

**THE IMPACT OF THE QUEBEC WORK PREMIUM ON THE LABOUR SUPPLY OF SINGLE WOMEN  
AND LONE MOTHERS**

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## **ABSTRACT**

In 2005, the Quebec government introduced the Work Premium, a refundable tax credit available to low-income workers. The objectives of this policy are to support work effort and to encourage individuals on social assistance to join the labour force. This paper examines the impact of the Work Premium on the labour force participation and hours worked of single women and lone mothers. Using the cross-sectional public-use microdata files from the Survey of Labour and Income Dynamics, we identify the impact of this policy by comparing, for those two groups, the changes in labour supply observed in Quebec between 2004 and 2006 to the changes observed in Ontario over the same period. We find that the Work Premium had a significant impact on the labour force participation of lone mothers, although the magnitude of this impact remains uncertain. In contrast, for single women, we do not find evidence of a significant impact of this policy on participation in the labour force. For both single women and lone mothers, we don't observe a significant impact on annual hours worked.

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# 1. INTRODUCTION

The twin problems of low incentives for people on social assistance to take on a low-paid job are disturbing both from an equity and efficiency point of view. To address this issue, as early as the 1970s, the United States and the United Kingdom introduced employment-conditional cash transfers targeted toward low-income individuals. While these schemes were once seen as unusual, Immervoll and Pearson (2009) report that in 2007, half of the OECD countries had adopted in-work benefits policies of some kind, refundable tax credits being one of them. The Quebec government did not escape this trend. It introduced in January 2005 the Work Premium, a refundable tax credit whose dual objective is to support and promote work effort, and to induce people to give up social assistance and become part of the work force.<sup>1</sup>

This paper analyzes the impact of the Quebec Work Premium on the labour supply of single women and lone mothers, both in terms of participation to the labour force and hours worked. The motivations for this research are numerous. As a matter of fact, while the US Earned Income Tax Credit and its counterpart in the United Kingdom have been studied extensively, to our knowledge, the impact of the Quebec Work Premium on labour supply has never been assessed *ex-post*. Moreover, the studies that analyzed *ex-ante* the impact of this tax credit were not unanimous, highlighting the need to look at the empirical evidence. Indeed, while the 2004-2005 Budget stated that the Work Premium would increase the participation rate of low-income households<sup>2</sup> by 9%<sup>3</sup>, Godbout and Arseneau (2005) questioned the ability of this tax credit to encourage individuals on social assistance to join the labour force given the small magnitude of the financial incentives provided by this measure. The results from the structural model of Parisé (2007) suggested that the Work Premium would increase the participation rate of single women and lone mothers taken as a group by 0.6 percentage points, and that the impact would be higher for lone mothers. An additional motivation for this research is that the Canadian federal government introduced in Budget 2007 a similar tax credit, the Working Income Tax Benefit

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<sup>1</sup> Ministère des Finances du Québec, 2004 (c).

<sup>2</sup> This refers to households with an annual income of \$15 000 or less.

<sup>3</sup> Ministère des Finances du Québec, 2004 (c).

(WITB). The analysis of the impact of the Work Premium on labour supply could thus provide insights on the potential impact of the WITB.

As mentioned previously, this research focuses on single women and lone mothers. This choice was motivated by many factors. Couples were excluded from the analysis because it was feared that their joint labour supply decisions would cloud the analysis and complicate the task of assessing the responsiveness to this policy. We concluded that the analysis of the reaction of couples to the Work Premium was not indicated for a first empirical investigation on this policy. Our focus on women is first explained by the fact that, in 2004, the participation rates of lone mothers and single women were lower than that of their male counterparts<sup>4</sup>. Thus, there appeared to be greater room for rises in participation rates among women. Additionally, there is a consensus in the literature that the participation elasticity for lone mothers is among the highest of all demographic groups (Meghir and Phillips, 2010), and so if the Work Premium had an impact on labour supply, it would be likely to be most easily observed in this group.

This paper is organized as follows. We start by presenting the rationale for in-work benefits, depicting the problem of high marginal effective tax rates in Quebec over the low-income range, as well as that of in-work poverty. Policies to encourage work and alleviate in-work poverty that have been proposed or adopted in different countries are then summarized. This paves the way for the description of the Quebec Work Premium and the institutional context in which it was introduced: the parameters of this tax credit, differences with previous programs, and other policies introduced in the same period are covered. The projected impact of the Work Premium is then discussed from both a theoretical and empirical perspective, presenting evidences from other countries as well as the results of *ex-ante* studies of the impact of this tax credit in Quebec. We follow with a presentation of the identification strategy used to assess the impact on participation and hours worked, together with a description of the data used for this project. After testing for the validity of the identifying assumptions, the results are presented and their robustness is tested. We conclude with a discussion of both the results obtained and the limitations of the analysis.

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<sup>4</sup> Statistics computed by the author using the public-use microdata files of the Survey of Labour and Income Dynamics for the year 2004.

