

# Reserving Time for Daddy: The Short And Long-Run Consequences Of Fathers' Quotas\*

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## Abstract

In order to motivate fathers to participate in parental leave, several nations have reformed their leave programs to offer higher benefits and institute 'daddy-only' quotas. Though takeup has subsequently increased, it is unclear whether fathers are responding to financial incentives or the changed constraint - or the 'daddy-only' label in itself. Further, though paternity leave may facilitate temporary changes in the division of household labor, little is known about whether these effects persist in later years. This paper examines these issues while conducting the first comprehensive causal analysis of the Quebec Parental Insurance Program (QPIP), a landmark reform to parental leave that increased benefits for all parents and reserved some weeks for fathers. Exploiting plausibly exogenous variation in program experience, I use data on benefit claims to first explore the immediate effects on leave behavior. Regression discontinuity analyses suggest that QPIP increased fathers' leave participation by 51 percentage points and duration by 3.1 weeks. Difference-in-differences estimations which use a longer span of data, include other provinces as a control group, and control for various trends result in similar estimates. Further, I find evidence that the 'daddy-only' quota produces an intra-household fly-paper effect: benefits stick to fathers even when the constraint does not bind and the new benefits are essentially fungible. Next, using data from time-diaries, I investigate the long-term consequences by exploiting variation in exposure to QPIP across provinces, time and the age of one's children. I find a large and persistent effect on the division of household labor: exposure to paternity leave alters mothers' and fathers' behavior to make households less sex specialized.

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\*Working Paper: Please do not cite or distribute without author's permission. This analysis is based on Statistics Canada's Employment Insurance Coverage Survey (2002-2010) and General Social Survey (2005, 2010). All computations, use and interpretation of these data are entirely that of the author.

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# 1 Introduction

Despite a dramatic reduction in the gender gap in labor force participation and wages in recent decades, a large and persistent gap remains in the realm of care work. Mothers are much more likely than fathers to take parental leave in the first months of a child's life, which has the potential to hurt mothers' careers.<sup>1</sup> Consistent with this, a cross-country analysis by the OECD reports that the length of paid parental leave available is correlated with a higher pay differential by gender (OECD, 2012). Even aside from parental leave, mothers perform considerably more unpaid work in the home than do fathers (Hochschild and Machung, 1989; Blair and Lichter, 1991; Bianchi, 2011, 2012). In turn, this disproportionate amount of housework done by women, particularly time-inflexible and routine work, has been shown to contribute to the gender pay gap (Hersch and Stratton, 2002). As a result, men's participation in parental leave and care work has attracted growing public attention and several nations have enacted policies to promote fathers' participation in parental leave programs.

These policies are motivated by the idea that active fathering not only benefits child development (Tamis-LeMonda and Cabrera, 2002; Lamb, 2010; El Nokali et al., 2010) and improves men's life satisfaction, but also can promote gender equality. Fathers' participation in parental leave strengthens women's labor market positions by not only enabling mothers to return to work earlier but also eroding the rationale behind statistical discrimination against women. Further, paternity leave makes the initial parenting experience more similar across genders which can have long-term consequences. In the absence of such schemes, mothers often leave the labor market for varying amounts of time and increase investments in childcare and housework while fathers maintain or even strengthen their ties to the workforce (Sanchez and Thomson, 1997), leading to differential investments in non-market and market skills. This establishes a gendered division of household labor which persists after the leave period ends. It can therefore be argued that if mothers and fathers experience the transition to parenthood in more similar ways it might reduce sex specialization in the long run. Keeping these arguments in favor of paternity leave in mind, we are faced with two broad questions. First, what kinds of incentives are successful in getting parents to share leave more equally and what are the mechanisms behind that success? Second, if a policy succeeds in getting fathers to take leave, does this lead to more egalitarian households in the long run - or are social norms so sticky that parents revert to traditional gender roles once the leave period ends?

This paper explores these questions while providing the first causal analysis of the Quebec Parental Insurance Program, a new system of parental leave benefits introduced in Quebec in 2006 which explicitly sought to boost fathers' participation. From 2001 to 2005, eligible parents in all Canadian provinces could claim leave benefits through the Employment Insurance (EI) Program.

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<sup>1</sup>Several studies note that the provision of extended maternity leave delays women's return to work (Schönberg and Ludsteck, 2007; Lalive and Zweimller, 2009) and lowers the probability of upward occupational moves (Evertsson and Duvander, 2011).

In 2006, Quebec left the EI system and established the Regime Quebecois D'assurance Parentale or the Quebec Parental Insurance Plan (QPIP). This new scheme lowered eligibility criteria, increased income replacement, and established a 5-week 'daddy quota' of leave for fathers (Doucet et al., 2010). Thanks to QPIP's 'daddy quota', Quebec is the only province in Canada in which fathers enjoy an individual and non-transferable right to parental leave. Prior to the reform, fathers only had access to 'shared' parental leave with their spouses, and leave-takers were compensated with a little over half their wages (up to a strict cap) such that household incomes were hit hard when fathers took leave. Consequently, fathers' leave participation stagnated at about 20% prior to QPIP. Notably, the majority of families did not exhaust their total amount of leave prior to the reform, such that families were leaving benefits 'on the table' even as fathers declined to participate.

In this study, I examine the short term effects of the QPIP reform on parents' leave behavior as well as the long-term impact on outcomes related to gender equality such as the division of household labor and spouses' incomes. I use two sources of data: data on benefit claims from the 2002-2010 rounds of the Employment Insurance Coverage Survey (EICS) and time-diary entries from the 2005 and 2010 General Social Survey (GSS). I employ several analytical methods such as regression discontinuity techniques and difference-in-difference methodologies, and test my results in a number of ways to show that they are consistent across different specifications and sample choices, suggesting that the relationships I have uncovered are causal.

To investigate the short-run effects of QPIP on parents' leave behavior, I use regression discontinuity analyses to identify jumps in outcomes at the point of program implementation as well as a difference-in-differences approach which exploits variation in policy across provinces and years. My results show that QPIP was very effective in achieving its goal of boosting fathers' involvement. The introduction of QPIP is associated with a sharp increase in fathers' claim rates by 51-53 percentage points and fathers' leave duration by 3 weeks. My results also suggest that fathers responded to not only the higher benefits but also the 'daddy-only' label in itself. That is, even though the quota did not alter a binding constraint for many families, reserving some weeks as 'daddy-only' appears to alter the distribution of leave towards fathers.

Accordingly, this paper makes two important contributions to the literature evaluating the effectiveness of policies promoting fathers' leave-taking. First, the few causal studies to date have utilized nation-wide reforms which do not fold in a 'natural' control group. This study is therefore unique in utilizing regional rather than national variation in policy which results in improved study design: by using other Canadian provinces as a natural control group, I provide causal estimates that are robust to various trends. Second, other causal studies have been unable to separate the effects of different reform features, e.g., the effect of improving benefits versus that of assigning a binding quota versus that of a 'daddy-only' label. This paper is the first to detangle these effects and find evidence that fathers respond to not only financial incentives but also 'daddy-only' labels.

I thus offer novel evidence of an intra-household flypaper effect (IHFE) for parental leave, whereby daddy-only leave ‘sticks’ to fathers even when the quota does not present a binding constraint.

Next, I investigate whether the increase in fathers’ leave-taking under QPIP had long term effects on household dynamics. I use time-diary data and exploit variation in exposure to QPIP across time, provinces and children’s ages to identify the long term causal effects. I find strong evidence that by altering the initial experience of parental leave, QPIP reduced sex specialization among couples several years after the leave period ended. I find that exposed fathers spent less time in paid work and at their workplace per day compared to fathers who were not exposed. Meanwhile, QPIP had a strong positive effect on mothers’ market outcomes - exposed mothers spent considerably longer in work and at the workplace and consequently earned significantly more than mothers who were not exposed. Interestingly, when looking at non-market work I find that exposure to QPIP increased both parents’ contributions, although exposed fathers increased their time by more than exposed mothers. Specifically, exposed fathers spend nearly 45 minutes more per day in housework, while exposed mothers decreased their housework and spent more time in childcare instead. Moreover, exposed fathers also spent more time physically at home and in the immediate vicinity of family members. In sum, I find that increased paternity leave had a large and persistent impact on gender dynamics within households, moving them towards a dual-earner dual-caregiver model wherein fathers contribute more to home production and mothers contribute more to market production.

These findings offer several important contributions to the literature on the long-term effects of paternity leave. Only a few studies have been able to draw causal inference by utilizing natural experiments to overcome endogeneity bias and selection issues. Of those studies, this is the first to examine the full range of parental time commitments in terms of childcare, housework and paid work of both parents simultaneously and thus reveals causal effects on overall household dynamics. It is also the first study to utilize regional rather than national variation in legislation, and can thus incorporate other provinces as a control group. Lastly, previous studies have relied on data from surveys that are not only imprecise but also prone to recall and response bias. This is the first causal study to leverage data from time-diaries, which are increasingly considered the gold-standard for gathering information about contributions to non-market work (Sevilla, 2014). Consequently, I am able to explore more accurate and detailed measures of parent’s behavior than prior studies have been able to. This study thus improves upon the existing literature by utilizing better data, improved methodology, and looking at the bigger picture of sex specialization across the breadth of parental responsibilities.

In sum, this paper is the first to do several key things: examine this policy episode in Quebec, consider the existence of a flypaper effect in parental leave, and conduct a comprehensive causal examination of the long-run effects of paternity leave. My results shed light on how leave schemes

can be designed to induce fathers to participate, and confirms that small changes in the initial parenting experience can have lasting effects on parents' behavior. In particular, they suggest that people respond to labels, and that behavior learned at the beginning tends to stick in later years. More broadly, my findings highlight that there need not be a trade-off between child welfare and gender equality - that by encouraging fathers to participate in parental leave we can distribute household responsibilities more equally and actually increase total investments in children.

The paper proceeds as follows: Section 2 provides background on the reform, Section 3 discusses the existing literature, Section 4 describes the data, Section 5 details the empirical methods used, Section 6 presents Results and Section 7 concludes.

## 2 Background

### 2.1 Parental Leave Programs in Canada and the QPIP Reform

In every Canadian province, at least a year of job-guaranteed parental leave is available to every parent who has worked 52 weeks or more with their current employer.<sup>2</sup> Further, parents who meet certain eligibility criteria can claim benefits, converting some of this leave into paid leave.<sup>3</sup> The Employment Insurance (EI) Program, which all Canadian provinces used until 2005, offers maternity benefits which mothers can take in the weeks immediately succeeding the birth and parental benefits that mothers and fathers must decide how to share between them. Most provinces continue to subscribe to the EI Program, with the notable exception of Quebec. On the 1st of January 2006, Quebec introduced the Quebec Parental Insurance Plan (QPIP), to which employees now contribute and claim benefits from instead of the EI system. The details of the EI plan, currently offered to residents of other provinces, and the QPIP Basic and Special plans, currently offered to residents of Quebec, are given in Table 1.

QPIP's features were designed to offer an improvement over the older EI system by easing some of the barriers that parents face to taking leave, namely, inflexibility, ineligibility, financial feasibility, and gendered attitudes. First, the new system was designed to be more flexible, offering parents a choice between the Basic Plan or a Special plan that offers higher benefits for a shorter duration, thereby letting parents select the combination of benefit amount and duration which best suited their needs. Second, the reform lowered the eligibility criteria in order to improve coverage and ease access to benefits. The EI system requires a claimant to have worked 600 hours of insurable employment which makes it difficult for workers from seasonal, temporary, part-time or otherwise non-standard employment, who tend disproportionately to be low-income mothers, to qualify for benefits. In comparison, QPIP uses an earnings-based threshold which is easier to meet, such that

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<sup>2</sup>In Quebec, the duration of job-guaranteed leave is 52 continuous weeks but is available up to 70 weeks after the birth of the child. However, paid leave can only be taken in the 52 weeks after the birth of the child.

<sup>3</sup>Each parent derives eligibility from their own working hours and employer tenure, unlike in some other nations (e.g. Norway) where eligibility for both parents is dependent on the mother meeting certain requirements.

any parent who has at least \$2000CAD of insurable earnings can qualify. Third, QPIP offers more generous compensation for foregone income. By both increasing the maximum replacement rate (from 55% to 70%) and raising the ceiling of maximum insurable earnings on which one can claim (from \$39,000CAD to \$57,000CAD in 2006), QPIP ensures that a greater portion of foregone wages can be recovered via benefits while on parental leave.

QPIP also introduced the nation's first of its kind 'daddy quota', whereby 5 weeks of leave (or 3 weeks under the Special Plan) were set aside for the father and could not be transferred to the mother. This quota was designed to combat fathers' unwillingness to take leave, correct gendered workplace attitudes, and remove the need for fathers to negotiate with spouses who may be unwilling to share parental leave. This important feature of the reform stands in stark contrast to the EI Program where fathers enjoy no individual right to paternity leave and may only access benefits through shared parental leave. More generally, QPIP changed the distribution of benefits within the household. To begin with, QPIP abolished the 2-week waiting period that EI claimants are subject to. Also, the amount of gender-neutral leave to be shared between parents was reduced and some weeks were reallocated to individual non-transferable leave for each parent. The net result was that mothers retained access to the same amount of potential leave as before (50 weeks) but a larger share now came through maternity leave rather than shared parental leave. Fathers gained access to more leave than they had earlier: 37 potential weeks under QPIP (5 of which are 'daddy-only') versus 35 weeks under the EI Program. In total, QPIP increased the amount of leave available to a family from 50 weeks to 55 weeks, such that total leave increased by the amount equivalent to the 'daddy-only' weeks.<sup>4</sup>

It is important to note that there was limited certainty about the timing or the details of the reform until only a few months prior to its implementation.<sup>5</sup> The final details of QPIP such as benefit amounts and the date of implementation were only announced in mid-2005. Given that it takes some time to successfully conceive a baby, it is reasonable to think that parents who gave birth around the time of the reform were already pregnant at the time of announcement. Therefore, whether a birth occurred a few days prior to rather than a few days after January 1st 2006 was

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<sup>4</sup>It should be noted that under either the EI or QPIP program, parents can take leave simultaneously so the mother does not have to resume work in order for the father to participate in parental leave.

<sup>5</sup>The idea of QPIP was discussed several years before the program came into place but there were several bottlenecks in the policy process which prevented the program from being implemented. In June 2000, Quebec introduced legislation to establish its own parental leave program and in 2001 the Quebec National Assembly passed an Act which led to the development of a plan for Quebec's own program. However, the implementation of this legislation stalled because the federal government would not agree on the funds that the Quebec government would be able to keep in order to finance its own program. In an effort to force the federal government to act, the Quebec government asked the Quebec Court of Appeal to rule on the constitutionality of the EI provisions on maternity and parental benefits. Only once the court ruled that the Employment Insurance Act regarding maternity and parental benefits encroached on provincial jurisdiction and exceeded the powers of the Canadian Parliament, did negotiations begin between the two governments in 2004. It was not until the middle of 2005, more than four years after the initial act regarding the program had been passed, did the news emerge that the two governments had finally reached an agreement. QPIP officially came into place on the 1st of January 2006.

essentially random, an important assumption for the clean identification of our program effects.

## 2.2 Expected Impact of QPIP on Parents' Leave Behavior

QPIP's improved flexibility and easier eligibility criteria are not expected to impact fathers significantly. Since the majority of fathers are full-time full-year workers, they face no difficulty qualifying for benefits under either the EI or the QPIP scheme. Further, since under QPIP the whole family had to act on either the Basic Plan or the Special Plan once the choice was made, few families selected the Special Plan which limited their duration in return for higher compensation. Therefore the two changes most likely to influence the decision for fathers to take leave were that of improved benefits and the daddy quota.

First, I consider how the representative parent should respond to the increased income replacement. By making benefits more generous, QPIP reduced the opportunity cost of taking leave i.e. the difference between foregone wages and benefits. Assuming leave is a normal good, the price reduction should result in a positive income and substitution effect, leading to an unambiguous increase in the amount of leave consumed. However, it should be noted that benefits increased for both mothers and fathers, so there is no reason to believe fathers should respond more strongly than mothers to the improved benefits. To the contrary, given the evidence to show that women have more elastic labor supplies than men (Juhn and Murphy, 1997; Blau and Kahn, 2007), if anything we would expect women to respond more strongly to the improved benefits. Further, since benefits are capped at a certain threshold, parents with lower incomes experience a larger marginal reduction in price as they face a smaller wage-benefit differential. Therefore, we should also expect parents from low-income households to respond more strongly than those from high-income households.

Second, I consider the reservation of the daddy quota. A daddy quota could make the difference between a father participating or not participating if, under the counter-factual, his wife consumed the total amount of leave allocated to the family. In that case, the addition of 5 daddy-only weeks would mean that in order for a family to continue exhausting total family leave, it would be necessary for the father to participate. However, Quebec's reform presents an interesting case because prior to the quota, most families did not use all of their leave. Figure 1a presents a histogram of the distribution of maternal leave duration in Quebec in the period before the reform. Although there was bunching at the cap of 52 weeks, a significant portion of mothers were not consuming all the paid leave available to the household. Figure 1b shows the cumulative density function of mothers' leave duration in Quebec and the Other Provinces in the pre-reform period (2002-2005). Even when the father did not take leave (the majority of families), over 60% of mothers reported taking 11 months of fewer of leave. Since under EI the first 2 weeks of leave are unpaid due to the waiting period, in these households there was at least 1.5 months of paid leave that was being left

on the table, and that had always been available for fathers to utilize.<sup>6</sup> Therefore, for the majority of families who were not consuming at the cap pre-reform the newly imposed constraint of the daddy quota should not have been binding. Accordingly, any increase in total family leave under QPIP should have been considered an ordinary extension of family leave since the additional weeks were essentially fungible between parents.

