "cash-for-care" (CFC) subsidy. Estimates based on a DD quasi-experimental approach show that the effect of the CFC subsidy is to decrease the participation rate of eligible mothers by 8%. For France, Piketty (2005) examines the extension of a similar parental home-care allowance (the "Allocation parentale d'éducation" [APE]) started in 1985–87 for mothers giving birth to a third child who also decide to interrupt full-time (or part-time) work for up to 3 years. In 1994, the program was extended to mothers giving birth to a second child (for families with a first child aged less than 3). Piketty's estimates suggest that, for a second child born after July 1994, labor force participation of eligible mothers decreased by between 11% and 19%, depending on socioeconomic controls and trends included in the regression equation. The current article is consistent with these in providing support for the hypothesis that generous incentives designed to modify the labor supply of mothers with young children can have an important impact on these mothers' choices.

The rest of the article proceeds as follows. Section II provides an overview of public child-care policy in Canada and contrasts Québec with the other provinces. Section III identifies the conceptual issues and outlines the framework for the econometric analysis, while Section IV describes our data set and presents descriptive statistics. Our empirical results are described in Section V and analyzed and discussed in Section VI. Conclusions are presented in Section VII.

## II. Child-Care Policy in Québec and across Canada

### A. The Implementation of Québec's Child-Care Policy (1997–2002)

Before September 1997, the Québec government directed some subsidies, partially covering certain fixed costs of child care, to licensed and regulated child-care facilities.<sup>10</sup> In addition, fee subsidies were available to low-income families according to eligibility criteria.<sup>11</sup> Table 1 displays the evolution and targeting of spending from 1996 onward. In 1996–97, subsidies amounted to \$288 million, of which 42% (\$122 million) were allocated to families for the purchase of licensed care. On September 1, 1997, licensed and regulated child-care facilities under agreement with

<sup>10</sup> Examples include one-time payments such as start-up grants and recurring amounts for infrastructure, educational materials, and special needs of children.

<sup>11</sup> For details on child-care subsidies in other provinces and territories of Canada, see Cleveland and Hyatt (1998).

**Table 1**  
**Québec's Budgetary Credits for the Child-Care Program (in Millions of Dollars), 1996-97 to 2006-7**

Fiscal Year	Not-for-Profit Network Center and Family Child Care	For-Profit Center	Parent Fee Subsidy for Day Care and Special Grants (in Millions of Dollars)	Total Subsidy*	Subsidy per Space (in Dollars)
1996-97	160	6	122	288	3,888
1997-98	150	5	129	294	3,832
1998-99	334	56	80	470	4,890
1999-2000	505	110	27	642	5,654
2000-2001	695	138	11	844	6,376
2001-2	872	148	1	1,020	7,004
2002-3	1,019	187	≈ 0	1,206	7,379
2003-4	1,099	211	≈ 0	1,310†	7,366
2004-5	1,162	224	≈ 0	1,386†	7,319
2005-6	1,178	252	≈ 0	1,493†	7,593
2006-7	1,291	271	≈ 0	1,612†	8,114‡

SOURCES.—For total subsidy, expenditure budget, annual, Québec's Treasury Board; for number of spaces, see table 2.

\* Funding includes one-time grants (e.g., start up), recurring operating grants to centers (and regulated family child-care and agency administration fees), special needs funding, and other grants.

† Subsidies include interest and capital charges for not-for-profit centers and government contributions to the retirement plan of employees of all centers. Since January 1, 2004, the daily fee has been \$7.00 instead of \$5.00.

‡ Based on 198,000 spaces on March 31 2007.

Québec's Department of the Family (not-for-profit centers, family-based day care, and for-profit day-care centers) started offering spaces at the reduced fee of \$5.00 per day per child for children aged 4 on September 30. The rate of growth of subsidized spaces increased in the second year of the program (child-care facilities and spaces are created throughout the year). On September 1, 1998, and September 1, 1999, respectively, 3-year-olds and 2-year-olds (on September 30) became eligible for the low-fee spaces. For the fiscal year 1998-99, 390 out of \$470 million in day-care subsidies were attributed directly to day-care providers. On September 1, 2000, all children aged less than 59 months (not eligible for kindergarten if their fifth birthday is after September 30) were eligible for reduced contribution spaces. In 2006-7, subsidies had reached \$1,600 million, practically all directed toward day-care providers.

For children aged 5 on September 30, 1997, free full-day rather than part-day kindergarten was offered by all school boards in Québec (some private schools already offered this option). Kindergarten is not compulsory, but children enrolled in public school must attend class for the full school day, 5 days a week. In September 1998, the Department of Education began subsidizing before- and after-school day care. School boards were required to offer these services on the school premises at the

reduced contribution of \$5.00 per day per child for children of kindergarten and grade school ages.

Table 2 presents the evolution of the number of spaces partly or totally subsidized by the government from 1993–94 to 2005–6 by type of child-care setting, along with the total number of children in the different age groups. We observe that nonprofit services are the main beneficiaries of the policy. The yearly increases in subsidized spaces from 1998 are all quite substantial. Since the introduction of the policy, it is well known that the program has not been able to satisfy the increased demand for low-fee spaces.<sup>12</sup> It is difficult to obtain data on the number of children on waiting lists with no access to a subsidized space. Therefore, we presumably underestimate the effect of the policy, since our analysis supposes that all women with at least one child under 6 years old are “treated.”

#### B. Child Care in Canada: Arrangements and Uses

We cannot provide a similarly elaborate picture of the evolution of child-care services in the other provinces of Canada, but the number of children in subsidized-fee day care is very small relative to the case in Québec, and it has remained small during the period of analysis.<sup>13</sup> It is also difficult to obtain a larger picture of day-care utilization, arrangements, and reasons for the use of day care across Canada. The last national survey on child-care use was conducted in 1988. Other than licensed centers and family-based regulated day care, parents can choose unregulated day care in their own home or in that of a relative or nonrelative. Provincial and federal policies provide tax relief for child-care spending upon presentation of receipts.

The Canadian National Longitudinal Survey of Children and Youth (NLSCY) has been produced every 2 years since 1994–95, and five cycles are now available, the last for 2002–3. This survey asks parents who work

<sup>12</sup> The Web site of the department responsible for family policy (Department of the Family; <http://www/mfa.gouv.qc.ca>) offers the following advice: “First of all, you must decide whether you want childcare in a childcare center 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.”