## **2. LITERATURE REVIEW**

### **2.1 The rationale for in-work benefits**

#### **2.1.1 Disincentives to work associated with welfare policy**

The basic static theory of labour supply assumes that individuals make a simultaneous decision about how much to consume and how much to work given the marginal wage they face, their non-work income as well as their preferences over leisure and consumption, which depend on personal and family characteristics such as age, children, education level, etc. (Meghir and Phillips, 2010).

Hence, factors that affect one's marginal wage, such as taxes, are also likely to influence his labour supply decision. However, the effective marginal tax rate (EMTR), that is, the actual tax rate that the individual faces, depends on the whole benefit and taxation system rather than solely on taxation (Duclos, Fortin and Fournier, 2009). Indeed, effective marginal tax rates result from collecting personal income taxes while maintaining a policy of income support (*Commission parlementaire sur la réduction de l'impôt des particuliers*, 1999).

Duclos, Fortin and Fournier (2009) mention that an important finding in a lot of studies on EMTR is that it is those households that are net beneficiaries of government transfers that confront the highest EMTRs. The reason for this is that clawback rates (i.e., the rate of decline of the financial assistance received as family income rises) are usually high. Hence, although they face a fairly low tax rate on paper, low income households who receive social welfare benefits are generally those who face the highest EMTR.

#### **2.1.2 Effective taxation in Quebec**

To obtain a distribution of EMTRs in Quebec, Duclos, Fortin and Fournier (2009) simulate personal income taxes and government transfer programs for a sample of individuals, households and families using an adapted version of a model developed by the *Ministère de l'Emploi et de la Solidarité sociale et de la famille du Québec*. They look at data from 2002, that is, three years prior to the introduction of the work premium in Quebec.

### ***2.1.2.1 Single individuals***

The authors obtain that for single individuals, when income just exceeds the level at which social assistance starts to be retrieved, the presence of the clawback from social assistance as well as the Quebec Pension Plan and Employment Insurance premiums push the EMTR over 100% (that is, for each dollar earned, more than a dollar is given back to the government) (see Figure A.1 in the appendix). Only when the income approaches 12 000\$ does the single individual experience a decline in the EMTR he faces. The calculations of the authors exclude some specific benefits accruing to certain social assistance recipients (drug insurance plan, dental care, disaster relief, etc.) that are also withdrawn when individuals are no longer eligible for social assistance. When the monetary value of these benefits is taken into account in the clawback of benefits faced by individuals exiting social welfare, one realizes that the EMTR these individuals face can easily exceed 100%. Duclos, Fortin and Fournier (2009) estimate that about 10% of all single individuals in Quebec faced an EMTR of 100% in 2002. Moreover, the majority of households facing an EMTR of 100% in 2002 were those without children (single individuals as well as childless couples), mostly because of the distribution of income associated with different demographic groups. It is worthwhile to note, however, that the EMTR of low-income individuals can be negative for the first dollars they earn (i.e., for each dollar earned, they receive additional money from the government) since social assistance is not affected by the first dollars earned while the General Sales Tax credit rises with income.

### ***2.1.2.2 Single parents***

Single parents are eligible to a greater number of transfer programs so they face higher and more variable EMTRs than single individuals (see Figure A.2 in the appendix). In comparison with the single-individuals group, in 2002, they also faced EMTRs above 100% over the \$15 000-\$18 000 income range because this was the income range at which the benefits from a program supporting the income of working parents were being phased out. According to Duclos, Fortin and Fournier (2009), about 5% of all single parents faced an EMTR of 100% in 2002, and about 25% of single parents had an EMTR higher than 80% in 2002. Low-income two-parents families also faced high EMTRs, as shown by Figure A.3 in the appendix. However, the proportion of those who faced an EMTR of 100% in 2002 was much lower, standing at 1%.

### **2.1.3 Participation in the labour force in Quebec**

It is interesting to note that in 2003, 43.1% of welfare recipients were classified as having no constraints to work (information reported in the *“Rapport d’étape de la mesure Action Emploi”* (2003) and cited by Côté (2006)). Among those people, there are of course seasonal workers, as well as people experiencing “frictional unemployment” when transitioning from one job to another. It is also possible that there are factors affecting the demand for workers, or that job-seekers’ skills don’t match those demanded in the labour market. However, the relatively high proportion of welfare-recipients classified as having no constraints to work could also be the result of supply side-effects on the labour market. That is, it could be that, given the financial incentives they face, some individuals decide not to participate in the labour market even if they have the opportunity to do so. Immervoll and Pearson (2009) note that throughout the OECD, very high unemployment rates among groups of low-skilled individuals are the result of the combination of limited work incentives, sluggish demand for low-skilled workers, as well as potential frictional problems in the matching of low-skilled job-seekers with vacancies.

### **2.1.4 In-work poverty**

As Godbout and Arseneau (2005) point out, if the “poverty trap” exists, i.e., if some people indeed choose not to work because the financial return to work is low, it is an indication that the opportunities available to them in the labour market are not very interesting and that in-work poverty is an issue. Indeed, throughout the OECD, more than 50% of all individuals classified as “poor” live in households where at least one person has a job. In fact, in most countries, high earnings are needed to escape in-work poverty (Immervoll and Pearson, 2009).