Given that the constraint does not bind, I investigate whether the daddy quota could alter the parents' maximization problem in a different way. To do so, I consider the existence of a non-monetary cost of leave in my conceptual framework, full details of which can be found in Appendix 1 but the logic of which I outline below. In addition to the opportunity cost of taking leave (wages net of benefits), parents may face a non-monetary 'stigma' cost which causes them to discount benefit income compared to wage income. This 'stigma' cost could encompass any number of things e.g. personal distaste to taking leave, peer pressure or workplace hostility to leave-takers. Further, this cost may differ across individuals, e.g. stigma may be higher for fathers than mothers, or for fathers working in blue-collar environments versus white-collar environments. Differences in stigma may therefore contribute to the differences in leave participation rates across genders and income or education groups.

One mechanism through which a daddy quota can have an impact even when the constraint doesn't bind is if the 'daddy-only' label attached to the quota reduces this stigma cost. The daddy-only label establishes a father's individual right to leave, removes the need to negotiate with his wife, and improves his bargaining position with employers and co-workers who may be more sympathetic to him using leave specifically designated for him. Moreover, the quota sends a clear public message that promotes fathers' involvement, which may reduce social stigma against taking leave and possibly even introduce stigma against those who do not utilize this generous opportunity to spend time with their children. Therefore, under QPIP fathers may have experienced a reduction in not only the opportunity cost of taking leave QPIP but also the stigma cost - whereas mothers only experienced the former. This might lead to fathers responding more strongly to the reform than mothers.

We can thus consider two alternate hypotheses:

(i)  $H_0$ : *No stigma cost exists.*

In the absence of any stigma cost, parents should respond only to the opportunity cost of taking leave. Since QPIP's improved benefits lowered the opportunity cost for both males and females, we should see leave consumption increase for both parents. Given womens' higher elasticities of labor supply (Juhn and Murphy, 1997; Blau and Kahn, 2007), we expect mothers to increase leave

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<sup>6</sup>Since the EICS survey question asks for all leave taken, this is a conservative estimate of the leave that was available to the father, since some of the reported mothers' weeks may have been taken as unpaid leave or sick or vacation leave.

consumption by just as much as, if not more than, fathers.

(ii)  $H_1$ : A stigma cost exists.

If a stigma cost exists, which is higher for fathers than mothers and which QPIP's 'daddy-only' label reduces, then fathers may increase their leave consumption by more than mothers. That is, if we observe an intra-household flypaper effect, whereby benefits stick to the fathers even though the additional weeks are fungible for most families, this would be evidence consistent with the existence of a stigma cost.

### 2.3 Expected Long-Run Impact of Paternity Leave on Household Behavior

Paternity leave policies promote gender equality by intervening at a crucial time for renegotiating household work (Hook, 2010) and facilitating a re-allocation of parents' resources across professional and domestic spheres. They make fathers available for time-inflexible housework and childcare, enabling mothers to return to the workforce sooner and invest in their careers. Thus, reduced sex specialization during the period of paternity leave can be explained both by fathers' increased time availability for non-market work and mothers' increased bargaining power.<sup>7</sup> The objective of this study, however, is to explore the *long-term* causal effects of paternity leave on the household division of labor, which few studies have been able to establish. I seek to answer the following question: do the effects of paternity leave on sex specialization persist after the leave period, or does the household revert to traditional gender roles afterward? There are several channels through which paternity leave may lead to a *permanent* reduction in sex specialization, as I argue below.

The first and most credible explanation builds on the theory of Becker (1981) that a household uses productivity differentials which may differ across genders to determine an efficient allocation of resources. Since men earn higher market wages on average and women have some biological advantages in childcare, the theory of comparative advantage suggests that men allocate more time to market work while women take on more domestic responsibilities because it is efficient for the household. However, being on leave increases fathers' time in childcare and housework, especially time-inflexible tasks, in which they gain experience and competence. Fathers on leave undergo on-the-job training which increases their domestic productivity and reduces differentials between their returns to non-market and market work. If fathers are penalized by employers for taking leave through lower wages or fewer promotions, this further reduces their productivity differential by lowering returns to market work.<sup>8</sup> Women whose husbands take paternity leave can return to

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<sup>7</sup>If bargaining power is proportional to an individual's contribution to the household income (as proposed by e.g. (Lundberg and Pollak, 1996)), it could be argued that fathers on leave have reduced earnings and thereby diminished ability to bargain away from doing unpleasant domestic chores, while their wives who have returned to work would have higher earnings and may do so. This argument relies on the parental leave being compensated at less than 100% of usual earnings, which is the case in Canada and in many nations offering extensive paid leave to fathers.

<sup>8</sup>Over time, if social norms and expectations about gender roles change, we may also see men and women make different decisions about human capital investments as well as occupation and industry choices, which would have an

work earlier and enjoy greater job continuity, increasing their returns to market work. As the ratio of the returns to market versus non-market work for mothers and fathers converge, this should lead to an efficient allocation which is less sex-specialized, whereby fathers contribute more to unpaid work and mothers contribute more to market work.

Another mechanism through which paternity leave may influence behavior in the long-term is that of habit persistence in preferences. Individuals may have utility over different kinds of work that is non-separable over time. Under such a model, lifetime utility would take the form of  $U(C) = \sum_{t=0}^T u(c_t - \alpha c_{t-1})$ , where  $u(\cdot)$  is a concave utility function,  $c_t$  is consumption in period  $t$  and  $\alpha$  denotes the intensity of habit formation. Due to the concavity of the utility function  $u(\cdot)$  we would then have that  $u'(c_t) \leq 0$  and  $u'(c_{t-1})$ . Under such preferences, an increase in current consumption  $c_t$  lowers the marginal utility of consumption in the current period but increases it in the next period. Paternity leave will increase fathers' initial consumption of time at home, and due to habit persistence, this may lead to an increased desire to feel involved at home even after the leave period ended. The same logic would hold if we wished to model either childcare or housework as a 'bad' rather than a 'good', such that we would model dis-utility of participation which decreases in intensity, e.g., being on paternity leave increases fathers' participation in cooking, which lowers their marginal dis-utility from the task in future periods. Further, paternity leave would eliminate the possibility of strategic shirking, since fathers cannot credibly claim to be incompetent in certain childcare and housework tasks any longer.

Paternity leave may also create a pattern of household behavior during the period of leave that is costly to reverse later. One potential cost of changing behavior after the leave period is that of learning. Parents who take leave simultaneously may divide up non-market tasks and each invest in task-specific human capital. After the leave period ends it becomes costly for either parent to learn how to perform the other's designated task and to avoid this cost they may continue to share chores as they did while they were on leave. In addition, there may be utility costs associated with reversion. For example, the wives of men who take leave may enjoy the experience of committing to their careers while being supported by a helpful spouse at home, and may perceive dis-utility from returning to traditional gender roles where their career is subordinate to their spouse's.<sup>9</sup>

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impact on their returns to market work.

<sup>9</sup>In that case, under a unitary model of maximization reverting to the traditional division of labor would be sub-optimal for the household. Alternatively, under a non-cooperative model, since mothers benefit from the non-traditional division of labor they can use their improved bargaining power to enforce continuation of this behavior even after the leave period ends.

### 3 The Existing Literature and My Contribution

#### 3.1 Previous Research on Leave Policies and Fathers' Participation

Despite the multitude of reasons that fathers' leave participation may be beneficial to fathers, mothers and children, the participation rates of fathers worldwide remain much lower than that of mothers. Since the father is often the higher-earning parent financial compensation plays a significant role in their decision to take leave. Studies have shown that loss of earnings is an important factor in fathers' decisions to not take parental leave (Zhelyazkova, 2013). It is also common for fathers to cite workplace attitudes as an obstacle to utilizing leave even when they are entitled to it, out of fear it could damage their careers (Bygren and Duvander, 2006). Social and psychological factors may also play a role: it is possible that men have a lower taste for childcare, that social constructs push men to see themselves as the primary breadwinner who must prioritize paid work, or that they are rarely exposed to role models in the form of men who care for infants.

Several studies have exploited international variation in policies to determine how easing these barriers can improve fathers' leave-taking. Fathers' leave take-up tends to be higher in countries with generous compensation rates (Moss and O'Brien, 2006) and is especially low in countries like the United States where leave is unpaid. O'Brien (2009) compares 24 countries and finds fathers' use of statutory leave is greatest when high income replacement (fifty percent or more of earnings) is combined with extended duration (more than fourteen days). It also matters whether fathers' access to leave is derived via a family right or an individual right. Several cross-country comparisons have shown that fathers are more likely to utilize leave when a daddy quota is in place (Bruning and Plantenga, 1999; O'Brien, 2009; Haas and Rostgaard, 2011). However, while these findings provide suggestive associations between different kinds of leave policies and fathers' behavior, they suffer from endogeneity issues since the assignment of each country to a specific policy regime is non-random, e.g., a country may offer high income replacement precisely because parents are highly motivated or concerned about parental leave.

More recently a few studies have exploited natural experiments where policy was changed suddenly to identify causal effects by comparing births just before and just after the reform. Dahl et al. (2012) report that the introduction of a daddy quota in Norway had an impact on fathers' takeup of 32%. Duvander and Johansson (2012) and Ekberg et al. (2013) study Sweden and find a strong effect on parental leave use resulting from the reservation of the first 'daddy month'.<sup>10</sup> These studies present causal estimates of the impact of daddy quotas and provide some evidence of the success of such schemes. However, the specific nature of these reforms present some limitations on the ways in which we can interpret the program effects. In the case of Sweden, the daddy quota did not represent the addition of a new month of leave, but instead a transfer from total family

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<sup>10</sup>Duvander and Johansson (2012) detect a smaller but clear effect resulting from the second daddy month, and no effect from the gender equality bonus

leave to ‘daddy-only’ leave. Thus, if the mother had previously exhausted the total leave, the quota now made it necessary for the father to participate to simply maintain the status quo amount of family leave. In Norway, the introduction of the quota did not decrease mothers’ potential leave, but since most mothers took the entire amount of family leave prior to the reform (Dahl et al., 2012), the family could only use the additional leave if the father utilized his month. Therefore, in the case of both Norway and Sweden the introduction of the quota altered a binding constraint. We therefore cannot be sure about the mechanisms behind the reforms’ success, i.e., were fathers responding to their individual right and the ‘daddy-only’ label or were families simply trying to maximize leave which made it necessary for fathers to participate?

This paper contributes to the causal literature on paternity leave reforms in three important ways. First, it is the only study of this policy episode in Quebec and is therefore the first to study a daddy quota in a social and political context that is very different from that of Nordic and Scandinavian countries. Second, it is the first to utilize regional variation rather than a nation-wide change in policy. The resulting setup offers a natural control group in the form of other Canadian provinces which did not reform their leave schemes, and I can use a difference-in-differences framework to identify causal effects while controlling for trends. Third, this paper is the first to directly explore whether the ‘daddy-only’ label matters in itself even when the quota does not impose a binding constraint. Since the quota did not alter or produce a binding constraint for most families in Quebec, I explore whether the quota produces an intra-household flypaper effect, where benefits stick to the household member they land on even when they are effectively fungible<sup>11</sup>

### 3.2 Previous Research on the Long-Run Effects of Paternity Leave

Much of the extant research on the long-term effects of paternity leave has examined variation in actual leave-taking among fathers or cross-country variation in leave policies. Such studies have found that fathers who take leave are more involved in childcare (Haas, 1990; Brandth and Kvande, 1998; Haas and Hwang, 1999; Tanaka and Waldfogel, 2007; Nepomnyaschy and Waldfogel, 2007) and that the average father’s time in childcare is higher in countries with generous paternity leave policies (Fuwa and Cohen, 2007; Sullivan et al., 2009; del Carmen Huerta et al., 2013; Boll et al., 2014).<sup>12</sup> Moreover, paternity leave is correlated with shorter work hours for fathers (Haas and Hwang, 1999; Duvander et al., 2010), and shorter career breaks, longer work hours and improved labor market positions for mothers (Brandth and Kvande, 1998; Pylkkänen and Smith, 2003). Taken together,

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<sup>11</sup>A small number of studies have provided evidence of such an intra-household flypaper effect that stem from educational fee reforms (Shi 2012), school feeding programs (Jacoby, 2002) or child benefits (Kooreman, 2000), but they all examine the reallocation of expenditures in response to directives aimed at children. This paper provides the first evidence of an intra-household flypaper effect in the allocation of benefit consumption between husband and wife stemming from a labeling effect.

<sup>12</sup>Although studies find no evidence of an association between paternity leave and fathers’ average time in housework, some do find evidence consistent with increased male participation in time-inflexible and typically-female housework (Brandth and Kvande, 1998; Hook, 2006, 2010; Estes, 2011)

these cross-sectional studies suggest that paternity leave is correlated with a less traditional division of labor within the household - but these associations are vulnerable to endogeneity issues. First, cross-country studies may be biased upwards by the omission of country-level variables such as institutional or normative contexts. Similarly, studies using cross-sectional variation in actual leave-taking among fathers cannot control for unobserved heterogeneity in preferences, beliefs, motivation, and workplace constraints.<sup>13</sup> Thus, their findings can only be interpreted as informative associations rather than causal estimates.

More recently a few studies have sought to identify causal effects by comparing the behavior of parents before and after a change in policy which led to a sudden increase in fathers' leave-taking, thus exploiting exogenous variation in leave-experience. Interestingly, these studies of 'natural experiments' do *not* confirm the results from cross-sectional research - and consequently highlight the importance of robust study design. First, several studies fail to detect a significant causal impact of paternity leave on the distribution of childcare between parents (Kluve and Tamm, 2009; Rieck, 2012; Ekberg et al., 2013; Ugreninov, 2013). One study did report that paternity leave leads to more equal sharing of housework, but could only detect a significant effect for the chore of laundry (Kotsadam and Finseraas, 2012). Second, these studies are not consistent in their findings on the causal effect on parents' labor market outcomes. While some studies report that paternity leave reduces fathers' earnings (Johansson, 2010; Rege and Solli, 2013), others find no impact on fathers' earnings or work hours (Cools et al., 2011). Similarly, some studies find no causal effect on mothers' labor supply or earnings (Rege and Solli, 2013; Kotsadam et al., 2011), while others report that paternity leave leads to higher or lower maternal earnings (Johansson (2010) and Cools et al. (2011) respectively). Thus, the results from these quasi-experimental studies are not conclusive, but do confirm the suspicion that the relationship between paternity leave and parental behavior may not be as straightforward as the cross-sectional evidence suggests.

In order to identify a causal mechanism, I too utilize a natural-experiment setup to exploit exogenous variation in leave behavior. However, by improving upon several shortcomings of previous studies, this paper provides three crucial contributions to the causal literature. First, it explores a wider range of outcomes than has been studied previously, and presents evidence on sex specialization across the breadth of household responsibilities. While previous studies focused on one or at most two dimensions of parental responsibility, this paper investigates multiple outcomes within the spheres of market and non-market work in detail, and is therefore able to identify substitutions between tasks. Moreover, some studies only explored outcomes for one parent ( e.g. Kotsadam et al. (2011); Ugreninov (2013)). In comparison, I investigate outcomes for both parents side-by-

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<sup>13</sup>Some authors attempt to proxy for this, e.g., Nepomnyaschy and Waldfogel (2007) include dummies for whether the fathers took pre-birthing classes with the mother and whether they were in the delivery room. However, while these factors may signal motivation or enthusiasm, they do not necessarily proxy for fathers' beliefs or preferences about gender roles. Moreover, these studies are unable to control for heterogeneity in employers or workplaces which can heavily influence constraints to fathers' leave-taking and involvement in later years.

side, capturing the fact that mothers' and fathers' time may be complements or substitutes in household production.

Second, other causal studies have used measures of parents' non-market contributions that can be argued to be deficient. Some studies explore narrow measures of parental involvement, e.g., Ekberg et al. (2013) and Ugreninov (2013) use the share of leave taken to care for sick children as their measure of a parent's household work. Other studies use broader measures, but rely on survey data vulnerable to measurement error and reporting bias. For example, Kluve and Tamm (2009) ask parents 1.5 years after the birth to report the proportion of childcare performed by them during the first year of the child's life, even though respondents may incorrectly remember their contributions. Other studies, such as Kotsadam and Finseraas (2012), use surveys which ask the respondent, e.g., "*Who does the chore of laundry in your household? - you? -your partner? -you share equally?*". The limited range of possible answers means these measures not only lack precision but also are vulnerable to response bias, wherein respondents purposefully understate or exaggerate their behavior to align with cultural norms rather than reporting their true actions. To avoid these issues in the measurement of parents' contributions, this paper leverages the precision of data from time-diaries. In a time-diary survey, the respondent is asked to record their activities as well as corresponding details such as locations and whether other people were present etc over the 24-hour period that the survey covers. According to Kotsadaam and Finseraas (2012, pg 1619) who study the effect of a Norwegian daddy quota on the sharing of housework, "under ideal settings, we would exploit a time-use data-set with a large enough sample of individuals who had their last child in a time period around the reform to investigate the actual sharing, but no such data-set exists (*for Norway*)". Fortunately, exactly such a data-set exists for Canada, and is used in this study.

Lastly, here too the utilization of regional variation provides me with improved study design. Other quasi-experimental studies have exploited nation-wide changes in policy to compare fathers who experienced a birth before a reform to those who experienced a birth after. Analyses using only one period of observation (e.g. Kotsadam and Finseraas (2012)) thus necessarily compare fathers of older children to those of younger children, whose behaviors may differ inherently - and further, the differences may simply reflect trends in parent's behavior. Studies with multiple periods of observation produce difference-in-difference estimates by comparing parents' behavior across children's ages and and time (e.g. Rege and Solli (2013)), but it can be argued that parents of older children are not an ideal comparison group due to the strong identifying assumption of parallel trends in parents' behavior across children's ages. Since my study exploits regional variation in policy, other Canadian provinces where policy did not change can be used as a natural control group, thus controlling for time and cohort trends and providing robust identification of causal effects.