<sup>13</sup> For some partial and tentative estimates, see Friendly, Beach, and Turiano (2003) and Doherty, Friendly, and Beach (2003). The OECD (2004) study on Canadian child care deplores the patchy state of day-care statistics in Canada.

**Table 2**  
**Number of Licensed Child-Care Spaces and Subsidized Spaces for Preschool Children on March 31 by Setting and**  
**Number of Children Aged Less than 1 Year, 0-4 Years, and 5 Years on July 1, Québec, 1993-2006**

Year	Spaces in Not-for-Profit Network <sup>*</sup>			Spaces in For-Profit Center <sup>†</sup>		Total Number of Children	
	Center	Family Based	Under Agreement	Without an Agreement and Not Subsidized <sup>‡</sup>	Total Number of Spaces at a Reduced Fee <sup>§</sup>		Less than 1 Year
1993-94	33,452	15,253		15,665	64,370	90,417	
1994-95	34,545	17,871		18,366	70,782	87,258	
1995-96	36,708	19,479		19,842	76,029	85,130	
1996-97	36,101	20,328	17,629	4,806	74,058	79,724	
1997-98	36,977	21,761	17,979	5,587	76,715 <sup>  </sup>	75,674	
1998-99	39,436	32,816	23,861	585	96,113 <sup>  </sup>	73,599	
1999-2000	45,793	44,882	23,270	1,208	113,545 <sup>  </sup>	72,070	
2000-2001	51,988	55,979	24,578	705	132,545	73,699	
2001-2	58,525	62,193	24,629	976	145,624	72,200	
2002-3	63,339	75,355	24,740	1,620	163,434	73,600	
2003-4	68,274	82,044	27,530	1,907	177,848	74,370	
2004-5	72,059	87,192	30,131	2,695	189,380	75,189	
2005-6	74,573	89,011	33,305	3,487	196,618	79,658	
2006-7	75,934	88,645	34,027	4,538	198,606	82,981	

SOURCES.—Department of the Family for number of spaces; Institut de la statistique du Québec for number of children by age.

<sup>\*</sup> This designation applies more strictly from September 1997.

<sup>†</sup> From 1999 to 2003, the government froze the number of spaces in for-profit child-care centers under agreement, which also offered spaces at the \$5.00 per day fee; few new spaces were added for this arrangement during this period.

<sup>‡</sup> These figures represent spaces in day-care centers without an "agreement" that are not subsidized but are licensed and regulated. These centers can choose their daily fee.

<sup>§</sup> The reduced parental contribution program (\$5.00 per day fee) began on September 1997 for children aged 4 by September. Before September 1997, licensed centers received some subsidies for their operating costs and families received a fee subsidy according to eligibility and family income (see table 1).

<sup>||</sup> The \$5.00 per day fee policy began with 4-year-olds and was extended to 3-year-olds in September 1998, to 2-year-olds in September 1999, and to children of all preschool ages not in kindergarten in September 2000.

or attend school if they use child-care services for these purposes. Table 3 presents the principal care arrangements used by parents of children in the 1–5 age group for Québec and the other provinces for the first five data cycles.<sup>14</sup> In the third period of the survey, we see that a larger percentage of children in Québec are in day care than is the case in other provinces. Family-based day care outside of the child's own home is the most widely used mode of day care across Canada. Day care has grown rapidly in Québec relative to other provinces since 1998. Day care in the household by nonrelatives is slightly higher outside of Québec, and center-based care, including before- and after-school care, has increased substantially in Québec as compared to the other provinces (where this arrangement ranks third).<sup>15</sup> To summarize, an important shift in day-care use has occurred in Québec since the introduction of the day-care policy in 1997, unlike what has occurred in the other provinces. For 5-year-olds, kindergarten attendance in Québec has, since 1997, increased from 88% part-time to 98% full-time (administrative data).<sup>16</sup>

### III. Analytical Framework and Econometric Modeling

#### A. Conceptual Issues

The change in child-care policy that was implemented in September of 1997 had different impacts on child-care costs depending on family income. This is explained by the structure of the policy in Québec before the regime switch, where child-care expenses were reduced via a refundable tax credit that was considerably higher for low-income families. There was, and still is, a federal deduction for child-care expenses. This deduction is based on the income of the lowest earner in the household. The overall impact of these fiscal measures reduced child-care costs for families in Québec (provided expense receipts were included with tax returns). Once the refundable tax credit and federal deduction are considered, for a gross price of \$25.00 per day for day-care services, middle-income families paid approximately \$11.00 per day, while the net price could be as low as \$5.00

<sup>14</sup> Unfortunately, the classification of arrangements changed after cycle 2.

<sup>15</sup> Exclusion of full-day kindergarten as a mode of care probably distorts the changes here. Five-year-olds and eligible 4-year-olds may attend kindergarten as their main mode of care, particularly in the Province of Ontario, where most 5-year-olds and eligible 4-year-olds attend (pre)kindergarten. If they are not in before- and after-school programs, they will most likely be recorded in the NLSCY as "no care arrangement used" or possibly as in-home care by a relative (see the increase for this category in table 3).

<sup>16</sup> All provinces have part-day (2.5 hours) free kindergarten in the public school system, except New Brunswick and Nova Scotia, where kindergarten is full day and compulsory. In Ontario, most school boards offer a part-day junior kindergarten (2.5 hours per day) for children aged 4, and a very large majority of these children are enrolled in preschool.