## **2.2 Work premiums and other types of policies to encourage work and alleviate in-work poverty**

### **2.2.1 Presentation of various types of policies to encourage work and alleviate in-work poverty**

To address the twin problems of financial disincentives to participate in the labour force as well as in-work poverty, different policies have been used or considered. Without presenting an exhaustive list of them, some of the policies that have been widely discussed or used are briefly summarized here.

Minimum wage policies have a long tradition in OECD countries and are also a way to address both the employment and the distributional problem. However, minimum wage policies' potential negative impact on the demand for low-skilled workers makes them controversial (Immervoll and Pearson, 2009).

Subsidies to employers who hire full-time low-skilled workers have also been a tool that has been used to encourage the participation of these workers in the labour force when the unemployment problem is mostly related to the demand for low-skilled (Godbout and Arseneau, 2005). Those subsidies decrease the cost of these workers for the firm and can thus encourage firms who employ low-skilled workers to hire more.

There are also policies that have been discussed by economists but whose implementation would involve a complete reorganization of the tax and benefit system. One of these well-known policies is the negative income tax, supported notably by Milton Friedman (Immervoll and Pearson, 2009). Such a policy entails that someone who doesn't work can't be better off financially than somebody who works at the minimum wage. Universal benefits, that is, benefits that are distributed without considering the financial situation of individuals are another way to alleviate in-work poverty without inducing financial disincentives to work. However, just like for the negative income tax, the implementation of such a policy on a wide scale would entail a complete reshaping of the tax and benefit system (Godbout and Arseneau, 2005).

Finally, in-work benefits policies taking the form of a refundable tax credit to low-income workers (hereafter referred to as work premiums) have appeared as an interesting avenue to increase employment well as to increase the incomes of disadvantaged groups of workers and their families without reforming the whole tax and benefit system. Godbout and Arseneau (2005) note that refundable tax credits to low-income workers are similar in some respects to a negative income tax, but that they differ since there is an “entry phase” where the refundable tax credit increases as work income rises, up to a certain income threshold.<sup>5</sup> In contrast, they point out that the amount received under the negative income scheme can only decrease as income increases. Although they were introduced as early as the 1970s in the United States and the United Kingdom, it is not until the mid 2000s that these schemes started to be considered more seriously by different countries in the OECD. They are now considered mainstream policies in many countries of the OECD (Immervoll and Pearson, 2009). The program studied here, the Quebec Work Premium, is a refundable tax credit of this type.

## **2.2.2 Work premiums: different applications throughout the world**

We will turn to different types of work premiums used worldwide. Their impact on labour supply will be presented in another section. Nowadays, many countries in the OECD have adopted in-work benefit policies (Immervoll and Pearson, 2009). The United-States and the United-Kingdom have been the pioneers, implementing such policies in the 1970s.<sup>6</sup> Because they have been in place for so long, most of the literature on in-work benefits focuses on the programs implemented in these two countries. The program in the United-States and in the United Kingdom will thus be reviewed here, followed by the Canadian experiences of in-work benefits.

### ***2.2.2.1 United States: the Earned Income Tax Credit (EITC)***

Introduced in 1975 in the United-States, the Earned Income Tax Credit is a refundable tax credit for low-income workers with twin objectives: decrease poverty and reduce the dependence to the state by giving an incentive to social assistance recipients to join the labour force. The

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<sup>5</sup> Once that income threshold is reached, the amount of the refundable tax credit starts to decrease as income increases, or remains constant over a certain income range before starting to decrease.

<sup>6</sup> For a review of all the programs that have been implemented in OECD countries, refer to Immervoll and Pearson (2009).

program was modified over the years. Starting from 1978, eligible households were able to receive anticipated payments instead of having to wait until the production of their income tax declaration to receive the payment. The generosity of the program was greatly increased in 1986. In 1990, the program started to take into account the number of children to determine the amount of the premium. The credit was initially targeted only to households with children but the program's coverage was increased later, reaching out also to households without children in 1993 (Godbout and Arseneau, 2005).

Nowadays, the Earned Income Tax Credit is still used. To be eligible to the program, there needs to be at least one individual in the household who earned labour income during the year, and the income has to be lower than a threshold depending on the household characteristics (presence of children, number of children, presence of another worker, etc.).<sup>7</sup> For households counting at least one child, the anticipated payments can be received periodically with their paycheck (Godbout and Arseneau, 2005).

The size of the refundable tax credit depends on households characteristics and on income: it increases proportionally with income up to a certain income threshold, remains constant up to another income threshold, and is then drawn back progressively as income continues to rise. The income thresholds depend on household characteristics. Overall, the program is much more generous for households with children (Godbout and Arseneau, 2005).