## 4 Data

### 4.1 Benefit Claims: Employment Insurance Coverage Survey

To analyze the immediate impact of QPIP on leave behavior I use data on benefit claims collected by Statistics Canada through the Employment Insurance Coverage Survey (EICS). The target population for this annual survey is a subset of the target population for the Labor Force Survey, and comprises individuals who, given their recent status in the labor market, could potentially be eligible for employment insurance. Mothers of infants less than one year old, who I will focus on in this study, fall into this last category, since they could potentially be eligible for benefits via maternity or parental leave. The EICS is conducted annually, and I focus on mothers in a nine-year window framing the QPIP reform, from 2002 to 2010. Specifically, I use data from 2002-2005 as the pre-reform period (roughly 42% of the observations), and 2006-2010 as the post-reform period.<sup>14</sup>

The primary sample comprises 9,484 observations of mothers aged 18-40 who have a child under one year old and identify as part of a couple.<sup>15</sup> Approximately one-fifth of the observations are from Quebec, while the rest of the observations come from the control group which comprises the five largest other provinces, i.e. Ontario, Alberta, British Columbia, Atlantic Region, and Manitoba and Saskatchewan, where the EI system remained in place over the entire period of the analysis.

One limitation of the Employment Insurance Coverage Survey is that it does not target respondents who are recent fathers. However, the survey does ask the mothers about their spouses' leave participation and duration as well as his education and income and other personal characteristics. The outcomes regarding leave participation are measured by indicators taking value 1 if the respondent (or her spouse) has claimed or plans to claim maternity/parental/paternity benefits through the EI or QPIP system. Parents' leave duration is measured by mothers' reports of total weeks of actual or planned leave taken by her and her spouse.<sup>16</sup>

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<sup>14</sup>I exclude data from 2001 and earlier because there were nation-wide reforms to the length of both job-protected and paid parental leave in late 2000, and also because Quebec extended its publicly subsidized childcare to children aged 0 to 1 in 2001.

<sup>15</sup>Supplementary regressions on a younger sample of mothers, restricting to mothers aged 18-30 and 18-35, yield similar results and are available in Appendix 3. I exclude single parents for three reasons. First, given the more limited financial resources of single parents, they are likely to respond differently to changes in the generosity of benefits than their partnered counterparts. Second, since they have no partner to share the gender-neutral parental leave with, there is no consideration of allocation decisions, which is an important component of this analysis. Third, there is concern that their behavior may be influenced by other policy changes which occurred in that period, such as enhancements of the National Child Benefit which particularly targeted lower-income single parents. Small sample sizes preclude a separate analysis of single mothers.

<sup>16</sup>There are two important things to note about the measure of mothers' leave duration. First, mothers who are still on leave at the time of survey offer responses about their planned leave duration while mothers who have returned to work report their completed leave duration. There is therefore concern that mothers still on leave may report planned duration that is either shorter or longer than the actual length of leave they end up taking. However, since the EICS only covers mothers who have an infant under a year old, limiting our sample to mothers who have already returned to work would lead to the systematic over-representation of mothers who took shorter leaves, skewing the distribution of leave durations to the left. Consequently, I treat duration of leave to be length of completed leave for those who have returned, and length of planned leave for mothers still on leave. Second, the survey asks new mothers

## 4.2 Time Use: General Social Survey

To analyze the long-run effects of QPIP on the division of household labor I use data from Statistics Canada's General Social Survey (GSS), specifically the two most recent rounds that collected time-diary data: cycle 19 which was conducted in 2005 and cycle 24 which was conducted in 2010. Since QPIP was introduced in Quebec in 2006, observations from 2005 are considered to be in the pre-reform period while observations from 2010 are considered to be in the post-reform period. The target population of the GSS includes all persons 15 years of age and older in Canada excluding full-time residents of institutions. Approximately one-fifth of the observations are from Quebec, the treatment group, while the rest of the observations come from the control group that consists of other provinces in Canada.<sup>17</sup> The sample comprises parents aged 18-50 whose youngest child is aged between 1-8 and who are in a married or cohabitating relationship.<sup>18</sup> Parents whose youngest child is under one year old are excluded from the sample to eliminate the possibility they may still be on parental leave at the time of the survey.<sup>19</sup>

I measure time spent in various types of work in minutes per day as recorded by their time-diary.<sup>20</sup> For parents' market outcomes I investigate the time spent in paid work, time spent physically at the office as well as annual earnings. For parents' non-market outcomes, I examine total time spent in non-market work (the sum of housework and childcare) as well as childcare and housework separately, and total time spent at home and time spent in the vicinity of family members. Following Aguiar and Hurst (2007), I define total domestic work as the sum of time in 'core' non-market work (such as meal preparation and cleanup, laundry, ironing, dusting, and indoor cleaning), time spent obtaining goods and services (such as shopping for groceries or household supplies) and 'other' home production such as maintenance and repairs, gardening, and caring for houseplants and pets. Following Craig (2006), I define total childcare as the sum of time spent in routine childcare (such as feeding children or getting them ready for school), interactive childcare (such as helping with homework or reading to children) and also travel and communication related to childcare such as driving children to school or attending a parent-teacher conference. Further, I explore these non-market contributions at a greater level of detail, e.g., breaking childcare up into interactive and routine and travel/communication activities separately and breaking domestic

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about the duration of all leave (not specifically paid parental leave) taken, and could capture unpaid leave or paid sick or vacation leave mothers take in lieu of paid parental leave. However, given the generous paid parental leave available and lack of stigma to maternal leave-taking, this is unlikely to have been the case except for mothers who used it as a means to supplement the paid parental leave which they had exhausted.

<sup>17</sup>Specifically, the control group comprises observations of parents resident in Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, Yukon, Nunavut and the Northwest Territories.

<sup>18</sup>I exclude parents who report themselves as unattached individuals or single parents since they have no partner to share household responsibilities with, rendering an exploration of division of labor moot.

<sup>19</sup>In all analyses I exclude parents whose youngest child is aged 4. Since the survey does not collect information on the child's exact date of birth, it is impossible to determine whether parents who were interviewed in Quebec in 2010 experienced this birth in 2005 or 2006, and therefore whether or not they were exposed to the QPIP.

<sup>20</sup>The GSS Time Diary requires respondents to note down their activity in 7-minute intervals throughout the day for the 24-hour period during which the survey is being conducted.

work into several categories such as maintenance/repairs, cooking, shopping, housekeeping, and other chores.

There are two limitations of the GSS data which should be mentioned. First, since the data is not collected at the couple-level I cannot track changes in spouses' behavior within the same household; instead, my results show how mothers' and fathers' behavior changed on average across households. A second limitation is that given that families can move between provinces, it is possible that families observed in Quebec experienced their last birth in one of the other provinces or vice versa. However, given that the 2006 census reported less than 3% of the Canadian population moving between provinces, the number of recent-movers in and out of Quebec in my sample is expected to be small and unlikely to bias the results significantly. Moreover, since this type of cross-contamination should reduce differences between observations in Quebec and other provinces, my results would underestimate of the true causal effect of exposure to paternity leave.

## 5 Empirical Methods

### 5.1 Identifying QPIP's Impact on Leave Behavior

#### *(i) Regression Discontinuity*

To evaluate the immediate impact of QPIP on parents' benefit claims I adopt a sharp regression discontinuity (RD) design. Since the reform was introduced on 1st January 2006 with no gradual phase-in period, this provides a sharp cutoff after which a birth was eligible for QPIP. For each mother I have information on the year and month of birth of her youngest child, and the running variable for the RD is the distance in months from the cutoff date.<sup>21</sup>

The model for each outcome is given by

$$Y_i = m(x_i) + \beta(x_i \geq \text{Jan2006}), \quad (1)$$

where  $Y_{i,t}$  represents the outcome of mother  $i$  and  $x_i$  is the running variable which is the distance between the birth month and the cuoff of January 2006.  $\beta$  represents the parameter of interest.  $m(x_i)$  is an unknown continuous function of the month of birth. I assume a flexible form for  $m(x_i)$  and estimate it non-parametrically.<sup>22</sup> I estimate equation (4) using local linear regressions (LLR) as Hahn et al. (2001) and Porter (2003) show that LLR performs better than kernel estimations at avoiding boundary problem and obtaining a higher order of convergence at boundary points. The choice of window/bandwidth is important since it determines the smoothing of the data, and there is a tradeoff between variance and bias when choosing the optimal bandwidth. I select the

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<sup>21</sup>The reported analyses use a bin width of one month. I also tried to widen the bins to 2-month intervals but rejected this method using an F-test since it oversmoothed the data.

<sup>22</sup>Appendix 2.3 presents results from robustness checks where I estimate a parametric RD analysis

bandwidth using the plug-in method proposed by Imbens and Kalyanaraman (2009).

In an RD-framework it is usually recommended that one ascertain the density of births is similar on either side of the cutoff, but since the EICS data is collected as a random sample, this is not a concern for identification. To check for internal validity I also verify that the pre-cutoff and post-cutoff group are balanced. Table 2 presents RD analyses which detect no significant discontinuities in parents' personal or household characteristics at the cutoff. The related graphs presented in Figures 2a-2l also confirm that observable characteristics such as age, age of spouse, education level, family size and number of children do not jump at the cutoff and therefore should not confound any jump we detect in leave behavior. As a robustness check, I show my main RD Results to be invariant to the inclusion of these personal covariates.

(ii) *Difference-in-differences*

In an ideal laboratory experiment, families would be randomized into program treatment and control groups which are offered different options of parental leave, and one could then compare the outcomes of parents in the two groups. However, absent such a laboratory setup, the Quebec reform comes as close to resembling this setup as possible: two groups which begin with access to the same options, one of which is then delivered a unique 'treatment' halfway through our observation period. This setup easily lends itself to a difference-in-differences (DD) setup. Accordingly, I present a second set of estimations which explicitly include other provinces as a control group and use a longer span of data from 2002-2010.

To identify the average treatment effect, I estimate:

$$Y_{ijt} = \alpha + \beta \text{Quebec}_j * \text{Post}_t + \theta \text{Post}_t + \phi Z_{ijt} + \lambda_j + \delta_t + \lambda_j \delta_t + \epsilon_{ijt}, \quad (2)$$

where subscript i denotes the individual, subscript j denotes province and subscript t denotes the year.  $Y_{ijt}$  therefore represents the outcome of mother i in province j in year t. As outcomes, I explore whether the parent claims parental leave benefits and the duration of their actual or planned leave.  $\text{Post}_t$  is an indicator variable taking the value 1 if the year t is 2006 or greater, i.e., if the observation is from the post-reform period. The coefficient  $\theta$  represents the change in the value of the outcome that is shared by all provinces. The term  $\text{Quebec}_j * \text{Post}_t$  takes the value of 1 if the individual i lives in Quebec in a post-reform year, and otherwise takes the value 0. The coefficient  $\beta$  therefore represents the DD estimate of primary interest as it captures the change in the value of the outcome post-reform that is unique to Quebec. Under the assumption that no other policy changes were enacted to affect it,  $\beta$  represents QPIP's average treatment effect on the treated (ATT).

The term  $Z_{ijt}$  is a vector of personal characteristics including age, education, legal marital status

and immigrant status as well as household characteristics such as family size, number of children aged 0-1 and 1-5 and 6-17, which controls for changes in group composition.  $\lambda_j$  and  $\delta_t$  denote province- and year-fixed effects while  $\lambda_j\delta_t$  controls for province-specific time trends.  $\epsilon_{ijt}$  is the error term. I calculate cluster-robust standard errors that generalize the White (1980) heteroskedastic-consistent estimates of OLS standard errors to the clustered setting in order to account for possible heteroskedasticity and within-province dependence of standard errors, which are particularly a concern in difference-in-difference estimations since the regressor of interest is highly correlated within clusters (Bertrand et al., 2004). However, the small number of province-level clusters available in my sample leads to concerns regarding statistical inference since asymptotic tests have been shown to over-reject with too few clusters. Accordingly, I use wild bootstrap-t procedures suggested by Cameron et al. (2008) to provide asymptotic refinement of standard errors. All analyses are conducted using ordinary least squares regressions despite the binary nature of some of the indicators because they resulted in very similar estimates as those from logit estimates, and the calculation of marginal effects from triple interaction terms in logit estimations is controversial (Puhani, 2008).

Table 3 presents summary statistics for the full 2002-2010 EICS sample as well as differences-in-means between the treatment and control groups over time. There are four notable differences in covariates across groups and times which merit mention. First, the average age of new mothers in Quebec grew by slightly more than in other provinces, though the difference of 0.92 years is unlikely to be economically significant. Second, the proportion of the sample that are immigrants also grew more in Quebec than in other provinces. Lastly, the education levels of new parents changed more in Quebec than it did in other provinces, with a higher proportion of college attendance among fathers and lower proportion among mothers. To account for these compositional changes in the sample, I present results from DD estimations with and without controlling for such covariates as age, education and immigrant status as well as household characteristics such as family size and number of children aged 0-1, 1-5 and 6-17. Furthermore, Appendix 3 presents regression results for restricted subsamples of parents, and shows the program effects are not very different if one focuses solely on non-immigrant parents or younger parents.

## 5.2 Identifying Long-term effects of QPIP on Household behavior

To explore long-term causal effects, I first limit my sample to parents whose youngest child is aged 1-3 and employ a difference-in-differences methodology which exploits variation over provinces and time.<sup>23</sup> I estimate the following DD equation:

$$Y_{ijt} = \alpha + \beta \text{Quebec}_j * \text{Post}_t + \gamma \text{Post}_t + \phi Z_{ijt} + \lambda_j + \epsilon_{ijt}, \quad (3)$$

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<sup>23</sup>Parents whose youngest child is 4 years old are excluded from all samples and regressions. This is due to the fact that lack of birth-month information prevents me from being able to cleanly identify whether a 4-year old observed in 2010 was born before or after the introduction of QPIP in January 2006.

where subscript  $i$  denotes the individual, subscript  $j$  denotes province and subscript  $t$  denotes the year.  $Y_{ijt}$  represents the outcome for parent  $i$  in province  $j$  in year  $t$ .  $Post_t$  is an indicator variable taking the value 1 if the observation is from after 2006, i.e., if the observation occurred after the reform was introduced in Quebec. The coefficient  $\gamma$  represents the change in the value of the outcome that is shared by all provinces. An interaction term,  $Quebec_j * Post_t$ , is included to capture the change in the value of the outcome post-reform that is unique to Quebec. The main parameter of interest is therefore the coefficient  $\beta$ , which displays the program effect on parents who have been exposed to QPIP. Under the assumption that no other policy changes were enacted to affect this parameter, the coefficient  $\delta$  can be thought to represent the intent-to-treat effect of the QPIP program on the outcome in question. The term  $Z_{ijt}$  is a vector of personal characteristics including age, age difference with spouse, marital status, nation of birth, as well as household characteristics such as family size, number of children aged 0-14, and age of youngest child. I control for Province fixed effects through the term  $\lambda_j$ .  $\epsilon_{ijt}$  is an i.i.d error term. Here again I calculate cluster-robust standard errors.

Since ‘Time Use’ GSS data is only available every 5 years the above DD estimation compares changes among Quebecois parents of children aged 1-3 from 2005 and 2010 versus identical parents in other provinces. This gives rise to the concern that something else may have changed over that period in Quebec, e.g. provincial policy or cultural norms, such that a simple double-difference could conflate a Quebec-wide trend with a change in behavior causally related to the QPIP program. To mitigate such concerns, I devise a check using a placebo group of parents whose youngest child is aged 5-8.<sup>24</sup> These parents form a convenient placebo group because even if they are observed in the treated province in the post-treatment year (2010), their children are slightly too old for them to have been eligible for QPIP. I then formally fold in this placebo group of parents, and employ a difference-in-difference-in-differences (DDD) identification strategy where I exploit variation in exposure to paternity leave across provinces, time, and age-group of the child. In this triple-differencing setup, a parent is only considered to be exposed to QPIP if they are observed in Quebec in 2010 *and* their youngest child was born since 2006 i.e. the child is aged 1-3. I estimate the following equation:

$$\begin{aligned}
Y_{ijt} = & \alpha + \delta Quebec_j * Post_t * Under3_g \\
& + \beta Quebec_j * Post_t + \sigma Under3_g * Post_t + \theta Quebec_j * Under3_g \\
& + \gamma Post_t + \chi Under3_g + \phi Z_{ijt} + \lambda_j + \epsilon_{ijt},
\end{aligned} \tag{4}$$

where subscripts  $i$  denote the individual,  $j$  denote province,  $t$  denote the year, and  $g$  denotes the age-group of the parent’s youngest child (i.e. 1-3 or 5-8). New to this equation is the term  $Under3_g$  which is an indicator taking value 1 when the parents’ youngest child is aged 1-3 years old, and 0 if the child is aged 5-8 years old. The parameter of interest is now  $\delta$ , the coefficient

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<sup>24</sup>I vary the age restrictions on the placebo group, using the same minimum age of 5 but increasing the maximum from 8 up till 14 and get similar results.

on  $Quebec_j * Post_t * Under3_g$ , which captures the effect of being in the treated province in the post-treatment period and having a child young enough that you were eligible for the treatment.