**Table 3  
Primary Care Arrangement Used for 1-5-Year-Olds to Allow Parent(s) to Work or Study: Number (%) of Children by  
Arrangement, Québec and Other Provinces, 1994-95 to 2002-3**

Arrangement	1994-95		1996-97		1998-99		2000-2001		2002-3	
	No.	%	No.	%	No.	%	No.	%	No.	%
Québec:										
Someone else's home by nonrelative, regulated	21,412	4	23,352	4	83,681	16	85,024	18	67,463	15
Someone else's home by nonrelative, unregulated	74,111	13	60,664	11	36,490	7	30,470	6	24,030	5
Someone else's home by a relative	34,212	6	25,250	5	1,563	0	1,983	0	2,481	0
Someone else's home by a nonrelative	0	0	7,149	1	18,166	4	17,528	4	16,310	4
Own home by brother or sister	9,660	2	11,258	2	31,917	6	17,227	4	15,635	4
Own home by other relative	29,537	5	22,178	4	74,324	15	100,604	21	135,345	31
Own home nonrelative	56,453	10	63,176	11	11,671	2	20,409	4	36,446	8
Day-care center	3,496	1	3,769	1	141	0	0	0	0	0
Before or after preschool or school program	0	0	0	0	1,244	0	246	0	118	0
Own care	1,639	0	1,332	0	246,876	48	204,111	43	154,512	35
Other arrangement	253,333	45	264,720	48	4,158	1	235	0	510	0
No care arrangement used*	77,255	14	64,154	12	510,231	95	477,947	95	442,119	95
Neither PMK nor spouse work or study†	6,248	1	3,159	1	567,356	100	567,356	100	567,356	100
Don't know/refusal/not stated										
All children	567,356		550,161		510,231		477,947		442,119	



for low-income families (see Baril, Lefebvre, and Merrigan [2000] for a detailed discussion).

Thus, before 1997, families faced a nonlinear pricing schedule with greater price reductions for low-income families. The new policy set prices at \$5.00 per day for everyone after 1997. The federal deduction continues to affect the net price of child care in Québec, but it is less important as the deduction is now much smaller. Hence, after September 1997, high-income families and middle-income families saw a larger price reduction than did lower-income families. However, possibly liquidity-constrained low-income families may have had problems accessing reliable day care under the previous regime, so that the post-1997 regime may have had important effects on this group as well. In addition, parents using relatives for day care might prefer a subsidized space, for which long hours of day care are often available. Indeed, the new policy requires parents to commit to 261 days of day-care services per year in order to be guaranteed 10–11 hours per day (see n. 17). Finally, since the \$5.00 per day child-care service is available every day of the week and is licensed and regulated, many parents would find it more reliable than home care.

The new regime may be less advantageous for families who make limited use of child-care services. Overall, if price was the main determinant of child-care choices, then families with higher earning potential would take more advantage of the policy, due to the larger reduction in child-care costs. Finally, our computations reveal that, for mothers working full-time, the hourly cost of subsidized day care is less than \$0.60 per hour (supposing a 9-hour day for work hours plus time spent commuting).<sup>17</sup>

### B. Empirical Model

Our econometric approach is based on a difference-in-difference (DD) procedure that is now well established in labor economics (Card 1990; Angrist and Krueger 1999; Meyer and Rosenbaum 2001; Bertrand, Duflo, and Mullainathan 2004). We observe mothers with young children in Québec, before and after the 1997 policy change. Our comparison group will be mothers with children of the same age in the other provinces of Canada, where no important day-care reforms occurred during the same time period. We consider 1999 to be the first year of the program as the subsidy in 1998 mainly went to accommodate mothers already in the

<sup>17</sup> In the low-fee child-care centers (including the school-based ones), services are usually provided from 7:30 a.m. to 6 p.m.; in family-based child care, the operating hours must be for a maximum of 10 hours. These services must be offered for a maximum of 20 days per 4 weeks and no more than 261 days per year. Since most of the spaces must be occupied full-time, a family will pay \$1,305 per year (billed monthly) to maintain its access to a space, even if the child is absent from day care (due to sickness or for family vacations).

labor market and using the existing facilities and very few new spaces were available before 1999.

We will estimate the following DD specification, which is standard in the literature:

$$Y_{it} = \alpha + \theta Q_{it} + \gamma I(t \geq s) + \beta Q_{it} I(t \geq s) + \varepsilon_{it}, \quad (1)$$

where  $i$  indexes mothers,  $Y_{it}$  is a labor market outcome at time  $t$ ,  $Q_{it}$  is a dummy variable taking the value of one if the mother lives in Québec and zero otherwise,  $I(t \geq s)$  is an indicator function equal to one if the period is after the policy change and zero otherwise,  $Q_{it} I(t \geq s)$  is an interaction term between  $I(t \geq s)$  and  $Q_{it}$ , and  $\varepsilon_{it}$  is an error term. Finally, the parameter  $\beta$  reflects the policy effect. The DD estimator of  $\beta$  is equivalent to least squares if no trends are included in the regression. The main identification condition for the estimation of the policy effect is that, aside from the new child-care regime, there are no other Québec-specific shocks in or after  $s = 1999$  pertinent to the labor supply decision of young mothers. In addition, the policy was unexpected (Baril et al. 2000) and can therefore be considered exogenous with respect to any unobserved variables in the error term. The \$5.00 per day child-care policy was announced in January 1997 following a White Paper on family policy released in the fall of 1996, so that it was known that the government was considering reforms that may have borne on child care. However, the details of the program finally adopted (such as the implementation date and the age requirements) were only known a few months before implementation. Were the policy merely a reaction to strong growth of female labor supply, there would be a potential endogeneity problem. However, given that we observe labor supply patterns for multiple pre-program years, we can control for any pre-1997 differentials between Québec and the other provinces (e.g., stronger growth in Québec), thus reducing simultaneity bias. Since the child-care regime change was part of wider reforms in public policy, our estimated effects could be corrupted by other aspects of the broader policy. However, in previous work (Lefebvre and Merrigan 2003), we show that other labor supply incentives were not very strong.

Specification (1) can be enriched in three ways. First, one can add a number of control variables to the regression, such as the age of the mother and her level of education. Second, although very young children were not included in the early years of the program and the first year of the program did not create new day-care spaces and facilities, a specific effect for the year 1998 was added to the regression but was not statistically significant. As mentioned above, we conjecture that most of the mothers using day care in 1998 were already in the labor market when the policy was implemented and were the first to benefit from the subsidies. Finally, we account for the effect of the reduced age eligibility and the gradual

increase in the number of places from 1999 to 2002 through the inclusion of a series of year-specific dummies from 1999 to 2002. These additions to (1) give:

$$Y_{it} = \alpha + \theta Q_{it} + \gamma_{21} I(t \geq s) + \sum_{t=1999}^{2002} \beta_t Q_{it} + \Phi X_{it} + \varepsilon_{it}, \quad (2)$$

where the  $\beta_t$  for  $t = 1999, \dots, 2002$  represent time-specific effects of the policy,  $X_{it}$  is a vector of socioeconomic control variables, and  $\Phi$  is a vector of parameters. Specification (2) is the final specification, with  $Y_{it}$  representing different labor market outcomes.<sup>18</sup>

As pointed out by Conley and Taber (2007), a strong limitation to our natural DD experiment is that only one group, mothers in Québec, experience the treatment change. Optimally, for a consistent estimate of the treatment effect, DD methods are better suited to cases where the treatment is applied to several groups and several comparison groups are available. In fact, to obtain consistent results, given that we observe outcomes for a single treatment group, we must assume that there is no time-varying province-specific effect from 1994 to 2003, the time period of our sample.