To benefit from this program, people have to be aware of it since they have to complete a form and join it to their tax report. However, as discovered by Ross Phillips (2001), about only 2/3 of low-income parents were aware of this program, and the proportion decreased to 50% for low-income Latin-Americans (Godbout and Arseneau, 2005). Haney (2004) estimates as 15%-20% the proportion of eligible individuals who don't claim the Earned Income Tax Credit (Godbout and Arseneau, 2005). However, McCubbin (2000) estimates that throughout the United States, between January and April 1995, 25.8% of the amount of money given to beneficiaries of the EITC was money that wouldn't have been given if it hadn't been for errors such as the misreporting of qualifying children (both intentional and non-intentional) or the misreporting of

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<sup>7</sup> Moreover, households with investment income exceeding \$US 2 650 are not eligible for the program.



revenues. According to McCubbin (2000), the misreporting of qualifying children was the most important source of error.

### ***2.2.2.2 United Kingdom : the Working Family Tax Credit (WFTC)***

In 1971, the United Kingdom implemented the *Family Income Supplement*, which was a temporary measure to support low-income workers working more than 24 hours per week. This program remained in place, to become the *Family Credit* in 1988. The difference with the Earned Income Tax Credit of the United States was that there was a minimum number of hours of work required to be eligible to the program (the goal was to encourage full-time work but not part-time work). Another difference between the UK tax credit and its American counterpart is that the amount of savings of the household is taken into account to determine the amount of the credit to be received. The program became considerably more generous in 1999, when it took the name of *Working Family Tax Credit*. Starting from that time, the credits were distributed through employers (through changes in employees' pay or tax deductions) to make the program more visible and make the impact of the program more immediate. Finally, in 2003, the program was changed again to be available to low-income workers without children, as reflected by a name change to "*Working Tax Credit*". The additional support for families was maintained through the creation of a *Child Tax Credit*. (Godbout and Arseneau, 2005).

Nowadays, to be eligible for the Working Tax Credit, a person with children needs to work at least 16 hours per week, and there is a bonus when one works more than 30 hours per week. In addition to that, 70% of childcare fees are refunded. For a person without children, the minimum number of hours of work per week to be eligible is 30. The credit is distributed through the employer (except for the self-employed). As for the Earned Income Tax Credit, the size of the refundable tax credit depends on households characteristics and on income: it increases proportionally with income up to a certain income threshold, remains constant up to another income threshold, and is then drawn back progressively as income continues to rise. The income thresholds depend on household characteristics. The program has a narrow target: it is generous over the low-income range (the average credit was £2 222 in 2005) but the tax credit decreases rapidly as income rises so that only 6% of households benefit from the program.<sup>8</sup>

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<sup>8</sup> It is important to note that the credit received is considered as an income in eligibility calculations for other programs: this decreases the effective generosity of the program (Blundell and Hoynes, 2001).

Overall, the program is much more generous for households with children. (Godbout and Arseneau, 2005)

### ***2.2.2.3 Canada : the Self-Sufficiency Project and the Working Income Tax Benefit (WITB)***

#### **2.2.2.3.1 The Self-Sufficiency Project (SSP)**

The Self-Sufficiency Project (SSP), whose goal was to encourage work and boost the income of adults who worked, took place in the early 1990s in British Columbia and New Brunswick. The program consisted of a monthly temporary earnings supplement given to selected single-parent welfare recipients who left welfare and worked 30 hours or more per week. The supplement was given for up to three years as long as the person continued to work full-time and remained off welfare (Michalopoulos, 2005). The earnings supplement was quite generous: parents who worked 30 hours per week or more got paid an amount equal to half the difference between their actual earnings and a target level of earnings (\$37 000 in British Columbia when the program started). When tax obligations and tax credits are taken into account, with the earnings supplement, most recipients had an income that was \$3 000- \$7 000 higher per year compared to what it would have been if they had worked the same number of hours without the supplement (Michalopoulos, Robins and Card, 2005).

There were three different studies encompassed in the SSP: the recipient study, the applicant study and the SSP Plus study:

- The SSP recipient study targeted single parents in New Brunswick and British Columbia (Vancouver area) from 1992 to 1995. To be eligible, individuals needed to have been on welfare rolls for at least 11 of the 12 previous months, and to be a welfare recipient for the current month. In total, 6 000 single parents were recruited for this study.
- The SSP applicant study targeted single parents that were new welfare recipients in the Vancouver area of British Columbia. Indeed, to be eligible for this program applicants needed to have been on welfare for one year and to leave welfare for full time work in the subsequent year. In contrast to the recipient study, people needed to apply for this program. In total, 3 316 single parents who had begun receiving welfare between 1994 and 1995 participated in this program.

- Finally, the SSP Plus program targeted a subset of the people selected for the SSP recipient study in 1994 and 1995. The difference with the SSP recipient study is that, in addition to the earnings supplement, voluntary services were also provided to participants to help them find work and stay at work. This study took place exclusively in New Brunswick (Michaloupoulos, 2005).