I argue that this DDD identification strategy is ideal for identifying the causal effects of QPIP for several reasons. First, including a control group of other provinces accounts for changes over time that are shared by all provinces, e.g., changes in technology which make housework easier. Second, the inclusion of the placebo group of parents of older children has several advantages. It controls for factors that may have changed uniquely in Quebec, but should not differ across children of different ages. For example, regional economies may have fared differently in the recent recession, but the parents of children of different ages within the same province would have faced the same economic opportunities. Further, if the exogeneity of the reform is questioned by suggesting that QPIP is correlated with a Quebecois culture with increasingly values gender equality, then including Quebecois fathers of slightly older children will control for the trends in egalitarian beliefs in Quebec.

Lastly, since the DDD method exploits variation in exposure to QPIP rather than actual participation, I provide evidence on ‘intent-to-treat’ (ITT) estimates which are preferable to estimates of ‘treatment on the treated’ (TOT) for several reasons. First, TOT estimates could be subject to the same bias from selection into treatment that previous cross-sectional studies have been criticized for. Second, from a policy-making perspective ITT effects may be more relevant as they allow for feedback effects whereby the ‘daddy quota’ could have changed expectations and norms over and above the effects of actually using the leave option. The ‘daddy quota’ sent a strong public message about the importance of fathers’ involvement in the home which may have incentivized fathers who were exposed to QPIP but not treated to nevertheless get more involved in the home. Furthermore, a change in the behavior of treated households may change costs and incentives for neighboring households. For example, workplace expectations for all mothers may rise as treated mothers increase their career commitment - and consequently, the penalty may increase for the untreated mothers who do not. Nevertheless, it is safe to assume that feedback effects on parents who were exposed but not treated are smaller than the first-order-effects on parents who were treated, such that the ITT results presented here underestimate the true causal effect of paternity leave on those who take it.

Table 4 presents sample characteristics for the GSS data across treatment, control and placebo groups in the years 2005 and 2010, as well as the difference-in-difference-in-differences. Reassuringly, I detect only one significant difference across the groups over time: it appears that between 2005 and 2010 the proportion of fathers who were not born in Canada grew more rapidly in the ‘exposed’ group (i.e. fathers in Quebec with a youngest child aged 1-3) than in the other groups. However in every other characteristic such as age, spouse’s age, number and age of children, family size, there are no reasons to believe the triple-differencing identification strategy would be mistakenly picking up changes in group composition. Moreover, each double- and triple-differencing regression

includes controls for these parental and household characteristics.

## 6 Results

### 6.1 Program Effect of QPIP on Parents' Leave Behavior

Table 5 presents regression discontinuity estimates of the immediate effect that QPIP had on parents' claim rates and duration. Panel I shows results for Quebec, and Column 1 reports that the introduction of QPIP in January 2006 is associated with a jump of 53.6 percentage points in the probability that a father claims parental leave benefits. This estimate is highly statistically and economically significant, representing an increase of 200% of the pre-reform participation rate of 22%. Column 2 indicates that QPIP resulted in a jump of 3.09 weeks in fathers' leave duration. This is also an economically and statistically significant effect, representing a 150% increase from the pre-reform average of 2.03 weeks. It should be noted that the inclusion of personal and household characteristics in the RD analysis do not affect the results, as can be seen in Panel II. For comparison purposes, Panels III and IV present RD results for the control group and show that there was no change in parents' behavior around the time of the reform in provinces that were not treated. Figures 3a-3d provide visual support by plotting these patterns in fathers' leave behavior in treatment versus control provinces. For the treatment group we see a clear discontinuity in fathers' participation rates and leave duration at the cutoff, whereas no such jump exists in the corresponding graphs the control group.

According to columns 3 and 4 of Table 5, the RD analysis detects no significant program effect on mothers' behavior at the cutoff. In mothers' participation, though there is a jump of 15 percentage points in mothers' participation, it is not statistically significant due to large standard errors. This can be seen in Figure 4a which presents the corresponding graph for mothers' leave participation in the treatment group: participation jumps at the cutoff but quickly falls back down again to the pre-reform level. For mothers' leave duration, the RD detects no significant jump at all. This means that in aggregate, the RD results from Table 5 show that mothers' leave duration didn't change while fathers' leave duration shot up, consistent with an intra-household flypaper effect from the 'daddy-only' label reducing stigma costs for fathers.

Table 6 presents results from difference-in-difference estimations which use a longer span of data, i.e. 2002-2010, and fold the control group of other provinces directly into the analysis. For fathers' leave outcomes, the DD estimates are very close to those obtained through the RD analysis. The simple DD finds a significant program effect of 52.4 percentage points on fathers' participation rates and of 3.23 weeks in leave duration. Controlling for personal covariates and province and year-fixed effects has no effect on those coefficients. However, controlling for province-specific time trends does reduce those effects slightly to a 47.2 percentage point increase in claim rates and 2.509 increase in leave duration. The most parsimonious DD specification detects a significant program effect of 11

percentage points in mothers' participation and 2.75 weeks in mothers' leave duration, whereas the specification which includes all personal characteristics, fixed effects and province-specific trends reports a 7.6 percentage point increase in claim rates and 3.02 week increase in duration, though both coefficients are not statistically significant. While it is curious that the DD results detect an impact on mothers' behavior when the RD results did not, it is possible that mothers' leave behavior was simply slower to respond to the reform. For example, their response may have been driven by QPIP's easier eligibility criteria, of which information was slow to disseminate and which requires time to have effect.<sup>25</sup>

Note that, similar to the RD, the DD results indicate that fathers' leave duration responded more strongly than did mothers' leave duration. This is especially so when we consider the effects in relative terms: since mothers' took an average of 43 weeks of leave prior to the reform, a program effect of even 3 weeks represents an increase of approximately 7%, whereas since fathers' took an average of 2.03 weeks of leave prior to the reform a program effect of 3 weeks represents an increase of 150%. This larger response in fathers' leave-taking to the reform is consistent with QPIP's daddy quota producing an intra-household flypaper effect due to a reduction in stigma cost.

To see this pattern in more detail, Table 7 presents the impact of QPIP on the joint distribution of parental leave. Here each cell represents a different combination of mothers' and fathers' leave. The coefficients therefore represent the program effect of QPIP on the probability that a family chose a certain combination of mothers' and fathers' leave duration. QPIP appears to have reduced the likelihood of any combination where the father takes 0 weeks of leave. It has increased the likelihood that the father takes between 1 and 5 weeks of leave, in any combination where the mother is taking more than 6 months of leave. It even increased the likelihood of fathers taking 6 or more weeks of leave i.e. more than his quota, if the mother used only 10-11 months of leave. There is a clear shift in the distribution of leave towards fathers participating more. This is consistent with the idea that the daddy quota produced an intra-household flypaper effect, whereby leave 'stuck' to the father even though the constraint did not bind, because it reduced fathers' stigma cost of taking leave.

Lastly, to explore whether QPIP affected income inequalities in leave-taking, Table 8 reports the heterogeneous program effects of QPIP according to household income. I define a low-income household to be one earning less than 30,000CAD, i.e. one in the bottom quartile of the income distribution.<sup>26</sup> Columns 1 and 2 suggest that QPIP produced a significantly smaller program effect on low-income fathers than on fathers from higher-income households. That is, low-income fathers

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<sup>25</sup>Since the eligibility criteria requires you to meet certain income criteria in the last 12 months, even if a mother heard about the change to the criteria in January 2006 she could not have taken advantage of it unless she knew of it in advance. Therefore only mothers who experienced births in 2007 or later could truly benefit from the lowered eligibility criteria.

<sup>26</sup>Defining the threshold at 20,000CAD or 40,000CAD was found to produce consistent results

increased their leave participation and duration under QPIP, but by 18 percentage points less and 1.7 weeks less than did fathers from higher-income households. This is an interesting finding since low-wage earners should respond more strongly to the increased benefits: since benefits are capped, low-wage earners experience a larger marginal reduction in the price of leave. Moreover, this curious finding of a weaker response from low-income fathers is made doubly interesting by the fact that it is not mirrored by low-income mothers - who do respond more strongly than higher-income mothers as expected. Though the coefficients are statistically insignificant due to large standard errors, Columns 3 and 4 suggest that under QPIP low-income mothers experienced more than twice the increase in participation rates and leave duration than that experienced by mothers from higher-income households. One possible explanation for why low-income fathers respond weakly to QPIP could be that they may have the highest stigma costs to taking leave, and that QPIP is less effective in reducing this stigma for them compared to higher-income fathers.<sup>27</sup> Overall, Table 8 suggests that QPIP has increased income inequalities in leave-taking among fathers, but has produced a reduction, if anything, in the gap between low-income and higher-income mothers.

## 6.2 Long-Term effects of Exposure to QPIP

It is worth beginning my discussion of the long term effects of QPIP by first establishing a baseline for how households behaved prior to the existence of QPIP. Table 9 shows mean outcomes for parents with youngest children aged 1-3 in the year 2005; it shows that household responsibilities were clearly divided along gendered lines. Mothers spent more time in non-market work including housework and childcare, especially in time-inflexible chores such as cooking, housekeeping and routine childcare. The only household chore in which fathers spend more time than mothers is that of maintenance and repairs, which is flexible, not routine and in line with norms of masculinity. The ratio is reversed when we consider market work in which fathers spend considerably more time. Moreover, they spend significantly more time physically at the workplace, and earn more than twice as much as the mothers. A clear pattern of sex specialization can be seen, providing us with a baseline against which to evaluate the magnitude of any program effects.

Panel A of Table 10 presents results from regressions exploring fathers' time in market work and related outcomes, as measured by the time-diary GSS data. The DD regressions on the sample of fathers whose children are aged 1-3 show that QPIP is associated with a decrease of 41.98 minutes in paid work per day. I find consistent results when employing the triple-difference methodology on the full sample of parents of children aged 1-8. Thus, even when accounting for Quebec-wide trends in this manner, I find a strong association between exposure to QPIP and fathers' reduced market contributions. Fathers who are exposed to QPIP spend considerably less time in paid work and physically at the workplace every day. Further, they appear to experience a reduction in

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<sup>27</sup>There exists considerable evidence of a positive association between education and more gender-egalitarian attitudes (Thornton and Freedman, 1979; Thornton et al., 1983; Shu, 2004) and that egalitarian gender attitudes trickle down through community education (Shu, 2004)

income of over \$11,000 - though the result is not statistically significant due to large standard errors.

Panel B of Table 10 presents results for mothers' market outcomes. The DD results suggest that exposed mothers spend over an hour more in paid work per day, and nearly as much time more physically in the workplace, compared to mothers who were not exposed. According to the DD results, mothers exposed to QPIP also earn over \$5000 more annually than do comparable mothers who were not exposed. The Triple-difference regressions which account for Quebec-wide trends offer consistent reports. According to these results, exposed mothers experienced an increase of 27 minutes at the workplace per day. Further, I detect an increase in mothers' annual income of over \$9,000, representing an increase of nearly 50% from their baseline earnings.

In Table 11 I present results from regressions exploring parents' time in non-market work and related outcomes. Panel A shows QPIP is associated with increased non-market contributions from fathers. DD results report that exposed fathers spend 39 minutes longer in total non-market work (25% increase from baseline) - while triple-difference results report that they spend 47 minutes longer (33% increase from). Most of this increase is in the realm of housework: the triple-difference results which account for Quebec-wide trends show that exposure is associated with a large increase in fathers' housework but no change in fathers' childcare contributions. In addition, exposure to QPIP is associated with an increase of 75 minutes spent physically at home (9% increase), and 24 minutes more per day in the immediate vicinity of family members (6% increase).

Panel B shows results for mothers' time in non-market work. Interestingly, exposure to QPIP is also associated with increased time spent by mothers in non-market work, though the absolute and relative magnitude of their increase is smaller than that of fathers. While exposed mothers reduce their time in housework by 18-28 minutes, they increase their time in childcare by 48-67 minutes, leading to an increase of 30-38 minutes in total non-market work (10-12% increase). Exposure is associated with 30-33 fewer minutes spent physically at home (3% decrease), though this coefficient is only statistically significant in the double-difference specification.

Since in aggregate exposed fathers increase non-market work more than do exposed mothers, Table 11 does suggest that in net female specialization in home production is reduced. Nevertheless, it is interesting that I detect any increase at all in mothers' childcare rather than a decrease. There are several possible explanations for this, though the data do not allow me to detangle these mechanisms. First, as previous research has suggested, mothers may be less willing to reduce time in childcare than in other household duties (Craig, 2005), so when paternity leave induces fathers to increase non-market contributions it may be efficient for them to increase time in housework which is less preferred by mothers. Alternatively, both parents may have equal preference for childcare but exposed mothers have gained bargaining power which they use to negotiate away from less-

preferred housework and towards more-preferred childcare.<sup>28</sup> Lastly, a possible explanation is that the increase in mothers' childcare may be related to the increase in mothers' leave-taking detected by the DD estimates in Table 6. If this is the case, increased maternal leave participation under QPIP may have increased mothers' investments in childcare, such that the negative association between QPIP and sex specialization indicated by Table 11 is an underestimate of the true causal effect of paternity leave in reducing the gendered division of labor.

Recall from the baseline statistics that prior to the reform, fathers did more typically-flexible work such as maintenance and repairs or interactive childcare and mothers did more work in the typically- inflexible 'feminine' work such as cooking, housekeeping and routine childcare. Table 12 presents results from regressions examining contributions to different types of non-market work. For the sake of brevity, I will focus my discussion on results from the DDD estimations which partial out Quebec-specific trends not related to QPIP. In comparing different housework chores, it appears the decrease in female specialization in aggregate was matched by the pattern of housework chores. For example, one may be concerned that the increase in fathers' average time in housework is solely from increases in typically male, flexible chores such as maintenance and repairs. However, it appears that fathers also increased their time in more gender-neutral chores such as shopping for groceries and household items, as well as other domestic chores which can include things such as planning social activities for household members and caring for household pets and plants etc. Further, most of mothers' decreased time in domestic work was driven by decreases in the routine and time-inflexible chores of cooking and housekeeping: I detect a program effect of 17 fewer minutes in cooking and 25 fewer minutes in housekeeping per day for mothers exposed to QPIP. In the case of childcare however, mothers' specialization in routine childcare is reinforced. Nearly two-thirds of the increase in childcare by exposed mothers comes from routine childcare, with a program effect of over 40 minutes, in comparison to an increase of only 22 minutes in interactive childcare. These results taken together suggest that although QPIP was associated with reduced female specialization in non-market production overall and certainly in housework, in the realm of childcare households have actually become further entrenched in gendered patterns.

### 6.3 Threats to Identification and Robustness Checks

In this section, I discuss possible threats to clean identification of program effects and present results from robustness checks to confirm that the effects I have presented above are causal links.

#### *(i) Exogeneity of the reform*

It is common to challenge the exogeneity of reforms by questioning whether the policies are

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<sup>28</sup>Again we can think of bargaining power being derived from relative earnings. Since mothers' labor market positions have improved due to their spouse taking leave or due to higher paternal participation rates overall, their bargaining power should have increased also.

in fact endogenously implemented as a response to trends in the outcome in the first place. For example, one may wonder whether policymakers in Quebec instituted a daddy quota because they were concerned by falling participation rates among fathers. Figure 5 shows fathers' participation rates in the treatment and control provinces over time. It shows that fathers' participation rates were not falling or rising more quickly in Quebec than other provinces prior to the reform. This confirms that the key assumption of the difference-in-differences identification, that of parallel trends between treatment and control groups, is satisfied. Prior to treatment both Quebec and other provinces experienced slightly increasing but parallel trends in fathers' participation. Thus, the control group offers a good proxy for the trajectory that Quebec would have followed absent the treatment, such that the program effects from DD regressions offer a good estimate of the level shift in participation rates due to the introduction of QPIP.

*(ii) Prior Knowledge of the reform*

Several studies have shown that even seemingly non-economic decisions such as that of fertility and timing of birth can respond to financial incentives (Gans and Leigh, 2009; Tamm, 2013). This leads to concerns that citizens may have known about QPIP sufficiently in advance and in detail in order to time their births so that they could utilize the new program. However, I present several pieces of supportive evidence that the strategic manipulation of births is not a significant concern confounding my estimates. First, details about the date and features of the reform were not announced until only a few months prior to its implementation. Figure 6 presents a 'Google Trends' graph tracking searches for the word 'QPIP' around the time of the reform.<sup>29</sup> There were relatively few searches for the program until January 2006 when QPIP came into place, consistent with the idea that details of QPIP were not commonly known sufficiently in advance of 2006 such that parents could plan their pregnancies accordingly.

Next, it is important to question whether residents of Quebec who were already pregnant when they learned of QPIP may have delayed their births until after January 2006 in order to be eligible for QPIP. Since RD analyses identify a jump at the cutoff and it is naturally infeasible to delay a birth by more than a few days, this is equivalent to checking that our RD estimates are not biased by pregnant women who were originally due in late December who may have been able to delay the delivery by a few days in order to qualify for QPIP instead of EI. As a check against this, I drop all observations in the one month surrounding the reform, and re-estimate the RD. Results from this 'trimmed' RD are shown in Appendix 2.2 and provide consistent estimates, reassuring us that the program effect is not being driven by the strategic manipulation of births.

A last possibility we must consider is that even though details of QPIP were not available until mid-2005, the basic idea had been proposed since 2001 and citizens may have heard that a reform

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<sup>29</sup>Google Trends Searches using the full English and French names of the program present similar patterns

was being discussed which would offer generous incentives for fathers to participate. It is possible that couples who were particularly keen to have fathers take leave delayed pregnancy until the new program was in place, building pent-up demand which could only be released in early 2006. This seems unlikely as this would suggest families may have been willing to postpone a pregnancy by many years (five years passed between the program proposal and final announcement of implementation) in order to gain a few weeks of ‘daddy’ leave. Nevertheless, I check against this by conducting an event study analysis to see how the program effect differed in the years following the reform. If my program effects were driven by pent-up demand which was released in 2006, we would expect fathers’ uptake to jump up in 2006 but then to fall back down in later years once this pent-up demand was relieved. Figure 7 presents results from an event-study analysis of the reform and shows that the program effect did not fall over time but in fact remained constant or may have grown stronger as years passed. This suggests that we need not be concerned by the identified program effect being driven by pent-up demand.