#### IV. Data Set and Descriptive Analysis

Statistics Canada's Longitudinal Survey of Labour and Income Dynamics (SLID) provides the data used for our empirical analysis. It is a nationwide survey on household and personal income as well as labor force participation. The individuals for this survey are sampled through the Labour Force Survey (LFS), which covers all provinces with the exception of the three territories, native reserves, the military, and individuals residing in institutions. Conceived originally as a rotating panel survey, the first panel was produced in 1993. The same individuals were interviewed every year from 1993 to 1998. In 1996, a second panel was introduced, covering the years 1996–2001. In 1999, a third panel was started to replace the first cohorts of respondents. The last panel started in 2002. Since 1996, the SLID has been composed of two cohorts representative of the total population of individuals aged 16 or more. First, for the period 1993–2002, we sampled all mothers aged 18–56 years who had at least

<sup>18</sup> An anonymous referee suggested a regression discontinuity design to estimate the policy effects, but, after consideration, we have decided that such an approach does not suit our problem. In our case, the discontinuity point would be the point at which children start school, i.e., the birth month requirement to be enrolled. In many provinces, but not all, it is December 31. In Québec the birth month requirement for entry is September 30. Also, we observe, by year, fewer than 200 mothers with children who are 5 years old. Therefore, there are very few observations at the exact discontinuity point. Finally, the regression discontinuity design requires a smooth age function as a control variable; this is unrealistic in our case as children of less than age 5 were also affected by the policy.

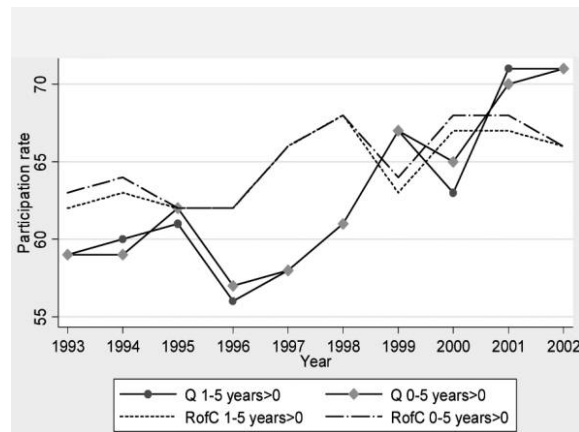


FIG. 1.—Mothers' labor force participation in August by ages of children in Québec (Q) and the rest of Canada (RofC).

one child younger than 6 years old.<sup>19</sup> Second, we partitioned our sample by the level of education of the mothers: those with a high school education or less and those with more than a high school education. Because highly educated mothers live in high-income households, for whom the decrease in child-care prices was greater, it is possible that the effect of the policy varies by education level. Five labor market variables were chosen to analyze labor market behavior:<sup>20</sup>

1. Labor market participation for 2 of the 12 months of the year (the information is available for all months): April and August (coded ml04v2 and ml08v2, respectively).
2. Employment during the reference year: full-time (coded fl1prt1); this indicator applies to individuals having worked during the reference year.
3. Number of weeks worked during the year (coded wksem28).
4. Number of hours worked during the year (coded alhrwk28).
5. Earnings for the reference year in all jobs (coded earn42), in real 1992 dollars.

Figures 1–5 trace the time-series evolution of the five labor market variables for the years 1993–2002 for mothers in Québec (Q) and in the rest of Canada (RofC). Since participation is available for each month, we must choose a particular month of the year. As mentioned, we use April and August. Results are not sensitive to choice of month, so we

<sup>19</sup> Only by using census families can a unique link be established between a mother or the spouse of a man and the children living in the family.

<sup>20</sup> For the exact definitions, see the electronic dictionary of SLID variables on Statistics Canada's Web site, <http://www.statcan.ca>.

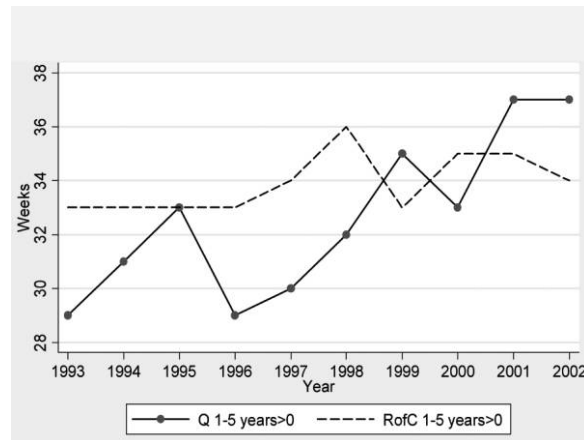


FIG. 2.—Mothers' annual weeks worked by ages of children in Québec (Q) and in the rest of Canada (RofC).

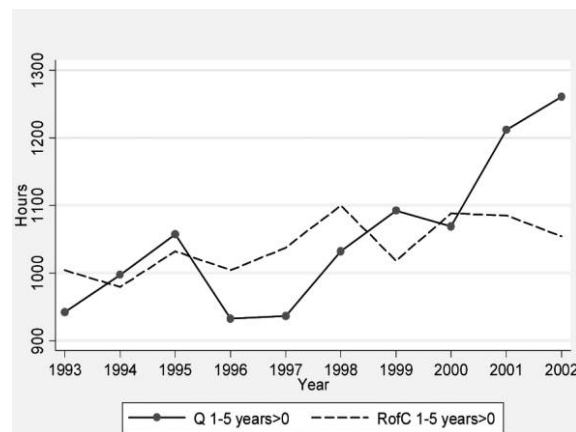


FIG. 3.—Mothers' annual hours worked by ages of children in Québec (Q) and in the rest of Canada (RofC).

only present results for August. Figure 1 presents the percentage of all mothers (single parent or with a partner) having at least one child aged less than 6 years and at least one child between the ages of 1 and 5, who worked in the month of August in Québec (Q) and in the rest of Canada (RofC) during the period 1993–2002. We can see that, except for the aberration in 1995,<sup>21</sup> participation rates in Québec increase rapidly after

<sup>21</sup> For the regression analysis, we excluded 1995 data without the results being affected.