#### 2.2.2.3.2 The Working Income Tax Benefit (WITB)

In the 2007 Budget, the Canadian federal government introduced the Working Income Tax Benefit (WITB), a refundable tax credit for all low-income workers, with the stated objective to lower the so-called welfare wall (Scarth and Tang, 2008). To be eligible, individuals and families need to have a working income superior to \$3000. The amount of the credit varies as a function of the marital status, the province or territory of residence, the working income of the family, whether the family has eligible dependants and whether the recipient is disabled. For single individuals without children, in 2012, the maximum amount of the WITB is \$970. The maximum amount is received when the working income is between \$6 880 and \$11 011. After that, the credit is gradually reduced until the net income reaches \$17 477.<sup>9</sup> For families, the maximum amount that can be received is \$1 762. This maximum amount is received when family working income is between \$10 048 and \$15 205, and the credit is gradually reduced until net income reaches \$26 952. It is possible to apply for quarterly advance payments that can total up to 50% of the total WITB for the year (Canada Revenue Agency).

#### 2.2.2.4 Quebec: The “Action Emploi” program

In December 2001, the Quebec government introduced the Action Emploi (AE) program for a trial period of one year, with the objective to make work pay for long-term social assistance recipients. To be eligible, people needed to have been on welfare for 36 of the last 45 months (self-employed were also eligible). The program was largely inspired by the Self-Sufficiency Project that had taken place elsewhere in Canada a few years before. Indeed, the AE program shared many similarities with the SSP: AE offered a generous income supplement to those among long-term welfare recipients who found a full-time job within 12 months. Just as in the SSP, this income supplement could last up to three years if the recipient remained eligible for

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<sup>9</sup> In Alberta, Quebec, British Columbia and Nunavut, the amount of the credit as well as the income thresholds are different.

the program. However, unlike in the SSP, the supplement was available for all welfare recipients who found a full-time job within 12 months. Moreover, the supplement was not linked to earned income since it had been argued that this could result in self-selection. Hence, the benefits for this program, which were quite generous, were of \$390/month in the first year, \$260/month in the second year and \$130/month during the third year (Lacroix, 2010). It is interesting to note that the take up rate for this program was very low (7.4% of the eligible population) (Lacroix, 2010). After the one year trial, the program stopped.

However, a slightly modified version of the AE program was implemented on a permanent basis on May 2008 (Lacroix, 2010). Indeed, the 2008-2009 Budget announced the introduction of the Work Premium Supplement for long-term social assistance recipients giving up last-resort financial assistance. The amount of this supplement is \$200 per month for a maximum of 12 consecutive months. It is available to people returning to the labour market after having received social assistance for at least 36 of the last 42 months (Ministère des Finances du Québec, 2008).

## **2.3 The Work Premium in Quebec**

### **2.3.1 Program description**

In the 2004-2005 Budget, the government of Quebec announced a refundable tax credit targeted toward low- and middle-income workers to be implemented starting on January 1, 2005. This measure, called the Work Premium, has two clearly stated objectives (Ministère des Finances du Québec, 2004 (c)):

- Support and promote work effort;
- Induce people to give up social assistance and become part of the work force.

In the 2004-2005 Budget, the government estimated that 536 000 households would benefit from this work premium in 2005. All types of low- and middle-income workers are targeted: people living alone, lone parents and couples with and without children. However, the amount of the premium varies with household types: for lone parents and couples with children, the

phase-in rate of the tax credit is higher, and so is the income threshold at which the premium starts to be reduced.

The Work Premium is administered as a refundable tax credit. To receive it, eligible households have to file an income tax return when they do their tax report. For people living alone and couples without children, the credit is received after the tax declaration has been sent. However, lone parents and couples with children that want to receive the premium during the year can ask the Ministère du Revenu for an advance payment. They will then receive quarterly instalments that can total up to half of the estimated Work Premium for the year (Ministère des Finances du Québec, 2004 (c)).<sup>10</sup> The instalments are computed on the basis of the expected annual income for the year.<sup>11</sup>

**TABLE 1**  
**MAIN PARAMETERS OF THE WORK PREMIUM**  
(2005 tax year)

	Person living alone	Lone parent	Couple without children	Couple with children
<b>Excluded earned income threshold<sup>(1)</sup></b>	\$2 400	\$2 400	\$3 600	\$3 600
<b>Rate of the tax credit</b>	7%	30%	7%	25%
<b>Maximum premium<sup>(2)</sup></b>	\$511	\$2 190	\$784	\$2 800
<b>Premium reduction income threshold<sup>(3)</sup></b>	\$9 700	\$9 700	\$14 800	\$14 800
<b>Reduction rate</b>	10%	10%	10%	10%
<b>Exit income threshold<sup>(4)</sup></b>	\$14 810	\$31 600	\$22 640	\$42 800

(1) The excluded earned income threshold is the maximum income one can gain without seeing its social assistance benefits decrease. It is the also the income threshold at which the work premium starts.

(2) The maximum premium depends on the premium reduction income threshold. It will vary automatically when premium reduction income thresholds are modified.

(3) The premium reduction income threshold is the income level from which the premium starts to decrease gradually. It corresponds to the exit income threshold for social assistance recipients without a limited capacity for employment, that is, the income level at which social assistance benefits are no longer received for people who don't have a limited capacity for employment. This threshold is adjusted in January every year, starting on January 2006.

