Two Canadian natural experiments on maternity leave enhancements and maternal health: Money for nothing?

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Introduction

General question: Does maternal leave duration and paid benefits impact short and long term maternal health? For whom?

- Large increases of labour force participation during women's childbearing years in rich countries :
  - Maternity leave policies (paid and job-protected) introduced decades ago
  - Canada 1971; EU 1990s: minimum of 3 months/14 weeks of maternity leave; USA and Australia are exception
  - Duration of job protection, lenght and direct financial support very large variation among countries (region)
- Fundamental objective of maternity leave policies: enhancement of maternal and child health and well-being:
  - Considerable gaps in the empirical evidence to date on links between leave duration and benefits on outcomes
  - Very few economic studies have investigated short-term and long-term impacts on maternal health

Specific research question and contributions

We estimate the causal effects of two different expansions of maternity leave policies on the health of mothers:

1. Canada (Federal Employment Insurance -EI) on January 1 2001 added 25 weeks of benefits (could be split between the mother and the father) providing a total potential entitlement of 50 weeks to mothers
2. Québec, on January 1 2006, took over the EI program which resulted in higher replacement ratios of pre-birth earnings, increased insurable earnings, and a relaxed eligibility rule (self-employed): Québec Parental Insurance Plan (QPIP)
3. We have access to the medical records of mothers who gave birth in selected months of years 2000, 2001, 2005 and 2006, before and after the changes in maternity leave policies
4. These groups of mothers enable us to adop a strict regression discontinuity approach (to infer the effect of the treatment on the treated)

Empirical findings mothers - Leave duration, multivariate analysis

- Chatterji & coauthors (2013, 2012, 2011, 2008, 2005) used many different American data sets: no clear relation with self-rated health, small significative effect on depressive symptoms
- Baker and Milligan (2011, 2008a, 2008b) on Canadian 2001 reform: later return to work postpartum, increase breast-feeding and duration, no impact on self-reported health outcomes
- Many other Canadian more descriptive studies on labour force behaviour: raise of time-off from work after extension
- Rossin (2011): American unpaid and longer paid leaves may have increased disparities in early childhood health and between mothers eligible or not from different socio-economic backgrounds

Empirical findings - Duration and Benefits - causal inference from natural experiment

- Bergeman & Riphahn (2011), Kluve & Tamn (2013): labor supply effects of a 2007 German reform (increased maternity leave benefit for at most one year)
- Guertzgen & Hank (2013) German gradual increases in maternity leave duration: clear extension of duration but less clear effects on health as identified by the number and length of absenteeism spells at work
- Humlum and Vejlin (2012) Denmark, where the number of weeks with full benefit compensation increased from 28 to 50 weeks: no effects on the mother's probability to be hospitalized with a depression, to use anti-depressants, and small negative effects on the number of maternal hospitalizations

The leave programs changes

1. Federal EI: 2000 to 2001-2005: from 700 $\Longrightarrow$600 hours paid work in past year; no self-employed; 55% of earnings with maximum of \$39,000/\$412 per week; 15 weeks of maternity leave; all parents (birth and adoptive) from 10 weeks $\Longrightarrow$ 35 weeks [25 $\Longrightarrow$ 50 weeks]
2. EI to QPIP: 2005 to 2006 (Basic Plan/Special Plan): coverage \$2,000 of earnings in past year; self-employed eligible
   - **Basic**: 70% of maximum of \$57,000/\$767 per week; 18 weeks of maternity leave; all parents (birth and adoptive) 32 weeks taken by one or share by both parents; 70%/7 weeks+ 55%/25 weeks; Birth fathers: take or loose 5 weeks at 70% [Overall: 50/55 weeks]
   - **Special**: 75% of maximum of \$57,000/\$822 per week; 15 weeks of maternity leave; all parents (birth and adoptive) 25 weeks taken by one or share by both parents 75%/12 weeks+ 70%/13 weeks; Birth fathers: take or loose 3 weeks at 75% [Overall: 40/43 weeks]