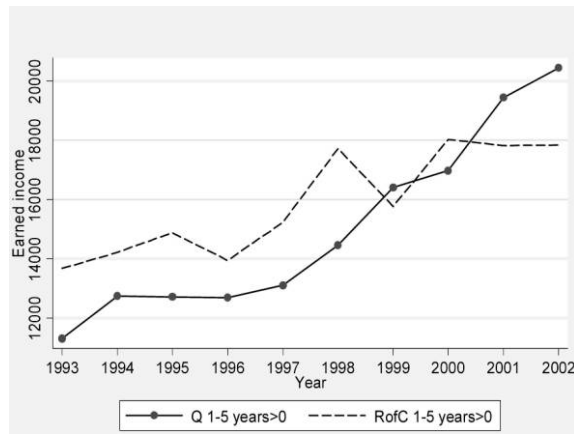


FIG. 4.—Mothers' annual earned income \$1992 by ages of children in Québec (Q) and in the rest of Canada (RofC).

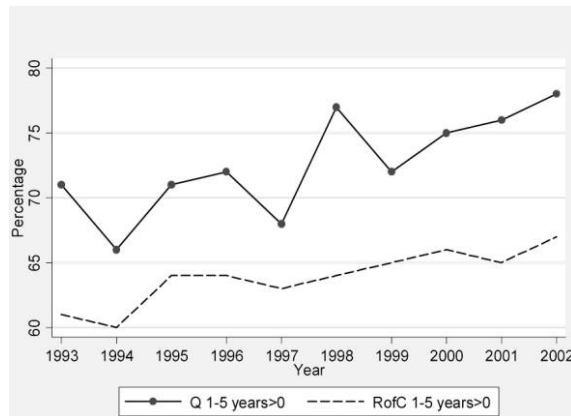


FIG. 5.—Working mothers in full-time employment by ages of children in Québec (Q) and in the rest of Canada (RofC).

1998 as compared to the rest of Canada, starting lower but eventually surpassing the latter in 2001 and 2002. The increase is notable between 1998 and 1999, the first year with a substantial increase in low-fee day-care spaces.

Figure 2 presents the same time series but for annual average weeks worked for mothers with at least one child between the ages of 1 and 5. We only present this group because it behaves similarly to the full sample of mothers with children less than 6 years old. The same pattern is evident,

with very strong growth in Québec relative to the rest of Canada after 1998. Figure 3 shows the same pattern for annual hours worked.

Figure 4 presents the time series for annual average earnings. It shows that there is a stagnation of mean earnings from 1999 in the rest of Canada while they are growing steadily in Québec. Figure 5 traces the percentage of working mothers in full-time employment. Again, the results point to positive effects of the program and show that a majority of mothers now work full-time. Graphic plots not presented here show that women with a high school education, women with more than a high school diploma, and women in two-parent families all show similar patterns. The number of observations was not sufficient to provide a reliable analysis of single-mother labor supply behavior.

Our preliminary analysis supports the hypothesis that the program had positive effects on the labor supply of women with young children in the province of Québec as all measures display strong growth after the inception of the program, something which did not occur in the other provinces at this time. We proceed in the next section to econometrically measure the size of the effects, their statistical significance, and their robustness to the presence of controls in the regression.

## V. Econometric Results

Table 4 shows the yearly mean values of mothers' characteristics for those with at least one child 1–5 years of age. Mothers are quite similar in both regions. We note the following differences. Mothers in Québec are slightly less educated in the earlier years of the sample. Compared to the other provinces, the prevalence of single-mother families in Québec is lower in the early years and higher in the later years. The proportion of mothers born outside Canada is smaller and family levels of earned income from sources other than the mother are lower in Québec than elsewhere.

Because a large proportion of mothers stay at home in the first year of a child's life and few subsidized day-care spaces are available when the child is less than age 1, we estimate models with mothers in families where there is at least one child aged 1–5. The control variables in the regressions are mother's age, mother's age squared, years of education, years of education squared, a dummy variable for the mother being born in a foreign country, a dummy variable for single-mother households, the number of children older than 5 years of age in the household, the number of children less than 6 years of age, a dummy variable for the presence of a child less than 3 years of age, and earned income from a source other than the mother. We also split the sample into subsamples of mothers with a high school education or less and mothers with more than a high school ed-

ucation. The former would be in lower-income families and are more likely to be liquidity constrained.

The estimates from two specifications based on equation (2) are presented for each of the three samples: (i) assumes a constant treatment effect for the years 1999 to 2002 ( $\beta_{1999} = \beta_{2000} = \beta_{2001} = \beta_{2002}$ ), the DD model; (ii) assumes policy effects that differ by year, and we test the hypothesis of equal effects across time,  $\beta_{1999} = \beta_{2000} = \beta_{2001} = \beta_{2002}$ .<sup>22</sup> Given that smaller provinces are oversampled, we perform all the regressions with Statistics Canada's sampling weights. Because some mothers are present more than once in the sample, standard errors are adjusted for clustering, the unit of the cluster being the mother. Finally, since the effects of the policy could be heterogeneous, our estimates should be interpreted as the average effect of the treatment on the treated, that is, mothers in Québec with a child between 1 and 5 years of age.

Table 5 presents the econometric results. Panel A contains the estimated effects of the policy on four labor supply measures for all women with at least one child between the ages of 1 and 5. Panel B corresponds to the subsample of mothers with a high school education or less, and panel C corresponds to the subsample with more than a high school education. Each panel contains the estimates of the effects of the policy on participation, annual earnings, annual hours worked, and the number of annual weeks worked.

We start with some general comments concerning table 5. For the full sample of mothers, panel A displays convincing evidence that the policy has a strong, positive, and statistically significant effect on the labor supply of mothers with at least one child between the ages of 1 and 5. Second, it is important to estimate the model assuming policy effects that differ by year, showing that the effect of the policy increases with years. For the full sample, under specification ii with different year effects, we reject the assumption of equality of effects across time; the *p*-value of this test is found in the row labeled "H0: equal policy effects (*p*-value)." Furthermore, we observe the effect of the policy to be stronger as more subsidized spaces are offered to mothers of young children.