*(iii) Quebec-wide trends in sex specialization*

Lastly, to provide more supportive evidence that the long-term effects I detect are not being driven by province-wide trends, I conduct DD estimations on only the placebo group of parents whose youngest child is aged 5-8 years old. The results are presented in Appendix 4 and are reassuring due to the fact that most coefficients are either statistically insignificant or of the opposite sign from the program effects of QPIP reported in Tables 10-12. These results thus support the validity of my triple-difference identification strategy, and confirm that we can place trust in the causal estimates derived through it.

## 7 Conclusion

I believe this study, the first to investigate this policy episode in Quebec, offers an important contribution to the literature on paternity leave. It is the first to provide causal evidence that daddy quotas may influence behavior even when they do not constitute a binding constraint, suggesting that the ‘daddy-only’ label produces an intra-household flypaper effect which makes leave stick to fathers. This study also offers the first comprehensive causal analysis of the effect of paternity leave on the household division of labor. It provides strong evidence that by altering the initial distribution of parenting responsibilities, paternity leave can influence decisions about how to allocate parents’ resources to childcare, domestic work and paid work in later years.

The multi-dimensional nature of the effect that I document here has several implications for research on this topic. First, the program effects detected in different outcomes highlight the importance of exploring the full range of both parents’ time commitments simultaneously. For example, studies which report that paternity leave does not improve sharing of childcare, such as that of

Kluge and Tamm (2009) and Ekberg et al. (2013), should be considered alongside my finding that it does improve sharing of housework. Also, my finding that both parents' increase non-market contributions under QPIP highlights the importance of using data and measures which could capture this, as opposed to measures such as relative proportions which would not be able to detect that mothers' and fathers' time in an activity may change simultaneously.

The results of this study also have important policy implications. First, they suggest that daddy quotas may help fathers overcome such barriers to taking leave as social stigma and perceived professional penalties. Second, they suggest that it is possible for policies which induce changes in short-term behavior to have persistent effects on people's behavior in the long term, i.e., that a reform resulting in an increase in fathers' leave duration of 3 weeks could be sufficient to stimulate a shift in household dynamics for years to come. Third, and perhaps most importantly, my results suggest that there need not be a tradeoff between child welfare and gender equality, such that paternity leave may present us with a rare win-win scenario.

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Figure 1a: Histogram of Maternity Leave Duration (months) in Quebec Pre-reform

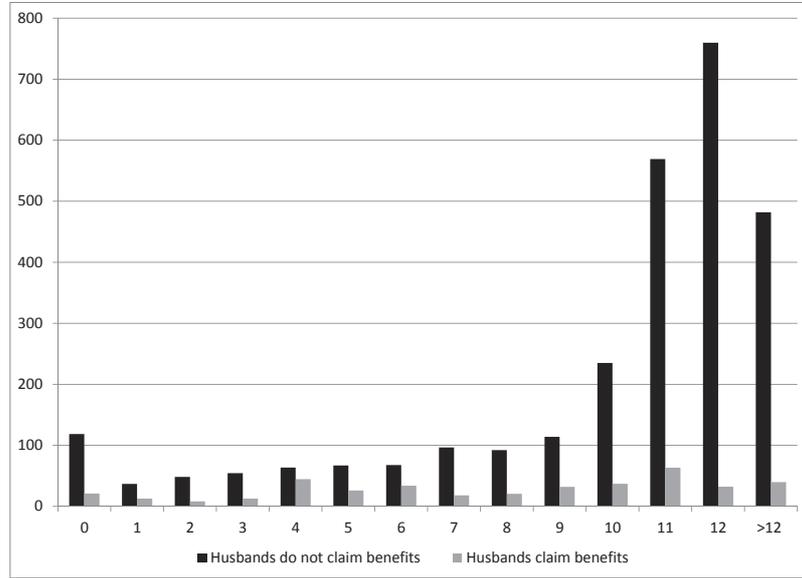


Figure 1b: CDF of of Maternity Leave Duration (months) in Quebec Pre-reform

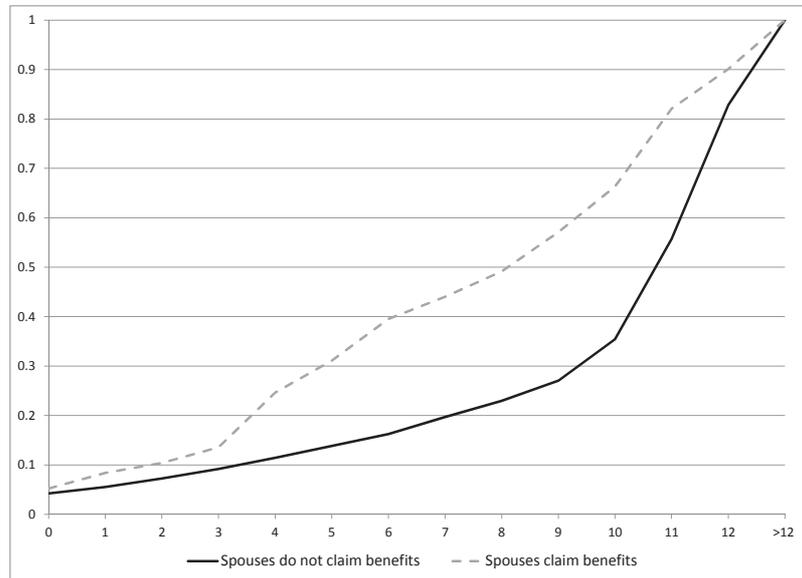


Figure 2a-2f: Discontinuities in personal and household characteristics in EICS data

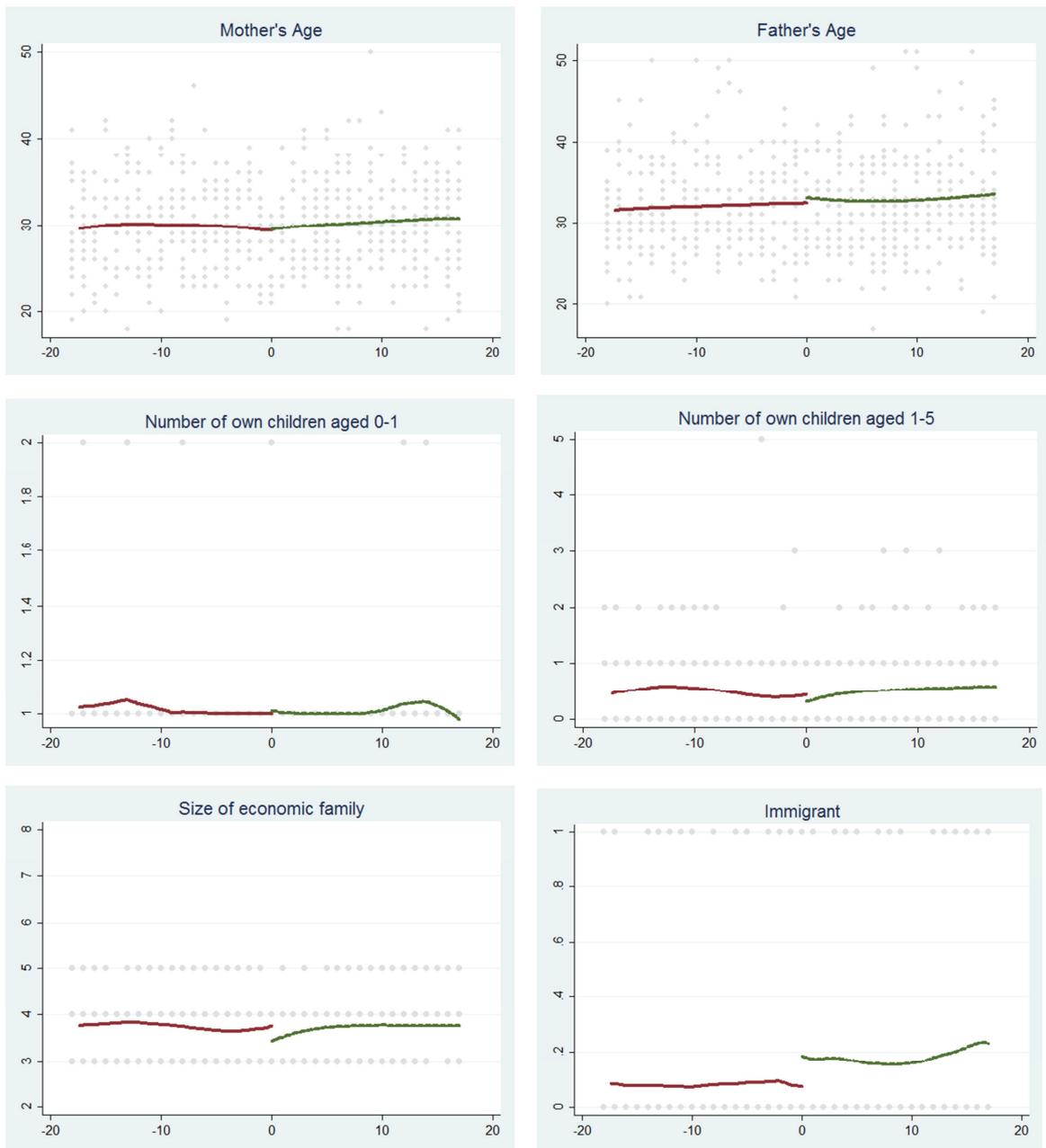
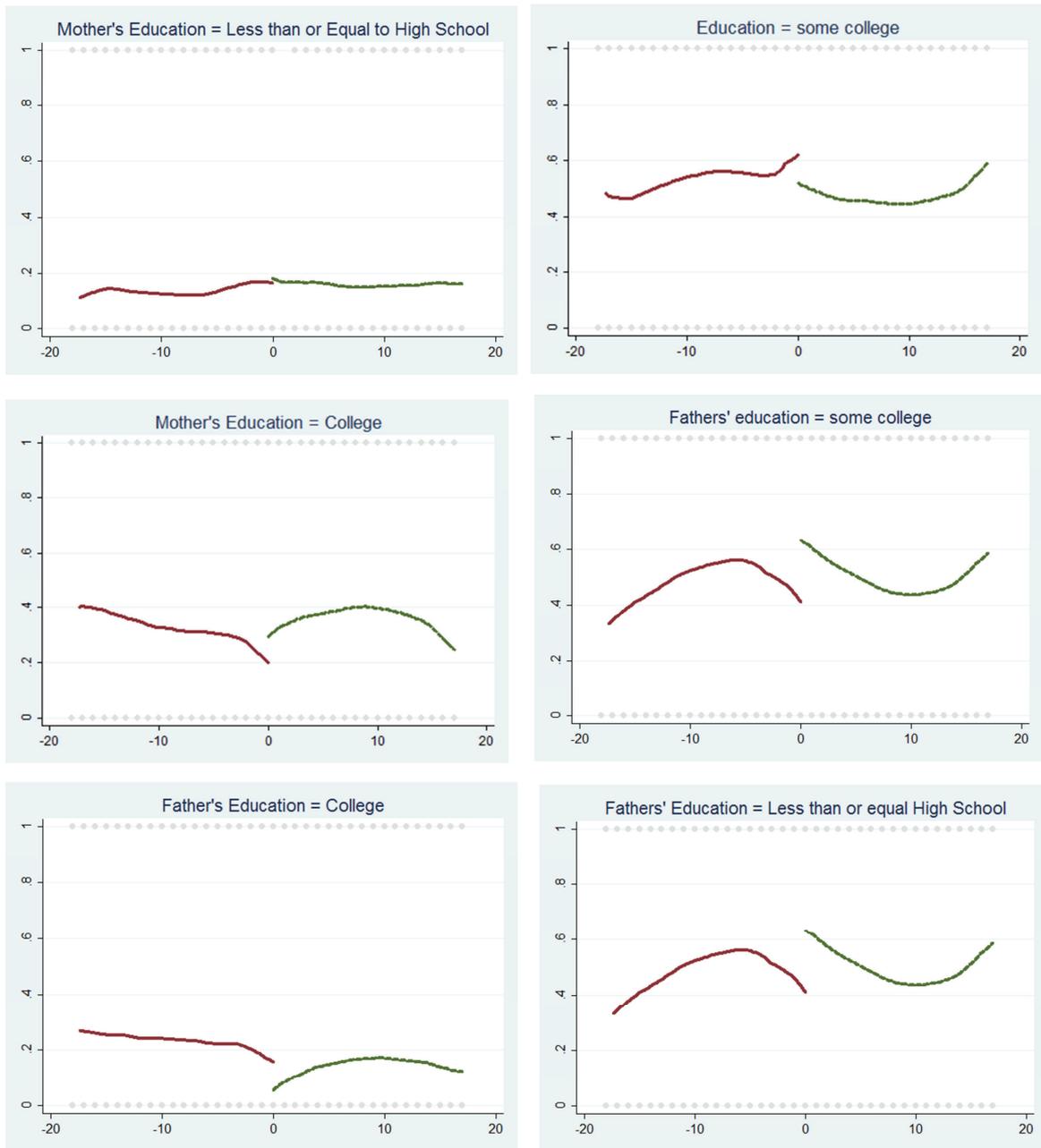
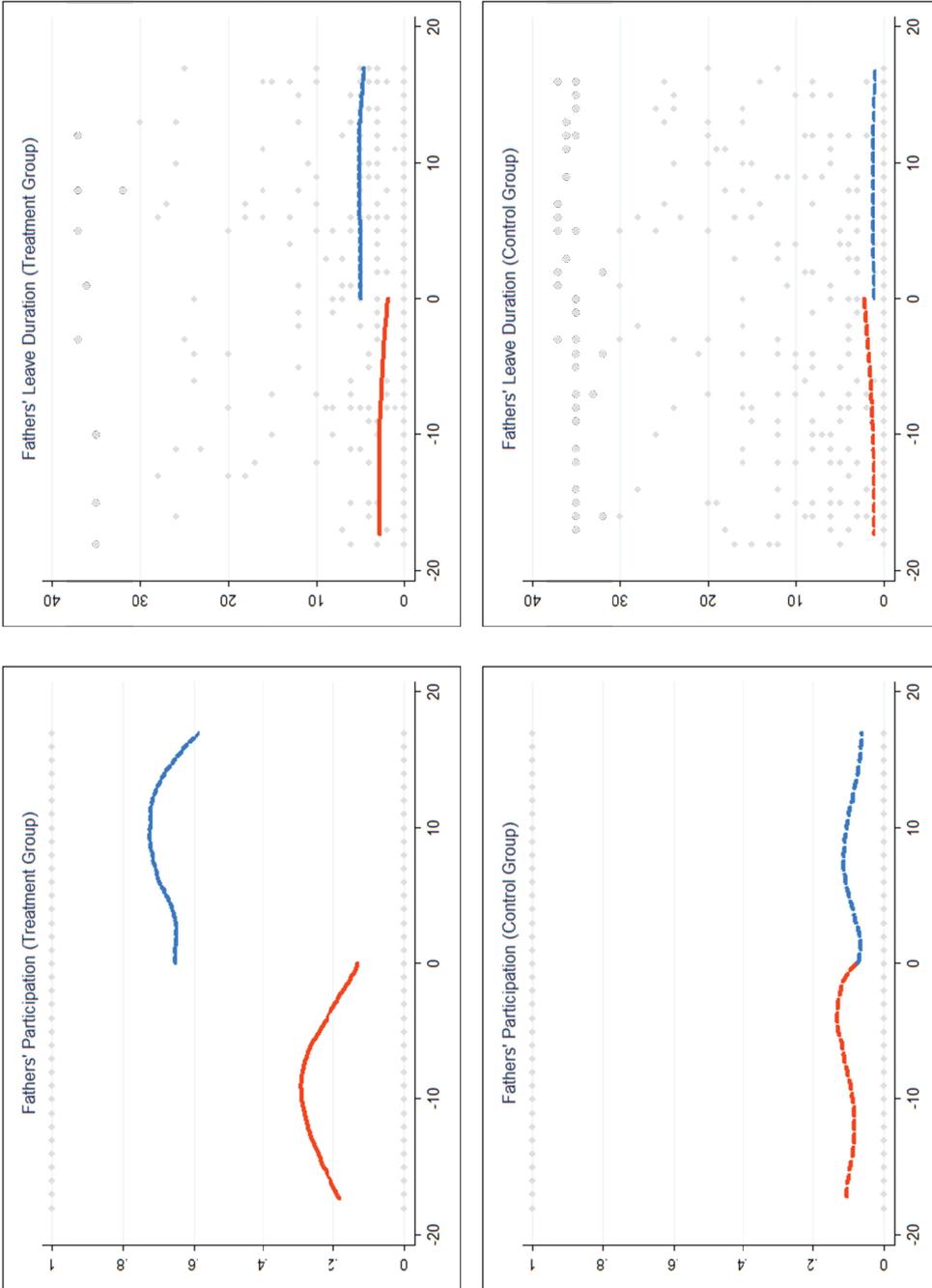


Figure 2g-2l: Discontinuities in personal and household characteristics in EICS data (contd.)