Data sets

1. Administrative data sets extracted from the Medical Registers of all medical acts provided by the public health insurance (RAMQ) to all mothers having giving birth a few months before and after the policy changes
2. All acts paid over 7 years: 2 years before childbirth, delivery day and 5 years postpartum
3. Cost to RAMQ of all acts billed by physicians (generalists or specialists) by type (examination, consultation, psychiatric, surgical and technical), diagnostics (prenatal, for delivery, for mental health problems, postnatal services), and site of treatments (outpatients in physicians' offices or hospitals, inpatients in hospitals or emergency rooms, laboratory), and service date
4. Public Prescription Drug Insurance Plan Registers for mothers insured by the Plan at time of birth (since 1997)

Samples

- Large randomly selected representative samples of mothers who gave birth shortly before and after the two large-scale reforms:
  1. October to December 2000 versus January to March 2001
  2. October to December 2005 versus January to March 2006
- In all, 36,000 mothers equally divided (18000 for 2000-2001, 18000 for 2005-2006); on a monthly basis they represent approximately 2/3 of mothers giving birth per month according to the monthly Québec national Registries of births
- Overall, 4.3 million medical acts delivered by physicians to all mothers over the seven-year time-span

Specific time spans selected

6 time spans for health outcomes out of the 7 years of data for each mother:

1. Day -271 to day -1 (before delivery day)
2. Delivery day to day 182 after delivery (6 months)
3. Day 183 to day 365 (next 6 months)
4. Day 366 to 731 (next 2 years)
5. Day 732 to day 1,095 (last 3 years of medical data)
6. Day 0 to day 1,825 (5 years after delivery included delivery day)

Health outcomes (16): medical acts (6); prescribed drugs (5); hospitalizations (5)

1. Medical acts: (1) costs of acts for each time span; (2) number of acts; (3) costs of mental health acts; (4) number of mental health acts; (5) total number of medical visits; (6) number of mental health visits
2. Net costs of prescribed drugs by time span: (1) all drugs; (2) drugs related to mental health; (3) costs of medical acts associated with drugs including and net costs; (4) number of all drugs; (5) number of all drugs related to mental health
3. Hospitalizations by time span: (1) costs of the medical acts provided; (2) costs of acts related to mental health; (3) number of medical acts associated with hospitalization; (4) number of acts of mental health nature (from the diagnostics of physicians) and associated with hospitalization; (5) number of all hospitalizations

Methodology: Sharp Regression-Discontinuity Design

Common framework: Let $\{(Y_i(0), Y_i(1), X_i)' : i = 1, 2, ..., n\}$ be a random sample from $(Y_i(0), Y_i(1), X_i)'$, where $(Y_i(1)$ and $Y_i(0)$ denote the potential outcomes with and without treatment, respectively, and treatment assignment is determined by the following known rule: woman i is assigned to the treatment condition if $X_i \geqslant \bar{x}$ and is assigned to the control condition if $X_i \leq \bar{x}$ for some known fixed value of $\bar{x}$. Two inference procedures for treatment effect at the threshold are implemented:

(1) Linear estimation without or with controls:

$$Y_{ict} = \alpha + \delta T_{ict} + \Phi X_{ict} + \varepsilon_{ict} \quad (1)$$

where T is a dummy variable for treatment, mothers giving birth before reforms are in the control group $(T = 0)$ and mothers giving birth after are in the treatment group $(T = 1)$. Separate estimation for the 6 windows of days of δ the effect of treatment on the treated. Four specifications: (1) treatment variable only; (2) adding a time trend; (3) adding lagged Y; (4) adding controls (5 age groups, 16 regions of residence). The thresholds are the months