<sup>22</sup> An important consideration is the possibility that differential pre-period trends could bias the results (Meyer 1995). If Québec mothers' labor supply was increasing at a faster rate than in the rest of Canada before the program, the DD estimator will be biased upward and we will attribute to the policy effects that are due to other factors. We therefore estimated a third specification that assumes pre-program trends and a post-program trend as well as policy effects that change from 1999 to 2002 as a check on the robustness of our results to the presence of pre-policy differences in labor supply trends between Québec and the rest of Canada. We do not present the results with time trends, which were generally found to be statistically insignificant, whose inclusion in the regression had very little effect on the value of the estimated parameters, and which considerably increased the standard errors. All estimates are available from the authors.

**Table 4**  
**Mean Values of Mothers' Characteristics with at Least One Child Aged 0-5 years, Québec and Other Provinces,**  
**1993-2002**

Characteristics	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Québec:										
No. mothers	343,298	355,544	333,432	347,315	323,948	316,682	305,533	293,272	247,808	265,770
Mean age	31.5 (4.4)	31.7 (4.7)	32.1 (4.7)	31.9 (4.9)	31.9 (4.9)	32.0 (5.2)	32.2 (5.4)	32.4 (5.5)	32.7 (5.5)	32.5 (5.4)
Years of education	13.0 (3.1)	13.4 (3.3)	13.6 (3.3)	13.5 (4.1)	13.4 (4.1)	13.9 (3.9)	13.9 (4.1)	14.1 (4.1)	14.2 (4.1)	14.3 (3.7)
Secondary diploma or less	38.7	36.9	34.8	36.9	36.8	31.7	32.6	31.0	26.5	23.3
Not born in Canada	10.8	8.8	8.0	12.2	9.8	7.9	8.7	4.0	8.9	7.3
Single parent	11.1	8.8	10.2	12.7	13.0	12.8	15.1	18.6	14.8	15.1
No. children 0-4 years	1.14 (.6)	1.17 (.6)	1.19 (.7)	1.15 (.7)	1.10 (.7)	1.08 (.7)	1.08 (.7)	1.02 (.7)	1.08 (.6)	1.11 (.6)
No. of children 0-5 years	1.43 (.6)	1.39 (.5)	1.46 (.6)	1.42 (.6)	1.39 (.6)	1.39 (.6)	1.35 (.5)	1.35 (.6)	1.34 (.5)	1.36 (.6)
No. children 1-5 years	1.34 (.5)	1.28 (.5)	1.31 (.5)	1.33 (.5)	1.30 (.5)	1.31 (.5)	1.25 (.5)	1.26 (.5)	1.23 (.5)	1.24 (.5)
No. children 6 years and plus	.91 (1.0)	.84 (1.0)	.89 (1.0)	.94 (1.0)	.96 (1.0)	.94 (1.0)	.92 (1.0)	.95 (1.0)	.89 (1.0)	.94 (1.1)
Child 0-2 years present	56.6	55.5	50.3	52.5	51.7	47.7	44.5	47.7	51.0	47.5
Other earned income (\$)	21,593	23,402	26,960	25,543	28,570	31,162	31,214	31,046	35,138	39,005

Other provinces:	1,553,398	1,527,925	1,524,826	1,470,188	1,415,141	1,380,229	1,313,728	1,213,189	1,117,026	1,190,631
No. mothers	31.4	31.8	32.0	32.0	32.3	32.4	32.7	32.8	32.9	33.0
Mean age	(5.0)	(5.0)	(5.1)	(5.3)	(5.3)	(5.4)	(5.5)	(5.6)	(5.6)	(5.5)
Years of education	13.2	13.5	13.6	13.5	13.6	13.8	13.9	14.0	14.2	14.2
Secondary diploma or less	(2.8)	(2.8)	(2.9)	(3.2)	(3.2)	(3.2)	(3.2)	(3.2)	(3.2)	(3.0)
Not born in Canada	35.2	33.4	31.6	35.2	33.0	30.1	31.3	28.4	26.8	24.4
Single parent	16.8	16.9	15.9	19.9	19.5	18.1	19.4	19.1	18.8	17.9
No. children 0-4 years	14.1	14.0	15.3	14.0	13.4	13.2	14.5	13.9	12.8	14.2
	1.16	1.13	1.14	1.13	1.11	1.13	1.09	1.04	1.10	1.08
No. children 0-5 years	(.7)	(.7)	(.7)	(.7)	(.7)	(.7)	(.7)	(.7)	(.7)	(.7)
	1.40	1.42	1.41	1.40	1.38	1.40	1.39	1.37	1.36	1.36
No. children 1-5 years	(.6)	(.6)	(.6)	(.6)	(.6)	(.6)	(.6)	(.6)	(.6)	(.6)
	1.29	1.30	1.29	1.30	1.28	1.30	1.28	1.28	1.25	1.26
No. children 6 years and plus	(.5)	(.5)	(.5)	(.5)	(.5)	(.5)	(.5)	(.5)	(.5)	(.5)
	.83	.89	.89	.92	.91	.91	1.01	1.04	.97	.98
Child 0-2 years present	(1.0)	(1.0)	(1.1)	(1.0)	(1.0)	(1.0)	(1.0)	(1.1)	(1.0)	(1.1)
Other earned income (\$)	55.7	51.8	51.8	53.8	52.7	49.7	47.9	49.0	51.2	47.8
	26,141	27,886	28,501	28,318	30,998	34,783	35,620	40,119	43,064	45,203

SOURCE.—Authors' calculations from the SLID Micro Data Files, 1993-2002.  
NOTE.—Standard deviations are in parentheses.