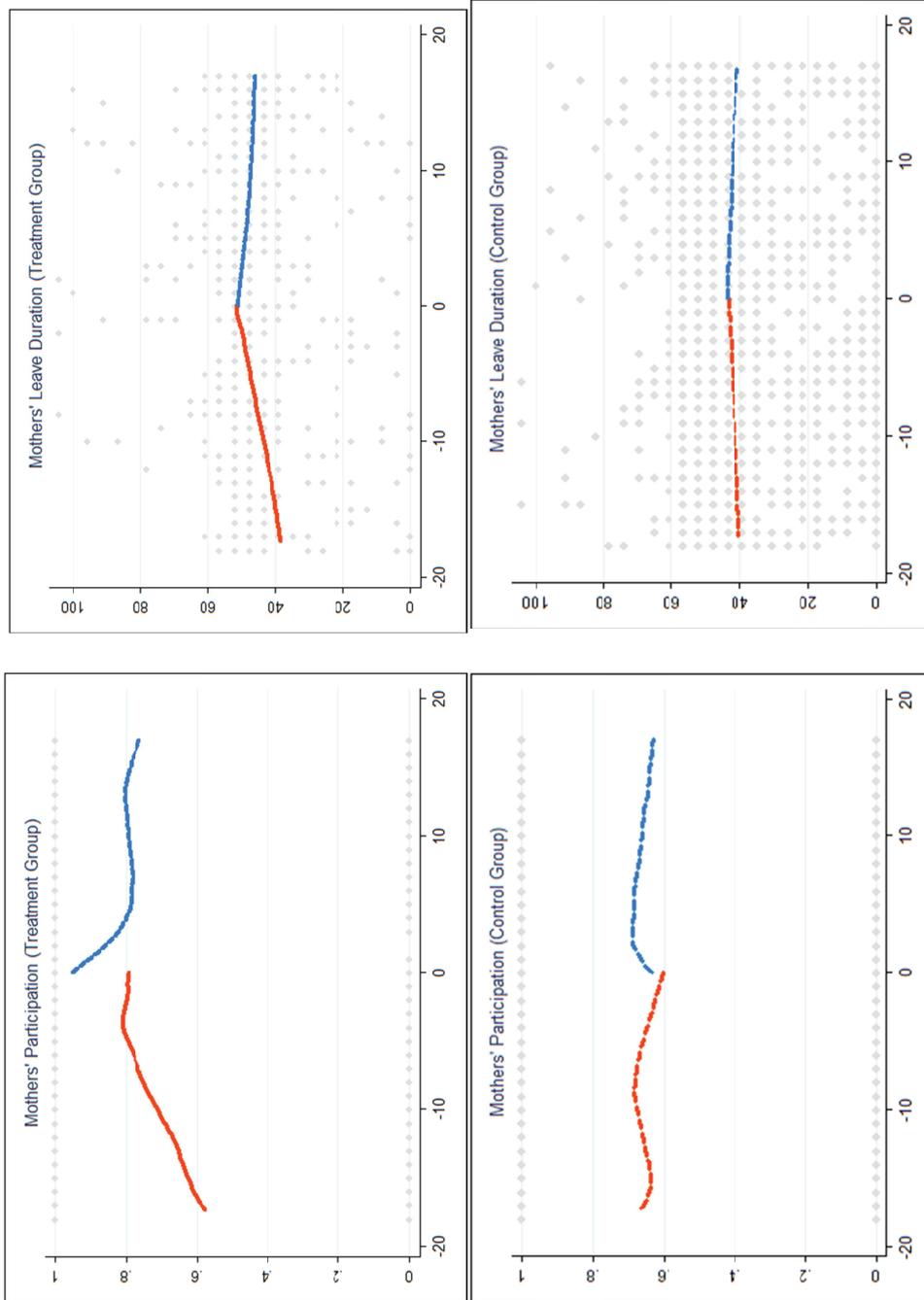
Figures 3a-3d:

### Regression Discontinuities in Fathers' Leave Behavior



Figures 4a-4d:

### Regression Discontinuities in Mothers' Leave Behavior



Graphs

correspond to regression discontinuity analyses using non-parametric local linear regression methods, the results of which are presented in Table X.

Figure 5: Trends in Fathers' Leave Participation

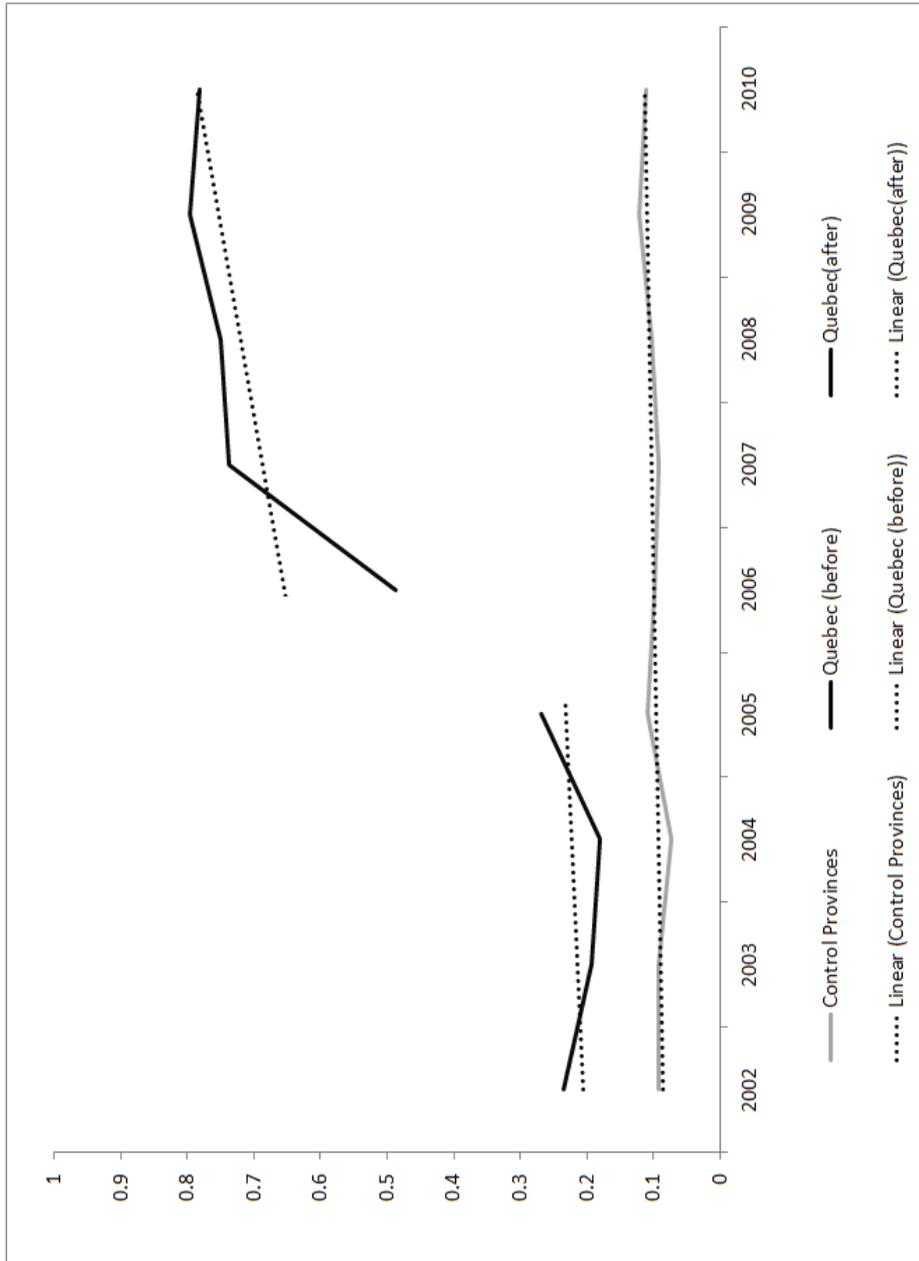


Figure 6: Google Trends in Searches for the word 'QPIP'

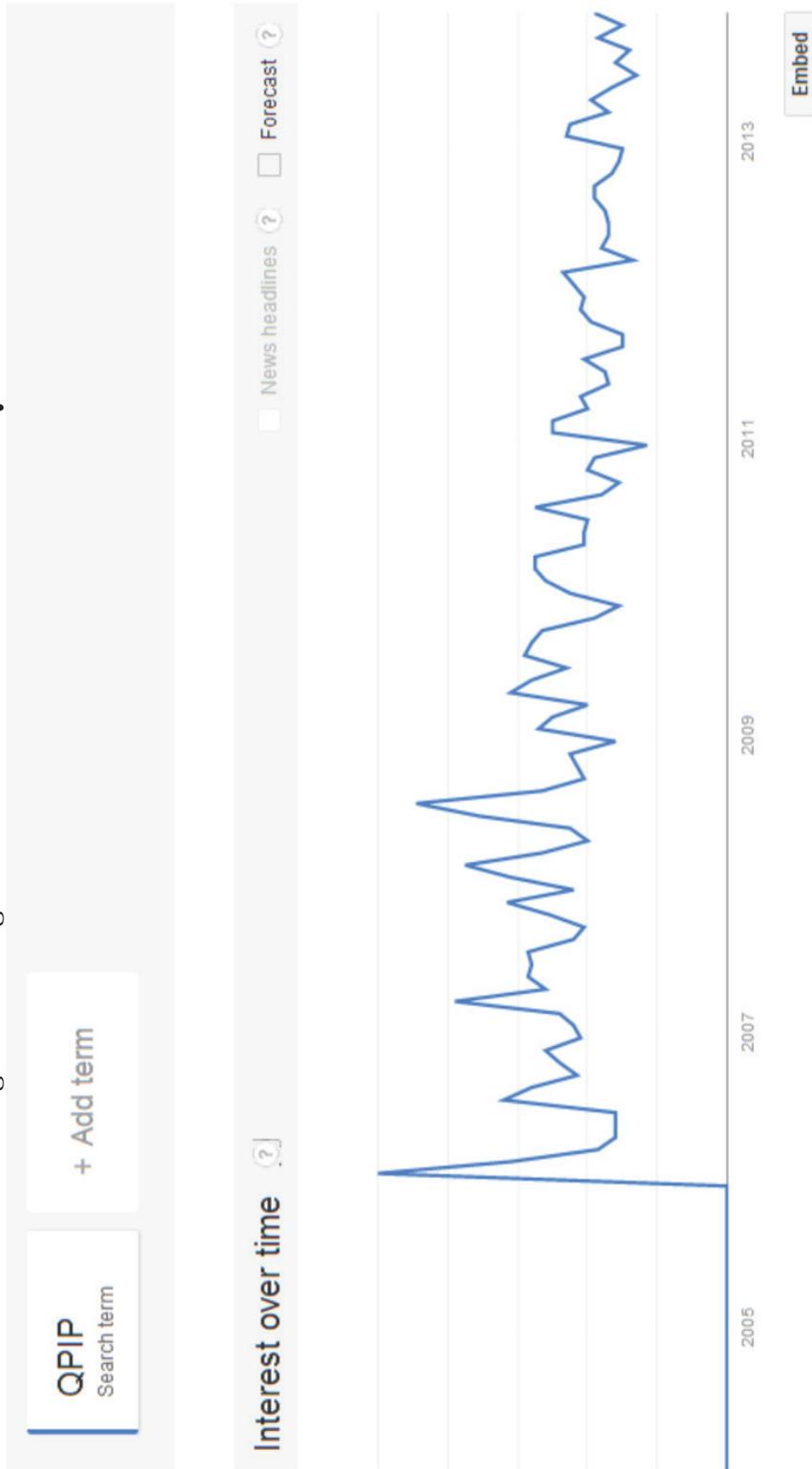
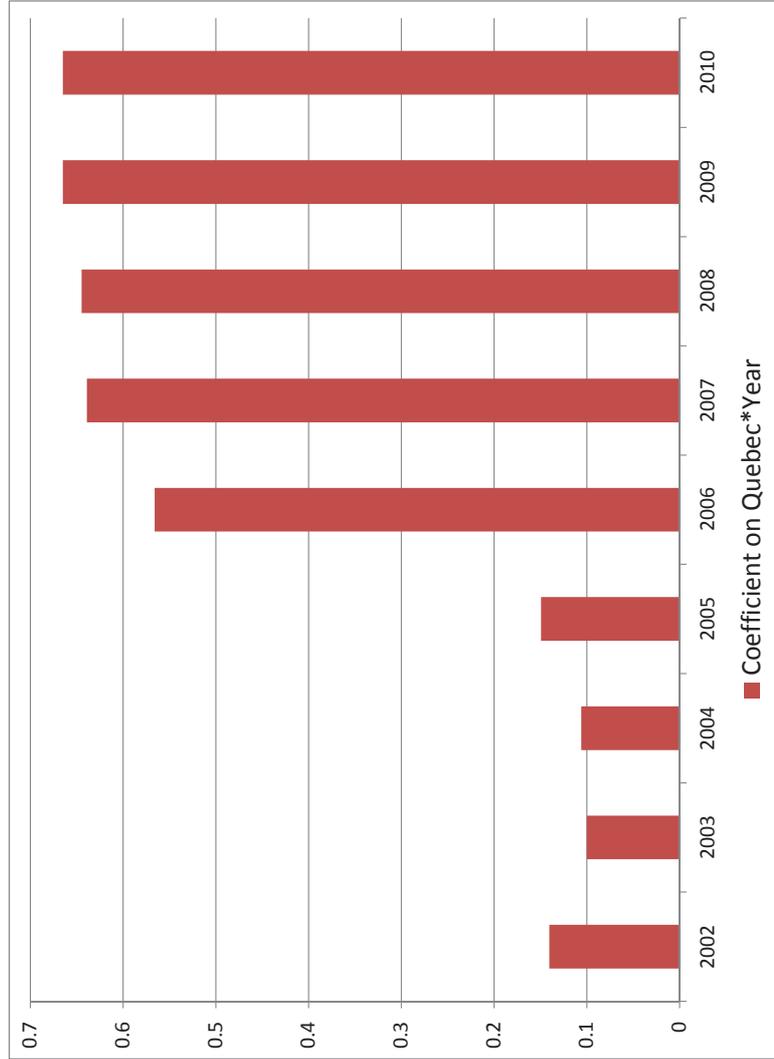


Figure 7: Event Study Graph of Fathers' Leave Participation



The event study was conducted by running a regression of the outcome on indicators for each year as well as interaction terms between an indicator for being in Quebec and indicators for each year. Graph plots coefficients from the interaction terms of Quebec and indicators for every year, and thus presents the difference between the average father in Quebec and that in other provinces in every given year between 2002-2010.

Table 1: Details of Parental Leave Programs in Canada

	<b>Employment Insurance</b>	<b>QPIP Basic Plan</b>	<b>QPIP Special Plan</b>
Eligibility	600 hours of insurable employment	\$2000 of insurable earnings	\$2000 of insurable earnings
Basic Replacement Rate	55%	70% for all maternity, & paternity leave, first seven weeks of parental leave and 55% thereafter	75%
Max insurable earnings	\$39,000	\$57,000	\$57,000
Waiting Period	2 weeks	None	None
Duration	Total 50 weeks = 15 weeks maternity leave + 35 weeks parental leave + no paternity leave	Total 55 weeks = 18 weeks maternity leave + 32 weeks parental leave + 5 weeks paternity leave	Total 40 weeks = 15 weeks maternity leave + 25 weeks parental leave + 3 weeks paternity leave

Source: Table constructed by author using information from the Digest of Benefit Entitlement Principles, available at

[http://www.servicecanada.gc.ca/eng/ei/digest/chp12\\_appendix.shtml](http://www.servicecanada.gc.ca/eng/ei/digest/chp12_appendix.shtml). For features which may change on a yearly basis, such as the amount of maximum insurable earnings, figures provided are for 2006.

Table 2: Regression Discontinuities in Personal and Household Characteristics in EICS data

	Mother's Age	Fathers' Age	Children aged 0-1	Children aged 1-5	Family Size	Immigrant
RD Estimate	0.138 [0.894]	0.624 [0.610]	0.012 [0.340]	-0.130 [0.432]	-0.324 [0.118]	0.110 [0.410]
Bandwidth	16.69	17.14	4.06	9.65	9.80	8.147

Table 2 (contd.): Regression Discontinuities in Personal and Household Characteristics in EICS data

	Mother's Educ $\leq$ High School	Mother's Educ = Some College	Mother's Educ = College	Fathers' Educ $\leq$ High School	Fathers' Educ = Some College	Fathers' Educ = College
RD Estimate	0.014 [0.913]	-0.100 [0.540]	0.091 [0.484]	-0.101 [0.264]	0.222 [0.191]	-0.123 [0.464]
Bandwidth	8.46	8.94	8.80	8.28	8.94	8.76

Note: Table presents results from non-parametric RD analysis of the treatment group (Quebec) to detect discontinuities at the cutoff in personal and household characteristics between parents who experienced a birth before versus after the cutoff. Robust p-values are presented in square brackets. Results are from local linear regressions with the optimal bandwidth selected using the plug-in procedure suggested by Imbens and Kalyanaraman (2009)

Table 3: Mean Characteristics of Full Sample of EICS Data

	Control 2002-2005	Control 2006-2010	Quebec 2002-2005	Quebec 2006-2010	Difference in Differences
Age of Mother	30.588	30.656	29.386	30.376	<b>0.922</b>
Age of Spouse/Partner	32.944	33.019	32.198	32.729	0.456
Legally Married	0.863	0.845	0.364	0.392	0.046
Immigrant	0.215	0.209	0.108	0.175	<b>0.073</b>
Family Size	3.793	3.834	3.719	3.763	0.011
Number of children aged 0-1	1.012	1.018	1.011	1.015	0.0000
Number of children aged 1-5	0.528	0.581	0.498	0.526	-0.012
Number of children aged 6-17	0.244	0.259	0.207	0.253	0.037
Mother has high school degree or less	0.244	0.210	0.163	0.164	0.029
Mother has some college	0.412	0.415	0.531	0.465	<b>-0.068</b>
Mother has college degree	0.342	0.374	0.305	0.372	0.038
Father has high school degree or less	0.277	0.262	0.246	0.179	-0.050
Father has some college	0.430	0.431	.508	0.511	-0.006
Father has college degree	0.291	0.306	0.245	0.309	<b>0.046</b>

Notes:

The sample is from benefit claims data collected by the Employment Insurance coverage survey from 2002-2010. The sample comprises mothers aged 18-40 with a partner/spouse in the household and a child under one year old.