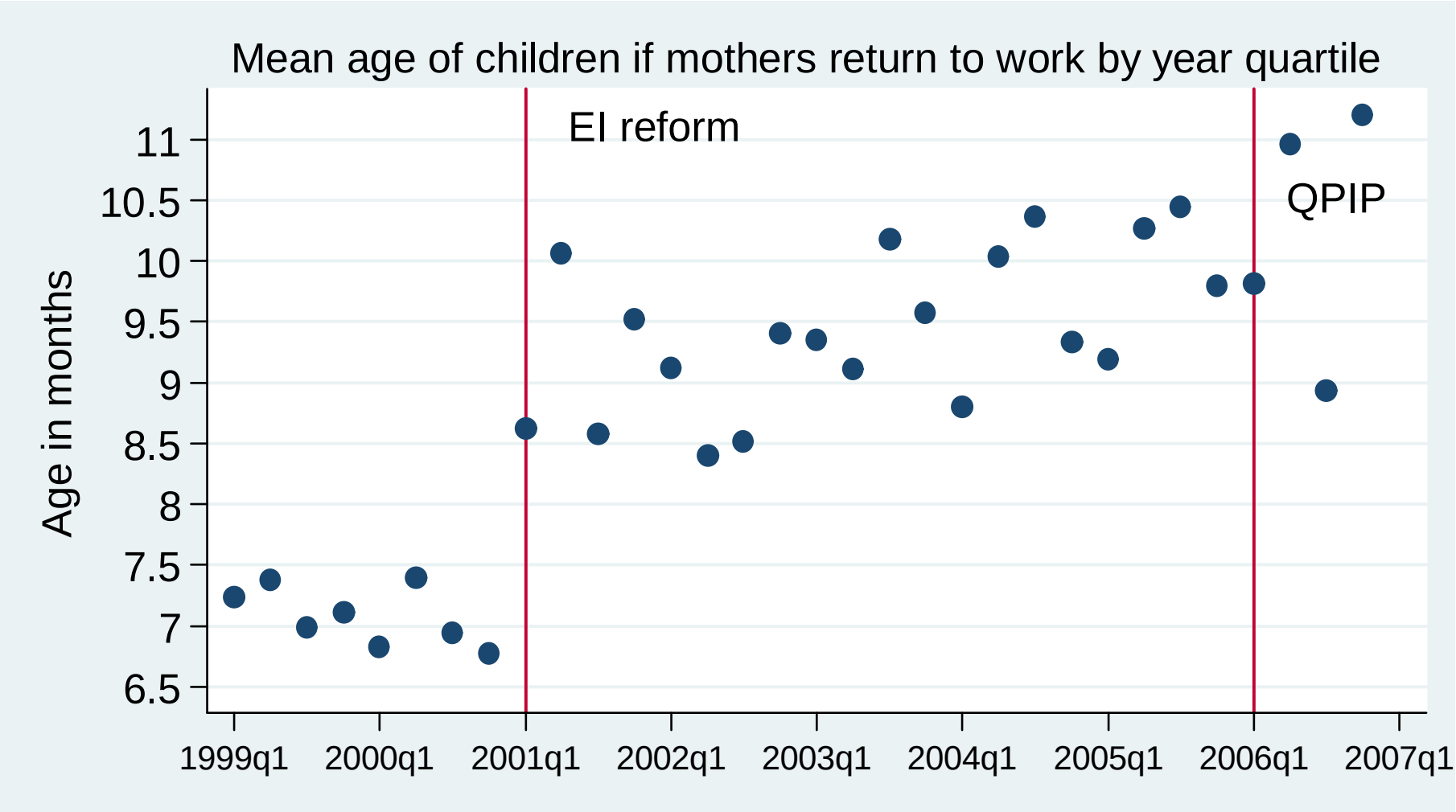
(2) Non-parametric local-polynomial robust estimators with data-driven bandwidth selection:

$$RY_{ict} = E\left[Y_i(1) - Y_i(0) \mid X_i = \bar{x}\right] \quad (2)$$

where $\bar{x}$ the theshold value are given by the day a mothers gave birth. We estimated relation (2) separately for the 6 windows of days defined earlier.