**Table 5**  
**Estimated Effects of Child-Care Policy on Québec Mothers' Labor Force Participation, Annual Earnings, and Annual Hours Worked and Annual Weeks Worked for Three Selected Samples and Two Specifications**

	No Trends and Equal Effects		No Trends and Unequal Effects		<i>p</i> -Value <sup>a</sup>
	$\beta$	$\beta$	$\beta_{2000}$	$\beta_{2001}$	
A. All mothers with at least one child aged 1–5 years:					
Participation ( <i>N</i> = 28,351)	.073***	.053*	.076***	.083***	.081***
Standard error	.026	.032	.030	.032	.034
H0: equal policy effects ( <i>p</i> -value)					
Annual hours worked ( <i>N</i> = 27,311)	133***	64	84	169***	231***
Standard error	52	61	58	66	71
H0: equal policy effects ( <i>p</i> -value)					
Annual weeks worked ( <i>N</i> = 28,504)	4.28***	3.29**	3.80***	5.09***	5.17***
Standard error	1.33	1.72	1.53	1.68	1.72
H0: equal policy effects ( <i>p</i> -value)					
Annual earnings ( <i>N</i> = 28,504)	2,302*	704	522	3,175**	5,285***
Standard error	1,251	1,461	1,284	1,462	1,759
H0: equal policy effects ( <i>p</i> -value)					
B. Mothers with a high school diploma or less with at least one child aged 1–5 years:					
Participation ( <i>N</i> = 8,877)	.073	.033	.108*	.069	.081
Standard error	.051	.066	.056	.678	.068
H0: equal policy effects ( <i>p</i> -value)					
Annual hours worked ( <i>N</i> = 8,638)	133	33	148	134	270*
Standard error	95	110	110	130	154
H0: equal policy effects ( <i>p</i> -value)					

Annual weeks worked ( $N = 8,929$ )	4.87*	5.17	3.01	5.65	6.29*
Standard error	2.61	2.85	3.14	3.62	3.51
H0: equal policy effects ( $p$ -value)					.53
Annual earnings ( $N = 8,929$ )	188	-337	-1,161	544	2,638
Standard error	1,183	1,219	1,223	1,571	2,242
H0: equal policy effects ( $p$ -value)					.09
C. Mothers with more than a high school diploma with at least one child aged 1-5 years					
Participation ( $N = 19,425$ )	.065**	.059*	.059*	.077	.067*
Standard error	.029	.035	.038	.067	.039
H0: equal policy effects ( $p$ -value)					.94
Annual hours worked ( $N = 18,626$ )	114*	42	69	160**	188**
Standard error	62	70	74	77	82
H0: equal policy effects ( $p$ -value)					.18
Annual weeks worked ( $N = 19,526$ )	3.57**	2.96*	3.09*	4.27**	4.02**
Standard error	1.53	1.79	2.04	1.83	2.00
H0: equal policy effects ( $p$ -value)					.16
Annual earnings ( $N = 19,526$ )	3,043*	918	1,544	3,839*	5,953**
Standard error	1,672	1,762	2,026	1,901	2,212
H0: equal policy effects ( $p$ -value)					.015

NOTE.—See text for specifications and hypothesis (H0) tests. Standard errors are adjusted for heteroscedasticity and clustering as the data are sampled from three panel data sets so that some mothers appear more than once in the sample.

\* The  $p$ -value is for  $\beta_{1999} = \beta_{2000} = \beta_{2001} = \beta_{2002}$ .

\* Statistically significant at the 10% level.

\*\* Statistically significant at the 5% level.

\*\*\* Statistically significant at the 1% level.

In panels B and C, the effects are very similar across education categories except for the case of earnings. We tested the null hypothesis that the policy effects were the same in each education group. For specification i, for all dependent variables, we tested the null that the effect was equal for both education groups. For specification ii, we tested the null of an equal effect for each year, and we also tested the joint null that the yearly effects were equal for all years.<sup>23</sup> In only one case—the joint test for earnings—was the null rejected. However, the standard errors for the subsample estimates are higher than for the full sample because of the smaller number of observations. We now discuss the results by labor market outcome.

#### A. Participation

The results for participation are presented in the first row of each panel of table 5. The estimated effect of the child-care policy in Québec, when assumed to be constant for the years 1999–2002 in the regression, was to increase labor force participation by 6.5 percentage points for the more educated mothers (panel C of table 5) and 7.3 percentage points for the other two samples. For two of the three samples, the estimated effect is found to be statistically different at the 95% confidence level. When we permit policy effects to vary each year, from 1999 to 2002, as seen in the set of estimated parameters under specification ii, they are found to be very similar. In 2002, the policy is estimated to increase the participation rate of all mothers with at least one child between the ages of 1 and 5 inclusively by 8.1 percentage points (panel A, col. 5). Given that the participation rate for these mothers was 69% in 2002, we estimate that it would have been 60.9% had Québec not had a low-fee child-care policy that year. We thus estimate that the policy increased participation by 13% in 2002.

#### B. Hours Worked

The program effects are systematically positive for both specifications. The effect of the policy in specification i was to increase the annual number of hours worked by 114 hours for the better educated (panel C of table 5) and by 133 hours per year for the other two samples (panels A and B). The increasing impact of the policy, corresponding to the increased number of subsidized spaces, is much clearer for annual hours worked, annual earnings, and annual weeks worked under specification ii than for participation. For annual hours worked, the null of constant effects for the years 1999–2002 is decisively rejected. We estimate that the policy,

<sup>23</sup> Say the superscript HE for the policy effects is assigned to the high-education group and LE for the low-education group; then the joint null tests  $\beta_{1999}^{HE} = \beta_{1999}^{LE}, \dots, \beta_{2002}^{HE} = \beta_{2002}^{LE}$ .

for the full sample in panel A, increased annual hours worked by 84 hours in 1999. In 2002, we estimate the impact to be 231 hours. Given that the mean annual hours worked are 1,261 in 2002 for all mothers in the sample, we find that the policy increased annual hours worked by 22%. The effect of the policy on hours is slightly smaller for educated mothers, as seen in panel C. This could be explained by the fact that higher-educated women work longer hours, so that the income effect of the price change could be more important in their case.

#### C. Annual Weeks Worked, Annual Earnings, and Full-Time Work

The pattern for annual weeks worked and annual earnings is very similar to that for annual hours worked, with the exception of earnings, for the less educated (panel B), for whom the effect in specification i is very small and far from significant. Measurement error for earnings could be high since it included net self-employed income. In all samples and for specification ii, the effect on earnings for 2002 is quite large, ranging from approximately \$3 thousand to \$6 thousand. The effects of the policy on annual weeks worked are statistically significant in panel A under specification ii for all years. The effect of the policy in 2002 for all mothers (table 5, panel A) is to increase annual weeks by 16.2%, as mean annual weeks worked in 2002 was 37 for all mothers in Québec. The results for full-time work, not presented here (see Lefebvre and Merrigan 2005a), show that the impact of the policy on participation is driven by an increase in full-time work.