(4) The exit income threshold is the income threshold beyond which the household is no longer eligible for the work premium. This threshold is adjusted in January every year, starting on January 2006.

Sources : Ministère des Finances du Québec (2004) *2004-2005 Budget : Additional Information on the Budgetary Measures* and *2004-2005 Budget: Reducing Income Tax*.

<sup>10</sup> However, lone parents and couples with children can only claim advance payments when the amount of the premium to which they are eligible exceeds \$500 (Ministère des Finances du Québec, 2004 (c)).

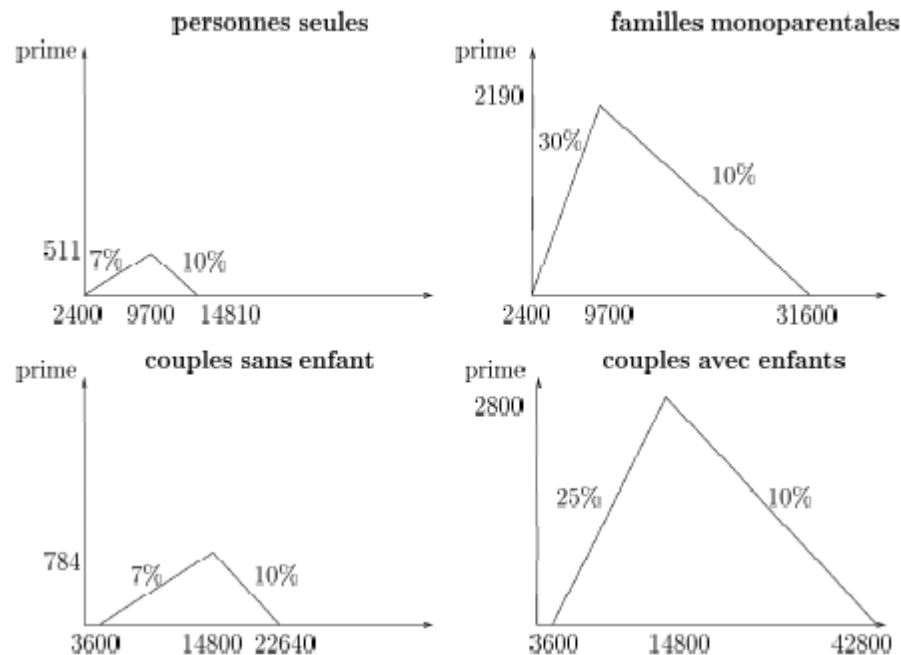
<sup>11</sup> In January 2009, singles also became eligible for advance payments (Ministère des Finances du Québec, 2008).

The Work Premium structure responds to that of social assistance, as shown by Table 1 and Figure 1.

- Social-assistance recipients can earn a certain level of work income before their benefits are decreased in a one-to-one ratio with the income they earn. This is called the excluded earned income. The Work Premium doesn't start until the maximum excluded income is reached (since there are no disincentives to start working before then).
- Starting from that excluded income threshold, a dollar of social assistance is taken away for every dollar earned, up to the point where no social assistance is received. The Work Premium follows the opposite pattern on that income range: starting from the excluded income threshold, the work premium increases at a constant rate up to the point where the household is no longer eligible for social assistance. This latter income threshold varies from one type of household to another.
- Once that threshold is reached (the "premium reduction income threshold"), the work premium starts to decrease at a constant rate of 10%, until the household no longer receives a work premium. The exit income threshold varies as a function of the type of economic family.

Table A.1 in the appendix presents the amount of the Work Premium in 2005 by employment income and household type.

**FIGURE 1**  
**MAIN PARAMETERS OF THE WORK PREMIUM: INCOME THRESHOLDS, PHASE-IN RATES AND**  
**REDUCTION RATES BY BENEFICIARY TYPE**  
 (2005 tax year)



Note : The design of the Work Premium is presented in the graphs above for four types of economic families (singles in the top left corner, lone parents in the top right corner, couples without children in the bottom left corner and couples with children in the bottom right corner). The earned income threshold at which the Work Premium starts to be phased-in, the earned income level at which the Work Premium reaches its maximum, and the income threshold at which the Work Premium is completely phased-out are presented on the horizontal axis. The vertical axis expresses the size of the Work Premium, and the maximum amount it can reach is indicated. The phase-in and phase-out rates are presented directly in the graphs.

Source: Lafond-Bélanger (2007), p.9.

### 2.3.2 Comparison with previous programs

The issue of the low incentives to transition from social assistance to work was already a preoccupation of the government of Quebec in the 1970s; it had then introduced the “Supplement au revenu du travail” (SUPRET) to address that issue. This program was abolished in 1988 and replaced by the Parental Wage Assistance program (the “PWA program”), which had a similar goal. The latter was abolished with the introduction of the Work Premium in January 2005 (Godbout and Arseneau, 2005).

There are, however, important distinctions between the PWA program and the Work Premium.

First of all, the Work Premium has a much wider reach. While the PWA program targeted only parents (lone parents and couples with children), singles and couples without children are also eligible to receive the Work Premium.