And 3 types of estimators:
i) A conventional estimator of RY is constructed using kernel-based local polynomials on either side of the threshold
ii) With valid confidence intervals (most commonly used in practice) one based on "under-smoothing"
iii) The other based on "bias-correction" with valid confidence intervals

Discontinuity: Implementation years 2001 and 2006



Results Federal reform groups (2001 versus 2000)

New mothers on welfare at the time of birth are excluded because they are ineligible for maternity leave payments

- Very small number of coefficients with two stars or more.(5%) indicating positive effets. Most of them occur when we include observations farther from the discontinuity points Therefore, it is very hard to find some evidence that the extended maternity leave in 2001 reduced medical costs incurred because of medical interventions by physicians reimbursed by the RAMQ.
- This does not mean that there were no health or well-being benefits from the policy, but do not find some as proxies by physician costs, and if there are some, they are rather small. The same conclusion applies to Table 3 for prescription drugs and Table 5 for medical acts in hospitals or number of hospitalizations.
- Same conclusions overall for acts, visits or drugs related to mental health

Results Québec reform groups (2006 versus 2005)

- There, the message is rather crystal clear; there is no evidence that the policy had an impact on the medical costs of mothers who gave birth in the first three months of 2006.
- Turning to prescription drugs, in Table 4, where the sample consists of mothers who were covered by the government's insurance plan but were not on welfare at the time of delivery, we fail to find any statistically significant effects in both years 2001 (Table 3) and 2006.
- When the medical costs are added to pharmaceutical costs in this sample, the effects are not significant as well for the sum of both costs
- Finally, the message is the same for medical acts in hospitals or number of hospitalizations

Non-parametric Estimators

Costs & Benefits of the Reforms, and Equity Issues

Delivering mothers: 72,010 (2000); 73,699 (2001); 76,341 (2005); 81,962 (2006); 88,700 (2012)

- Federal EI cost: 2000=278 m$; 2001=399 m$ or + **121 m$**; 2005 = 722 m$

Estimated coverage of delivering mothers: 2000=56.7%; 2001=60.9%; 2005=63.2%; unpaid leave in 2005 = 28,100

- QPIP cost: 869 m $ (2006); **+147 m $ increase over 2005**; total cost 2012: 1.843 billion $: **+974 m $ over 2006**

Estimated coverage of delivering mothers: 2006=78.8%; 2012 = 78.9%; unpaid leave in 2012 = 18,700

- Rather large proportion of "new" mothers with "unpaid leave" even with Québec's relaxed eligibility conditions
- Rather large increases over time of total benefits per delivering mother ($27,000 in 2012)
- Surprinsingly, 21,000 children aged less than 12 months are in the low-fee subsidized childcare system (10%)

Summary, Conclusions and Extensions

- A RD approach to estimate the impact of the change in two parental leave programs in Canada: (1) the first basically increasing the time mothers stay home with the child after birth; (2) the second increasing family income and dedicated time for fathers

1. Little evidence that these policies had a strong impact on medical costs, prescription drug costs, number of acts or prescription drugs, and mental health (proxied by nature of medical acts or drugs)
2. Results consistent with what is found elsewhere in the literature on this topic: increasing the generosity of maternity leave parameters does not seem to have an impact on the health costs of mothers after giving birth, or the impact is to reduce costs, slightly, when they are returning to work
3. Why? In general, mothers are young and in very good health. It seems reasonable to think that spending more time with a child at home in the first year could have an impact on mental health but we cannot find any evidence at this level either

This does not mean of course that the policy did not increase the well-being of families; it simply says that the government would not have observe any pecuniary returns from decreased health costs because of these policies

Two on going extensions:

1. First: analyse administrative data sets of medical acts provided by the public health insurance and prescription drug Insurance plan (RAMQ registers) to all children born in Québec in the months October-December 1998, 2000, 2005 and January-March 1999, 2001, 2006, over 6/7 years
2. Second: new samples of mothers and 6 months of delivery to control for seasonality (1998-1999; 1999-2000; 2000-2001; 2005-2006; 2006-2007)