## VI. Discussion

The results support the hypothesis that the low-fee day-care policy implemented by the province of Québec at the end of 1997 had substantial labor supply effects on the mothers of preschool children. This effect is observed for all mothers of young children whether they are well educated or not. However, the results for the less well educated are not as convincing as those for the better educated. This strong statistical evidence is obtained with data that span the years 1993–2002 and a general econometric specification, thus rendering less attractive competing explanations for the substantial labor supply increase in Québec during the years immediately following the introduction of the policy. Indeed, our results are robust to the inclusion of pre- and post-policy trends, so that the estimated effects cannot be due to a relatively strong (compared to the rest of Canada) pre-1997 trend in labor supply in Québec. In addition, our SLID data set includes a large number of control variables, allowing us to confirm that the estimated policy effects are not due to changing sociodemographic features of the population of mothers with preschool children.

The evidence shows that the policy had effects on both educated and less educated mothers despite the fact that the decrease in price (after accounting for pre-1997 tax treatment of child-care expenses) was effectively greater for higher-income families. This can be explained by the facts that lower-income families are more likely to be liquidity constrained and that the policy made child-care facilities more easily available. The results also provide evidence that the effect on labor supply became stronger as more and more subsidized spaces were created across the province for different age groups, providing further confirmation that the effective cause of the increased participation was the child-care policy. It is also possible that the creation of low-fee spaces may have induced price decreases for other forms of day-care services by providing increased competition in the unregulated market for day-care services (e.g., paid care at home by nonrelatives), amplifying the effects of the policy.

The Québec policy effected a large exogenous reduction in prices that may not have been observed in earlier studies on the effect of child-care subsidies on labor supply. This could explain why our study provides compelling evidence that reducing child-care prices can produce substantial effects on labor supply. However, computing credible price elasticities in our study is unfeasible because prices paid by parents in Québec before the policy change are unavailable. Even if they were, there are other obstacles, such as the nonlinearity of the budget constraint and liquidity-constrained households.

A few points must be made regarding the generalization of our results to other jurisdictions. This policy was implemented during a period (1997–2002) of strong GDP growth for Québec (22%) and for the whole of Canada (23.1%), associated with increased aggregate labor demand, so that women induced by the policy change to seek employment would have better chances of success. It is not clear that such a policy would produce the same effects in countries with more sluggish job markets such as France or Italy. In addition, in countries where most of the mothers out of the labor market stay at home because they strongly value personally rearing their children, any type of subsidy would have limited efficacy.

The effects of the policy cannot be strictly interpreted as being due to a price change. For the first 6 years of the program, for-profit child-care facilities were not permitted to increase the number of available spaces but could sign an agreement with the government to offer \$5.00 per day spaces. The number of facilities available to parents clearly could not respond to the excess demand created by the policy. The government intervened by offering financial help to build additional not-for-profit centers and promoted family-based facilities. Since there was also a lack of trained day-care workers, the government also funded new programs to train day-care workers in postsecondary institutions. It also substan-

tially increased wages of day-care workers,<sup>24</sup> not only to attract the needed workers but also because the new network of day-care centers rapidly became the target of unionization efforts, leading to wage-setting by means of collective bargaining.<sup>25</sup> We can thus see that the new regime was characterized by the following features: the price change, the financial outlay for the creation of new child-care centers, the creation of day-care post-secondary education programs in child care, and increased wages for child-care workers. This last feature explains why the average yearly subsidy to registered day-care providers (including parent-fee-subsidy before 2002) increased on average from \$3,888 for 1996–97 to \$8,114 per year for the fiscal year 2006–7 (see table 2).

### VII. Concluding Remarks and Directions for Further Research

To summarize, this article shows that the substantial decrease in the price of day care in the province of Québec caused by a policy of generous subsidization of day-care providers had a substantial positive effect on labor supply and earnings. Our results are consistent with other studies showing that mothers with young children react strongly to generous incentives whether they increase or decrease the reservation wage. The main caveat is the use of only one treatment group leading to a possibly inconsistent estimate of the policy effect (see Sec. IV). However, the evidence showing an increase in the size of the effect as new spaces are created by the government adds some credibility to our conclusion that the policy has a positive effect on labor supply.

The Québec experiment provides a unique opportunity to identify the effects of child-care subsidies given the large scale of the program and the amount of resources dedicated by the provincial government. The public cost of the program increased from 0.16% of Québec's gross domestic product in 1996 to 0.57% in 2006. However, as described in the preceding section, policy does not occur in a vacuum, and features other than the price change accompanied this policy during its implementation.

Other important labor supply issues can be addressed with this natural experiment. For example, does this policy have long-lasting or long-term effects on labor supply? In this respect, a follow-up paper (Lefebvre, Merrigan, and Verstraete 2007) provides evidence that the policy has also produced long-term effects on labor supply, possibly by way of an important positive effect on work experience. In addition, does the policy

<sup>24</sup> In parallel with the creation of new spaces, the wages provided to educators and other child-care employees were steeply increased, due to a gender equity policy, and regulated after negotiations with the main unions representing the employees.

<sup>25</sup> Most of the employees in the center-based child-care facilities are members of a union. Providers of family-based childcare are considered as self-employed workers.

have an impact on the use of time for household production either for fathers or for mothers? Finally, the policy can be used as a credible instrumental variable to establish the impact of endogenous variables on key economic variables. For example, the effect of experience on hourly wages could be estimated, allowing experience to be endogenous, with an instrumental variables estimator using instruments chosen on the basis of policy considerations (the data set must exclude child-care workers). Clearly, an important research program can be built around the estimated policy effects presented in this article.

Finally, our study illustrates the importance for large-scale representative surveys of labor force activity asking participants with young children the price paid for child care as well as hours spent in day care. Such questions are easy to ask and can be answered with precision by household members. With this piece of information, the SLID could be used to compute the price of day care in the presence of tax credits and deductions. The Québec experiment provides substantial price variation that could help better identify wage and price effects. The estimation of a structural model based on these data could be very useful for simulation purposes.

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