Moreover, the Work Premium is a much simpler program than the PWA program. To benefit from the Work Premium, eligible households only have to file their tax declaration, in contrast with the PWA program. Hence, it is expected that almost all eligible households will receive the premium to which they are entitled, which wasn't the case with the PWA program (Godbout and Arseneau, 2005).

In total, the Quebec government estimated in the 2004-2005 Budget that 506 379 additional households would be reached by the Work Premium program. It is important to note that 171 043 of these households are lone parents and couples with children that were previously eligible to the PWA program but that didn't apply to receive the tax deduction (Ministère des Finances du Québec, 2004 (c)). In fact, Parisé (2007) mentions that people within the Ministère des Finances du Québec told her that less than 50% of eligible individuals participated in the PWA program. The wider reach of the Work Premium is reflected clearly in the budgetary envelope of this program: while tax expenses associated with the PWA program represented \$26 million, tax expenses associated with the Work Premium amounted to \$269 million in 2005 (Ministère des Finances du Québec, 2004 (c)).

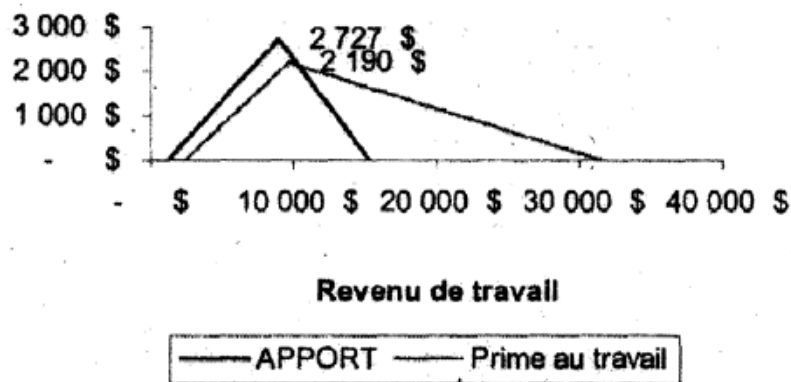
Finally, there are distinctions between the main parameters of the Work Premium and those of the PWA program. Generally speaking, the PWA program was more generous, but was targeted toward a much narrower segment of the population, as shown by Figure 2. Indeed, in addition to being targeted solely toward lone parents and couples with children, the exit income threshold for the program was much lower.

In 2005, for lone parents, the exit income threshold with the PWA program was \$15 322 while it was \$31 600 with the Work Premium in 2005. Similarly, for couples with children, it went from \$21 815 to \$42 800. However, for households whose income is in the income range that was



targeted by the PWA program, the tax deduction was more generous with the latter program than with the Work Premium. As a matter of fact, while in both programs the maximum premium is obtained at almost the same income level, the maximum premium for lone parents shifted from \$2 727 with the PWA program to \$2 190 with the Work Premium, and from \$3 980 to \$2 800 for couples with children.

**FIGURE 2**  
**COMPARISON BETWEEN PARENTAL WAGE ASSISTANCE AND WORK PREMIUM BENEFITS FOR A LONE PARENT WITH ONE CHILD**  
 (2005 tax year, Parental Wage Assistance = "APPORT" and Work Premium = "Prime au travail")



(1) "Prime au travail" is the French name for the Work Premium and "APPOINT" is the acronym for the French name of the Parental Wage Assistance program ("Aide aux parents pour leurs revenus de travail").

(2) In this graph, the Work Premium ("Prime au travail") is represented by the triangle with the larger width.

Source: Godbout and Arseneau (2005), p.45.

### 2.3.3 Interactions with other policies

It is worth noting that other measures were introduced at the same time as the Work Premium. The child assistance payment is one of them. As its name indicates, this refundable tax credit is targeted toward lone parents and couples with children. Its design is coherent with that of the Work Premium: the gradual withdrawal of the tax credit for the child assistance program starts only at the point where the household no longer receives the Work Premium. As such, households face a gradual withdrawal of both tax credits (Ministère des Finances du Québec, 2004 (c)). The child assistance payment replaces a set of many previous tax credits (the family benefits, the non-refundable tax credits for dependent children and the tax reduction for

families). It also replaces a component of the PWA program which allowed eligible households to claim a \$5 per day compensation if they used subsidized child care services (whose price is \$7 per day). The child assistance payment is not contingent on work so although the income effect could potentially affect labour supply decisions, this program should not have had a big impact on labour supply.

In the 2005-2006 Budget, the government of Quebec announced a new tax deduction for workers, to be introduced on January 1, 2006. The goal of this tax deduction is to take into account that people in the labour force incur certain expenses related to work, such as transport and clothing expenses. The tax deduction corresponds to 6% of earned income revenues for the year, and can reach up to \$500 (Ministère des Finances du Québec, 2005 (a)). In the 2006-2007 Budget, the government announced that the maximum tax deduction for workers was to be raised to \$1000 starting on January 1, 2007 (Ministère des Finances du Québec, 2006 (a)). This tax deduction for workers is expected to reinforce the impact of the Work Premium, removing some of the monetary barriers to join the labour force.