Double Differences in bold are significant at the 5% level.

Table 4: Mean Characteristics of GSS Data

	Parents with youngest child aged 1-3				Parents with youngest child aged 5-8				Difference-in-Differences		
	Control		Quebec		Control		Quebec		Quebec	2010	Difference-in-Differences
	2005	2010	2005	2010	2005	2010	2005	2010	2010	Differences	
<b>Fathers' Characteristics (N=1606)</b>											
Age	34.897	35.031	34.407	34.431	39.933	40.126	39.661	39.523	39.523	0.210	
Age of spouse	36.256	33.048	31.933	30.982	40.929	38.150	37.161	37.617	37.617	-0.980	
Canadian Born	0.767	0.735	0.855	0.694	0.765	0.686	0.829	0.879	0.879	<b>-0.257</b>	
Born in Quebec	0.027	0.026	0.824	0.671	0.018	0.028	0.812	0.828	0.828	-0.159	
Age of Youngest child	1.905	1.675	1.624	1.571	6.526	6.519	6.692	6.548	6.548	0.312	
Children under 14	1.963	1.895	1.842	1.867	1.947	1.877	1.905	1.892	1.892	0.036	
Children in Household	1.939	1.920	1.857	1.888	2.095	2.003	2.127	1.929	1.929	0.155	
Legally Married	0.889	0.852	0.499	0.526	0.897	0.926	0.530	0.457	0.457	0.168	
Household size	4.023	4.033	3.875	4.009	4.20	4.084	4.146	3.963	3.963	0.189	
<b>Mothers' Characteristics (N=1936)</b>											
Age	32.465	32.600	31.748	31.111	36.945	38.748	37.042	38.485	38.485	-0.412	
Age of Spouse	35.502	37.00	32.600	35.339	37.576	43.405	39.461	40.798	40.798	0.728	
Canadian Born	0.728	0.6744	0.786	0.814	0.729	0.692	0.803	0.754	0.754	0.094	
Quebec Born	0.022	0.018	0.753	0.799	0.729	0.023	0.747	0.733	0.733	0.064	
Age of Youngest child	1.841	1.606	1.853	1.534	6.400	6.483	6.610	6.232	6.232	0.369	
Children under 14	1.828	1.929	1.736	1.777	1.952	2.012	2.009	1.941	1.941	0.068	
Children in Household	1.827	1.924	1.730	1.800	2.160	2.075	2.086	2.038	2.038	-0.063	
Legally Married	0.897	0.864	0.458	0.447	0.917	0.917	0.568	0.534	0.534	0.0539	
Household size	3.975	4.032	3.813	3.889	4.266	4.236	4.095	4.068	4.068	0.016	

Notes: Sample is from Rounds 19 and 24 of the General Social Survey of Canada. The sample comprises parents aged 18-50 who report being in a cohabitating or married relationship and whose youngest child is aged between one and eight years old. The last column presents difference-in-difference in means across years, provinces and children's age groups. Triple differences marked in bold are significant at the 5% level.

Table 5: RD Estimates of Immediate effect of QPIP on Parents' Leave Behavior

	(1)	(2)	(3)	(4)
OUTCOMES:	Fathers' Participation	Fathers' Leave Duration	Mothers' Participation	Mothers' Leave Duration
<b>I. RD Analysis for Quebec</b>				
Jump at Cutoff	0.536*** [0.000]	3.088* [0.058]	0.155 [0.176]	-0.2777 [0.931]
Bandwidth	8.692	18.968	8.568	24.874
<b>II. RD Analysis of Quebec, including Personal Covariates</b>				
Jump at Cutoff	0.531*** [0.000]	3.126** [0.044]	0.188 [0.147]	0.930 [0.931]
Bandwidth	8.791	18.968	8.568	24.874
<b>III. RD Analysis of Control Provinces</b>				
Jump at cutoff	-0.006 [0.922]	-1.332 [0.114]	-0.008 [0.925]	-0.207 [0.927]
Bandwidth	6.143	14.733	7.11	20.669
<b>IV. RD Analysis of Control Provinces, including Personal Covariates</b>				
Jump at cutoff	-0.026 [0.685]	-1.430 [0.082]	0.036 [0.667]	-0.111 [0.960]
Bandwidth	6.143	14.733	7.11	20.669

Notes:

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table presents results from non-parametric regression discontinuity analyses using local linear regression methods. Sample restricted to births to mothers in Quebec aged 18-40 in a cohabitating or married relationship. The running variable comprises month of birth, with bin size of 1 month each. Optimal Bandwidth chosen by the plug-in procedure suggested by Imbens and Kalyanaraman (2009). Outcomes for participation rates are indicators for whether the respondent/spouse has taken or plans to take leave while leave duration is measured as weeks of leave planned or taken by respondent or spouse. Personal covariates include age and education of mother and spouse as well as household size, religion and number of children in various age groups. Heteroskedasticity-robust p-values are presented in square brackets.

Table 6: Difference-in-Differences in Parents' Leave Outcomes

	(1)	(2)	(3)	(4)
OUTCOMES:	Fathers' Participation	Fathers' Leave Duration	Mothers' Participation	Mothers' Leave Duration
<b>I. Simple D-in-D Specification</b>				
Quebec * Post-Reform	0.524*** [0.00]	3.226* [0.07]	0.114** [0.04]	2.748 [0.10]
N	9292	7157	9292	6444
<b>II. D-in-D Specification including Personal Covariates and Province &amp; Year- Fixed Effects</b>				
Quebec * Post-Reform	0.520*** [0.00]	3.241 [0.18]	0.121** [0.05]	2.767* [0.07]
N	9289	7156	9289	6441
<b>III. D-in-D Specification including Personal Covariates and Province &amp; Year- Fixed Effects and Province-Specific Trends</b>				
Quebec * Post-Reform	0.472*** [0.00]	2.509 [0.33]	0.076 [0.69]	3.02 [0.27]
N	9289	7156	9289	6441

Notes:

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table presents difference-in-difference estimates of parents' leave behavior between Quebec and Other Provinces before and after the introduction of QPIP in 2006. Outcomes for participation rates are indicators for whether the respondent/spouse has taken or plans to take leave while leave duration is measured as weeks of leave planned or taken by respondent or spouse. Sample spans 2002-2010 of the EICS data and comprises mothers aged 18-40 in cohabitating or married relationships who have experienced a birth in the last year. Set of personal and household characteristics include age of respondent and spouse, legal marital status, indicator for immigrant, household size, number of children aged 0-1 and 1-5, and various education levels of respondent and spouse. Heteroskedasticity-robust p-values, clustered at the province level and calculated using wild bootstrap procedures, are presented in brackets.

Table 7: Program Effect of QPIP on Joint Distribution of Parental Leave

	Mother takes 0 months of leave	Mother takes 1-5 months of leave	Mother takes 6-9 months of leave	Mother takes 10-11 months of leave	Mother takes 12+ months of leave
Father takes 0 weeks of leave	0.005 [0.772]	-0.021 [0.534]	-0.083 [0.139]	-0.115 [0.158]	-0.236** [0.019]
Father takes 1-5 weeks of leave	-0.007** [0.019]	0.006 [0.732]	0.040* [0.079]	0.108*** [0.000]	0.276*** [0.000]
Father takes 6+ weeks of leave	-0.006 [0.237]	0.008 [0.495]	-0.009 [0.110]	0.043*** [0.000]	-0.006 [0.257]

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table shows the DD effect of QPIP on the likelihood of various combinations of mothers and fathers' leave duration. Columns represent mothers' leave duration in months and rows represent fathers' duration in weeks; hence each cell represents a different outcome which is an indicator for a family choosing a particular combination of mothers' and fathers' leave durations. Table presents results from difference-in-difference linear regressions using Quebec as the treatment group and other provinces as the control group. The EICS Sample and comprises mothers aged 18-40 in a cohabitating or married relationship who have experienced a birth in the last year. All regressions include controls for personal and household characteristics such as age of respondent and spouse, legal marital status, indicator for immigrant, household size, number of children aged 0-1 and 1-5, various education levels of respondent and spouse, province- and year- fixed effects, as well as province-specific time trends. Heteroskedasticity-robust p-values clustered at the province level and calculated using wild bootstrap procedures are presented in brackets.

Table 8: Heterogeneous program effects of QPIP on Parents' Leave Outcomes

OUTCOMES:	(1) Fathers' Participation	(2) Fathers' Leave Duration	(3) Mothers' Participation	(4) Mothers' Leave Duration
Quebec * Post-Reform	0.531*** [0.00]	3.003 [0.25]	0.057 [0.65]	1.865 [0.43]
Low-income * Quebec * Post-Reform	-0.188*** (0.00)	-1.699*** (0.00)	0.059 (0.98)	4.598 (0.19)
N	9289	7156	9289	6441

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table reports the heterogeneous program effects of QPIP by exploiting variation in time, province and across income groups in difference-in-difference-in-difference regressions. Regressions control for Personal Covariates and Province & Year- Fixed Effects and Province-Specific Trends. Low-income households are those reporting annual income below \$CAD30,000. Outcomes for participation rates are indicators for whether the respondent/spouse has taken or plans to take leave while leave duration is measured as weeks of leave planned or taken by respondent or spouse. Sample spans 2002-2010 of the EICS data and comprises mothers aged 18-40 in cohabitating or married relationships who have experienced a birth in the last year. Set of personal and household characteristics include age of respondent and spouse, legal marital status, indicator for immigrant, household size, number of children aged 0-1 and 1-5, and various education levels of respondent and spouse. Heteroskedasticity-robust p-values, clustered at the province level and calculated using wild bootstrap procedures, are presented in brackets.

Table 9: Baseline Sex Specialization in Quebec before the Reform

	Fathers	Mothers	$\frac{Fathers}{Mothers}$
Time in Non-market work	158.70	312.83	0.51
Time in Childcare	88.69	165.42	0.54
- Interactive childcare	42.56	61.96	0.69
- Routine childcare	37.77	87.72	0.43
- Travel & Communication	8.36	15.73	0.53
Time in Domestic Work	70.01	147.41	0.47
- Cooking	31.78	70.88	0.45
- Housekeeping	16.04	64.38	0.25
- Shopping	48.91	50.86	0.96
- Other chores	12.36	10.45	1.18
- Maintenance & Repairs	9.80	1.69	5.79
Time at home	873.68	1,134.92	0.76
Time with family	409.07	509.32	0.80
Time in Paid Work	416.75	168.54	2.47
Time at workplace	314.44	113.14	2.77
Annual Income	52,691	20,904	2.52

Table presents means from the GSS sample for mothers and fathers aged 18-50 in married or cohabitating relationships whose youngest child is aged 1-3 years old who were observed in Quebec in 2005.

Table 10: Effect of Exposure to QPIP on Parents' Market Outcomes

OUTCOMES:	(1)	(2)	(3)	(4)
	Time in Paid Work	Time at Workplace	Time at Workplace if employed	Annual Income
<b>A. FATHERS</b>				
<b>Double Differences (N=993):</b>				
Quebec * Post-reform	-41.98*** [2.64]	-11.87 [0.613]	2.583 [0.923]	-2035 [2568]
<b>Triple Differences (N=1606):</b>				
Child Under 3 * Quebec * Post-Reform	-181.637*** [19.43]	-107.063*** [0.008]	-124.09*** [0.009]	-11890.84 [4030.151]
<b>B. MOTHERS</b>				
<b>Double Differences (N=1115):</b>				
Quebec * Post-reform	60.147*** [9.924]	52.28** [0.023]	79.907*** [0.002]	5202.72*** [1075.918]
<b>Triple Differences (N=1939):</b>				
Child Under 3 * Quebec * Post-Reform	35.443 [22.936]	27.138*** [0.039]	87.72*** [0.000]	9466.455*** [1696.315]

Notes:

\* $p < 0.10$  \*\* $p < 0.05$  \*\*\* $p < 0.01$ 

Robust province-clustered standard errors are presented in brackets. Sample restricted to mothers and fathers aged 18-50 in married or cohabitating relationships whose youngest child is aged 1-8 years old. In the Double-differences setup the sample only includes parents whose youngest child is aged 1-3 OR 5-8 and the regressions exploit variation across provinces and time. In the triple-differences setup the sample pools both groups and regressions exploit variation across province, time and age of child.

Table 11: Effect of Exposure to QPIP on Parents' Non-market outcomes

OUTCOMES:	(1)	(2)	(3)	(4)	(5)
	Total Time in Non-market Work	Time in Domestic Work	Time in Childcare	Total Time Spent at Home	Time with Family Members
<b>A. FATHERS</b>					
<b>Double Differences (N=993):</b>					
Quebec * Post-reform	39.88*** [6.090]	19.33*** [5.036]	20.54*** [3.719]	42.93* [16.24]	-11.237 [26.97]
<b>Triple Differences (N=1606):</b>					
Child Under 3 * Quebec * Post-Reform	47.288** [19.43]	46.305** [16.17]	0.983 [6.808]	75.885*** [0.71]	24.47* [12.63]
<b>B. MOTHERS</b>					
<b>Double Differences (N=1115):</b>					
Quebec * Post-reform	30.828** [10.1]	-18.02** [7.487]	48.85*** [10.655]	-30.34* [0.067]	-60.74** [20.33]
<b>Triple Differences (N=1939):</b>					
Child Under 3 * Quebec * Post-Reform	38.827*** [11.95]	-28.296*** [9.243]	67.123*** [11.39]	-33.936 [0.163]	-12.159 [8.27]

Notes:

\*p&lt;0.10 \*\*p&lt;0.05 \*\*\*p&lt;0.01

Robust province-clustered standard errors are presented in brackets. Sample restricted to mothers and fathers aged 18-50 in married or cohabitating relationships whose youngest child is aged 1-8 years old. In the Double-differences setup the sample only includes parents whose youngest child is aged 1-3 OR 5-8 and the regressions exploit variation across provinces and time. In the triple-differences setup the sample pools both groups and regressions exploit variation across province, time and age of child

Table 12: Effect of Exposure to QPIP on Parents' time in Non-Market Tasks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
OUTCOMES:	Maintenance and repairs	Cooking	Housekeeping	Shopping	Other	Interactive Childcare	Routine Childcare	Travel + Communication
<b>A. FATHERS</b>								
<b>Double Differences</b>								
Quebec * Post-reform	-0.943 [1.189]	2.744 [1.759]	9.912** [3.175]	-12.40*** [2.837]	7.618 [6.044]	8.771*** [2.419]	9.223*** [2.177]	4.946*** [0.885]
<b>Triple Differences</b>								
Child Under 3* Quebec * Post-Reform	19.075*** [8.326]	1.878 [2.373]	4.733 [6.345]	38.639*** [11.61]	20.618** [7.330]	0.588 [4.460]	7.436* [3.867]	-4.470 [2.666]
<b>B. MOTHERS</b>								
<b>Double Differences</b>								
Quebec * Post-reform	8.111*** [1.644]	-16.47*** [4.950]	-8.105* [5.871]	-10.60*** [3.360]	-1.559 [2.504]	-1.019 [10.145]	57.315*** [6.255]	-7.442 [4.087]
<b>Triple Differences</b>								
Child Under 3* Quebec * Post-Reform	6.192 [3.982]	-17.009*** [5.169]	-25.804*** [8.576]	3.491 [7.505]	8.325** [3.256]	22.469*** [7.111]	43.246*** [6.821]	1.408 [4.895]

\*p<0.10 \*\*p<0.05 \*\*\*p<0.01

The outcomes of interest are time spent in maintenance and repairs (including interior and exterior maintenance and repairs, vehicle maintenance and other home improvements), cooking (including meal preparation, baking, brewing, preserving food, and meal cleanup), shopping (including for groceries, gas, plants/flowers, take-out food, videos, sports supplies durables, services etc, and reading/research related to these purchases) , housekeeping (indoor an outdoor cleaning, laundry/ironing/folding, mending shoes and dressmaking/sewing), and other domestic work (including gardening, grounds maintenance, pet and plant care, management of household activities and finances, cutting firewood, packing or unpacking luggage, car, moving boxes or groceries, and travel to/from other domestic work. The outcomes of interest are all time spent in interactive childcare(including helping/teaching/reprimanding, reading/talking/conversing/playing with children) and routine childcare(baby Care/child Care, unpaid babysitting, food preparation and feeding, putting children to bed or getting ready for school, personal, medical and emotional care if children) and travel/communication related to childcare (such as visiting childcare and schools, communicating with teachers and childcare workers, reviewing report cards and homework logs, organizing play dates and parties for children, and travel to/from personal care activities for children). Robust province-clustered standard errors are presented in brackets. Change is calculated from the respective baseline for mothers and fathers given in Table 2.

## Appendix 1: Theoretical Framework

I develop a model of leave stigma, based on Moffitt (1998), where in addition to the opportunity cost of taking leave parents can face a ‘stigma’ cost to participating in the leave program. This stigma cost could encompass any number of things: personal distaste to taking leave, social stigma, peer pressure or workplace hostility etc. This model can accommodate both the initial gender gap in participation rates as well as the intra-household flypaper effect produced by QPIP, as I will elaborate below.

### 7.1 Basic Model

Each parent has a utility function of the form

$$U(H, Y + \lambda PB), \quad (5)$$

where  $H$  is the fraction of time worked,  $Y$  is wage income,  $B$  is benefit income and  $P$  is an indicator taking value 1 if the person chooses to participate in leave. Importantly,  $\lambda$  represents a discount factor due to stigma associated with benefit income, i.e. a higher stigma is associated with a lower value of  $\lambda$  and therefore greater discounting.  $U(\cdot)$  is a monotonic, strictly quasi-concave utility function that is decreasing in time worked, and increasing in benefit and wage income.

Each parent aims to maximize (8) subject to a wage income constraint,

$$Y = wH, \quad (6)$$

with  $w$  as wage, and also a benefit income constraint,

$$B = rw(1 - H), \quad (7)$$

where  $r$  is the income replacement rate, and  $1-H$  is time taken for parental leave.

Substituting (9) and (10) into (8) gives us the following:

$$\max_{P, H} U(H, wH + (1 - H)). \quad (8)$$

I first solve for  $H$  taking  $P$  as fixed. Maximizing (11) with respect to  $H$  gives the marginal condition:

$$U_1/U_2 = w(1 - rP\lambda) \quad (9)$$

Equation (12) above captures the tradeoff between working and not working, giving us some intuition about the net effective wage. If the person chooses not to participate i.e.  $P=0$  then the net wage is just  $w$ , the wage income from a unit of work. If the person chooses to participate, i.e.  $P=1$ , and there is no stigma, i.e.  $\lambda = 1$ , the net effective wage is  $w(1 - r)$ , or the simple difference between wage and benefit for that hour of work. If the person chooses to participate, i.e.  $P=1$ , and there is a stigma cost, the discount factor of  $\lambda \in (0, 1]$  is such that the marginal utility from wage income is higher than that from benefit income. In that case, the net effective wage is higher at  $w(1 - r\lambda)$ .

The choice of  $H$  therefore is a function that is increasing in the net effective wage  $w(1 - rP\lambda)$  and decreasing in the non-wage income  $rPw\lambda$ :

$$H = H[w(1 - rP\lambda), rPw\lambda] \quad (10)$$

The choice of  $P$  in turn depends on whether maximum utility would be higher under  $P=0$  or  $P=1$ . Define  $H^*$  as the optimal utility-maximizing value of  $H$  from equation (13) above. Then the indirect utility function takes the form:

$$V[P, H] = V[P, w(1 - rP\lambda), rPw\lambda] = U[H^*, wH^* + \lambda Prw(1 - H^*)]. \quad (11)$$

The decision of whether to participate depends on whether  $V$  is higher with  $P=1$  or  $P=0$ . Let  $P_{diff}$  is the difference in indirect utility when one participates  $V_{P=1}$  and does not participate  $V_{P=0}$ . Then the decision of whether to participate is conditional on

$$P_{diff} = V_{P=1}[1, w(1 - r\lambda), rw\lambda] - V_{P=0}[0, w, 0] > 0. \quad (12)$$

Note that  $V_{P=1}$  and  $P_{diff}$  are increasing in  $r$  and  $\lambda$ .

The person will choose whether or not to participate according to:

$$P^* = \begin{cases} 1 & \text{if } P_{diff} > 0 \\ 0 & \text{otherwise} \end{cases}, \quad (13)$$

and then choose their hours of work according to:

$$H^* = \begin{cases} H[w(1 - r\lambda)] & \text{if } P_{diff} > 0 \\ H[w, 0] & \text{otherwise} \end{cases} \quad (14)$$

## 7.2 Comparative Statics

To consider the impact of QPIP we examine how improved benefits (an increase in  $r$ ) and the daddy-only label (an increase in  $\lambda$  for men) affect the above solution.

### (i) An increase in $r$

We know that  $\frac{\partial P_{diff}}{\partial r} > 0$  since:

$$\frac{\partial P_{diff}}{\partial w(1 - r\lambda)} < 0; \frac{\partial w(1 - r\lambda)}{\partial r} < 0 \quad (15)$$

and

$$\frac{\partial P_{diff}}{\partial rw\lambda} > 0; \frac{\partial rw\lambda}{\partial r} > 0. \quad (16)$$

Thus an increase in  $r$  will increase  $P_{diff}$ , making it more likely a parent will participate in leave. Further, increased  $r$  also causes  $H^*$  to fall which means less time worked since  $\frac{\partial H^*}{\partial r} < 0$  as a result of:

$$\frac{\partial H^*}{\partial w(1-r\lambda)} > 0; \frac{\partial w(1-r\lambda)}{\partial r} < 0 \quad (17)$$

and

$$\frac{\partial H^*}{\partial rw\lambda} < 0; \frac{\partial rw\lambda}{\partial r} > 0. \quad (18)$$

Increased income replacement under QPIP should have made it more likely that every parent participates in leave and increased the amount of leave consumed. However, it should be noted that since the improved benefits were offered to both mothers and fathers, there is no reason to believe this would elicit an especially large response from fathers. To the contrary, given the considerable evidence that married women have higher elasticities of labor supply than married men (Filer et al., 1996; Juhn and Murphy, 1997; Blau and Kahn, 2007), we might even expect mothers to respond more strongly than fathers to improved benefits.

**(ii) An increase in  $\lambda$**

We know that  $\frac{\partial P_{diff}}{\partial \lambda} > 0$  since:

$$\frac{\partial P_{diff}}{\partial w(1-r\lambda)} < 0; \frac{\partial w(1-r\lambda)}{\partial \lambda} < 0 \quad (19)$$

and

$$\frac{\partial P_{diff}}{\partial rw\lambda} > 0; \frac{\partial rw\lambda}{\partial \lambda} > 0. \quad (20)$$

Therefore a higher discount factor raises  $P_{diff}$  and make it more likely a parent will participate in leave. A higher discount factor also reduces  $H^*$  since  $\frac{\partial H^*}{\partial \lambda} < 0$  as a result of:

$$\frac{\partial H^*}{\partial w(1-r\lambda)} > 0; \frac{\partial w(1-r\lambda)}{\partial \lambda} < 0 \quad (21)$$

and

$$\frac{\partial H^*}{\partial rw\lambda} < 0; \frac{\partial rw\lambda}{\partial \lambda} > 0. \quad (22)$$

This analysis of the effect of stigma on a parents' leave consumption can explain three important patterns documented in this paper. First, since mothers have lower stigma to begin with, this difference in discounting could contribute to the large gender gap in leave participation we see prior to QPIP. Second, since QPIP's daddy-only label may have affected fathers' stigma so that  $\lambda_{Fathers}^{EI} < \lambda_{Fathers}^{QPIP} < \lambda_{Mothers} \leq 1$ , fathers may have experienced a reduction in monetary and stigma costs whereas mothers only experienced the former - which would explain why fathers increased leave consumption more under QPIP than did mothers. Third, given previous evidence suggesting not only that more educated people are more egalitarian but also that egalitarian values are adopted more quickly by educated people and then trickle down to the less educated, differences in initial stigma as well as heterogeneous effects of the daddy-only label on stigma could explain why low-income fathers respond more weakly to QPIP than fathers from higher-income backgrounds.

## Appendix 2: Robustness Checks of Regression Discontinuity

Table A2.1 Non-Parametric RD Analysis of Quebec, Trimming around cutoff

	Fathers' Participation	Fathers' Leave Duration	Mothers' Participation	Mothers' Leave Duration
Jump at Cutoff in Quebec	0.615*** [0.001]	1.698 [0.058]	0.262 [0.113]	4.166 [0.217]
Bandwidth	9.104	19.899	8.884	24.408

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table presents results from RD regressions to detect discontinuities in outcomes at the point of cutoff. Regressions conducted non-parametrically using local linear regression methods, and optimal bandwidth selected using the plug-in procedure suggested by imbens2009. Births from January 2006 and December 2005 are excluded from this sample. Robust p-values presented in square brackets.

Table A.2.2 Parametric RD Analysis of Quebec, using various Bandwidths<sup>30</sup>

	Fathers' Participation	Fathers' Leave Duration	Fathers' Duration	Mothers' Participation	Mothers' Leave Duration	Mothers' Participation	Mothers' Leave Duration	Mothers' Duration	Mothers' Leave Duration
<b>Bandwidth = 24 months</b>									
RD Estimate	0.501*** [0.000]	0.521*** [0.000]	3.589* [0.079]	3.611* [0.082]	0.048 [0.683]	0.069 [0.588]	-0.780 [0.894]	1.317 [0.818]	
Includes Personal and Household Characteristics	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Observations	630	630	613	613	630	630	482	482	
<b>Bandwidth = 18 months</b>									
RD Estimate	0.509*** [0.000]	0.619*** [0.002]	2.421 [0.264]	2.52 [0.228]	-0.048 [0.646]	-0.022 [0.838]	-1.612 [0.737]	-0.325 [0.945]	
Includes Personal and Household Characteristics	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Observations	806	806	786	786	806	806	617	617	
<b>Bandwidth = 12 months<sup>31</sup></b>									
RD Estimate	0.434*** [0.000]	0.466*** [0.000]	2.421 [0.264]	2.524 [0.228]	-0.034 [0.735]	-0.002 [0.987]	0.692 [0.887]	3.182 [0.493]	
Includes Personal and Household Characteristics	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Observations	411	411	405	405	411	411	317	317	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Results from Parametric RD regressions on treatment province of Quebec to detect discontinuities in outcomes at point of cutoff. Sample comprises births in months surrounding the reform, with the window varying from 12 to 18 to 24 months on either side of 1st January 2006. Functional form selected using the F-test method suggested by Lee and Lemieux (2010). Robust p-values presented in square brackets.

## Appendix 3: Robustness Checks for Difference-in-Differences on Benefit Claims Data

Table A3.1: DD Estimate of impact on Fathers' Leave Participation, 2004-2010

Average Treatment Effect	0.521*** [0.000]	0.521*** [0.003]	0.457** [0.019]
Includes Personal Covariates and Province and Year FEs	No	Yes	Yes
Includes Province-specific Time trends	No	No	Yes
Observations	7,288	7,287	7,287

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Results from regressions to detect difference-in-differences between Quebec and other provinces over time. Outcome is an indicator regarding whether respondent's spouse has taken or plans to claim parental leave benefits. Sample is restricted to the years 2004-2010 of the EICS data to ensure comparability with data on fathers' leave duration which was only collected in those years. Sample comprises mothers aged 18-40 in cohabitating or married relationships who have experienced a birth in the last year. Set of personal and household characteristics include age of respondent and spouse, legal marital status, indicator for immigrant, household size, number of children aged 0-1 and 1-5, and various education levels of respondent and spouse. Heteroskedasticity-robust p-values, clustered at the province level and calculated using wild bootstrap procedures, are presented in brackets.

Table A3.2: DD Estimates of Impact on Restricted Sample of Non-Immigrants

	Fathers' Participation	Fathers' Leave Duration	Mothers' Participation	Mothers' Leave Duration
Average Treatment Effect	0.446*** [0.007]	1.364 [0.906]	0.103* [0.063]	1.887 [0.395]
Includes Personal Covariates and Province and Year FEs	Yes	Yes	Yes	Yes
Includes Province-specific Time trends	Yes	Yes	Yes	Yes
Observations	8,096	6,236	8,096	5,789

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table presents difference-in-difference estimates of parents' leave behavior between Quebec and Other Provinces before and after the introduction of QPIP in 2006. Outcomes for participation rates are indicators for whether the respondent/spouse has taken or plans to take leave while leave duration is measured as weeks of leave planned or taken by respondent or spouse. Sample spans 2002-2010 of the EICS data and comprises non-immigrant mothers aged 18-40 in cohabitating or married relationships who have experienced a birth in the last year. Set of personal and household characteristics include age of respondent and spouse, legal marital status, indicator for immigrant, household size, number of children aged 0-1 and 1-5, and various education levels of respondent and spouse. Heteroskedasticity-robust p-values, clustered at the province level and calculated using wild bootstrap procedures, are presented in brackets.

Table A3.3: DD Estimates of Impact on Restricted Sample of Younger Parents

<b>I. Restricted Sample of respondents aged 18-35</b>				
	Fathers'	Fathers'	Mothers'	Mothers'
	Participation	Leave Duration	Participation	Leave Duration
Average Treatment Effect	0.474**	2.394	0.057	1.039
	[0.027]	[0.670]	[0.922]	[0.571]
Includes Personal Covariates and Province and Year FEs	Yes	Yes	Yes	Yes
Includes Province-specific Time trends	Yes	Yes	Yes	Yes
Observations	8,133	6,245	8,133	5,789

<b>II. Restricted Sample of respondents aged 18-30</b>				
	Fathers'	Fathers'	Mothers'	Mothers'
	Participation	Leave Duration	Participation	Leave Duration
Average Treatment Effect	0.494**	2.00	0.052	1.385
	[0.039]	[0.946]	[0.371]	[0.547]
Includes Personal Covariates and Province and Year FEs	Yes	Yes	Yes	Yes
Includes Province-specific Time trends	Yes	Yes	Yes	Yes
Observations	5,099	3,876	8,133	3,415

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table presents difference-in-difference estimates of parents' leave behavior between Quebec and Other Provinces before and after the introduction of QPIP in 2006. Outcomes for participation rates are indicators for whether the respondent/spouse has taken or plans to take leave while leave duration is measured as weeks of leave planned or taken by respondent or spouse. Sample spans 2002-2010 of the EICS data and comprises mothers in cohabitating or married relationships who have experienced a birth in the last year. Set of personal and household characteristics include age of respondent and spouse, legal marital status, indicator for immigrant, household size, number of children aged 0-1 and 1-5, and various education levels of respondent and spouse. Heteroskedasticity-robust p-values, clustered at the province level and calculated using wild bootstrap procedures, are presented in brackets.

## Appendix 4: Robustness Checks using GSS Placebo Group

Table A4.1: DD Regressions on Placebo Parents' Market Outcomes

	(1)	(2)	(3)	(4)
OUTCOMES:	Time in Paid Work	Time at Workplace	Time at Workplace if employed	Annual Income
<b>A. FATHERS</b>				
Quebec * Post-reform	147.168* [28.656]	104.45** [0.00]	136.30 [0.00]	6221.292** [2050.815]
<b>B. MOTHERS</b>				
Quebec * Post-Reform	31.88 [16.30]	29.859 [0.021]	-4.86 [0.50]	-3719** [1517]

Notes:

\* $p < 0.10$  \*\* $p < 0.05$  \*\*\* $p < 0.01$

Robust province-clustered standard errors are presented in brackets. Sample restricted to mothers and fathers aged 18-50 in married or cohabitating relationships whose youngest child is aged 1-8 years old. In the Double-differences setup the sample only includes parents whose youngest child is aged 1-3 OR 5-8 and the regressions exploit variation across provinces and time. In the triple-differences setup the sample pools both groups and regressions exploit variation across province, time and age of child.

Table A4.2: DD Regressions on Placebo Parents' Non-market outcomes

	(1)	(2)	(3)	(4)
OUTCOMES:	Total Time in Non-market Work	Time in Domestic Work	Time in Childcare	Total Time Spent at Home
<b>A. FATHERS</b>				
Quebec * Post-reform	-6.999 [13.794]	-32.447** [12.142]	25.447*** [2.726]	-35.309* [0.37]
<b>B. MOTHERS</b>				
Quebec * Post-Reform	-10.100 [9.459]	8.811 [7.375]	-18.911** [7.927]	2.584 [0.878]

Notes:

\*p&lt;0.10 \*\*p&lt;0.05 \*\*\*p&lt;0.01

Robust province-clustered standard errors are presented in brackets. Sample restricted to mothers and fathers aged 18-50 in married or cohabitating relationships whose youngest child is aged 1-8 years old. In the Double-differences setup the sample only includes parents whose youngest child is aged 1-3 OR 5-8 and the regressions exploit variation across provinces and time. In the triple-differences setup the sample pools both groups and regressions exploit variation across province, time and age of child

Table A4.3: DD Regressions on Placebo Parents' time in Non-Market Tasks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
OUTCOMES:	Maintenance and repairs	Cooking	Housekeeping	Shopping	Other	Interactive Childcare	Routine Childcare	Travel + Communication
<b>A. FATHERS</b>								
Quebec * Post-reform	-22.153*** [5.989]	0.4340 [2.344]	3.549 [8.379]	-52.562*** [6.011]	-14.27*** [1.991]	11.737*** [2.751]	3.981 [3.000]	9.141** [3.392]
<b>B. MOTHERS</b>								
Quebec * Post-reform	1.320 [4.639]	-0.029 [4.152]	18.269*** [4.502]	-17.837* [8.982]	-10.748*** [2.074]	-19.105*** [4.022]	11.391*** [3.414]	-11.198** [4.317]

\*p<0.10 \*\*p<0.05 \*\*\*p<0.01

The outcomes of interest are time spent in maintenance and repairs (including interior and exterior maintenance and repairs, vehicle maintenance and other home improvements), cooking (including meal preparation, baking, brewing, preserving food, and meal cleanup), shopping (including for groceries, gas, plants/flowers, take-out food, videos, sports supplies durables, services etc, and reading/research related to these purchases) , housekeeping (indoor an outdoor cleaning, laundry/ironing/folding, mending shoes and dressmaking/sewing), and other domestic work (including gardening, grounds maintenance, pet and plant care, management of household activities and finances, cutting firewood, packing or unpacking luggage, car, moving boxes or groceries, and travel to/from other domestic work. The outcomes of interest are all time spent in interactive childcare(including helping/teaching/reprimanding, reading/talking/conversing/playing with children) and routine childcare(baby Care/child Care, unpaid babysitting, food preparation and feeding, putting children to bed or getting ready for school, personal, medical and emotional care if children) and travel/communication related to childcare (such as visiting childcare and schools, communicating with teachers and childcare workers, reviewing report cards and homework logs, organizing play dates and parties for children, and travel to/from personal care activities for children). Robust province-clustered standard errors are presented in brackets. Change is calculated from the respective baseline for mothers and fathers given in Table 2.