Moreover, in January 2006, Quebec opted-out of the federal parental leave program, to replace it with its own, enhanced program. The Quebec parental leave program is more generous in terms of replacement ratios and earnings maximum (Lefebvre, Merrigan and Roy-Desrosiers, 2011). For parents of newborns, this might have had a negative impact on labour force participation. However, since in any given year this program targets only a fraction of the population (parents of newborns), and since it replaced an existing program (albeit less generous), the overall impact on labour supply in the population should be limited.

Finally, the number of subsidized childcare spaces increased over the decade that followed the implementation of subsidized childcare in Quebec, in 1997. The number of regulated spaces increased gradually from 77 000 spaces in 1997 (partly regulated) to about 197 000 spaces in 2006 (Lefebvre, Merrigan and Roy-Desrosiers, 2011). The increase in available places over these years has probably affected labour supply. However, since the increase in spaces was gradual, we could expect an important impact on labour supply over the entire period, but a relatively small impact on labour force participation from one year to another.

## **2.3.4 The magnitude of the financial incentives embedded in the Work Premium**

### ***2.3.4.1 The magnitude of the financial incentives for singles***

Godbout and Arseneau (2005) note that an individual who would be working part-time (20 hours/week) at the minimum wage (\$7.45/hour in 2005) would have received a premium of \$374 in 2005 (about 5% of his income). For a person working full-time (35 hours per week) at the minimum wage, the premium received would be only \$125 (about 1% of her income) since at that income level, the person would already be in the income range where the premium is phased out. The premiums fall to zero for singles earning slightly more than the income of a person working full-time at minimum wage.<sup>12</sup> Hence, the financial incentives to work embedded in the Work Premium are not very important for singles.

It is interesting to look at what the tax credit means in terms of increase to the net hourly wage (i.e., the hourly wage net of effective taxes). Table 2 shows the financial impact for singles working part-time or full-time at the minimum wage before and after the introduction of the Work Premium. Even with the introduction of the Work Premium, the effective hourly gain for singles working part-time at the minimum wage is only \$2.33 per hour, an increase of 36 cents per hour compared to the situation before the 2004-2005 Budget. For singles working full-time at the minimum wage, the net hourly gain in 2004 was slightly higher than that for singles working part-time (\$3.17) but the work premium only increased the hourly gain by 7 cents. Hence, we can conclude that the financial incentives to work embedded in the work premium are fairly low for singles.

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<sup>12</sup> Table A.1 in the appendix presents the amount of the Work Premium by employment income and household type in 2005.

**TABLE 2**  
**NET HOURLY GAIN FOR SINGLES WORKING AT THE MINIMUM WAGE BEFORE AND AFTER THE**  
**2004-2005 BUDGET WHICH INTRODUCED THE WORK PREMIUM**

	2004	2005	Difference
<b>Part-time work at the minimum wage</b>			
Annual work income	\$ 7 748	\$ 7 748	
Disposable income if not working	\$ 6 893	\$ 6 893	
Disposable income if working	\$ 8 939	\$ 9 313	
<b>Net income if working</b>	<b>\$ 2 046</b>	<b>\$ 2 420</b>	<b>\$ 374</b>
<b>Net hourly gain (1 040 hours/year)</b>	<b>\$ 1.97</b>	<b>\$ 2.33</b>	<b>+ 36 cents</b>
<b>Full-time work at the minimum wage</b>			
Annual work income	\$ 13 559	\$ 13 559	
Disposable income if not working	\$ 6 893	\$ 6 893	
Disposable income if working	\$ 12 662	\$ 12 787	
<b>Net income if working</b>	<b>\$ 5 769</b>	<b>\$ 5 894</b>	<b>\$ 125</b>
<b>Net hourly gain (1 820 hours/year)</b>	<b>\$ 3.17</b>	<b>\$ 3.24</b>	<b>+ 7 cents</b>

Source: Godbout and Arseneau (2005), p.43.

#### ***2.3.4.2 The incentives for lone parents***

Since the Work Premium replaced the PWA program to which low-income parents were entitled, it is important to assess the “net” financial incentive of the Work Premium for this group. As mentioned before, the PWA program was slightly more generous for low-income people but it was much more targeted: the benefits decreased very rapidly with income. Moreover, a child assistance payment was introduced at the same time as the Work Premium, hence raising the disposable income of lone parents that weren’t working after the 2004-2005 Budget (Godbout and Arseneau, 2005).

Given these two effects (the PWA being more generous for low-income lone parents and the disposable income of a lone parent out of the labour force being superior after the 2004-2005 Budget), the financial incentive to go to work part-time at the minimum wage *decreased* by \$688 with the 2004-2005 Budget, as shown in Table 3. The net hourly gain for a lone parent working part-time at the minimum wage went from \$4.16/hour to \$3.50/hour. However, for lone parents taking on a full-time job at the minimum wage, the 2004-2005 Budget increased the incentive to go to work by \$940. Indeed, the income of an individual working full-time at the minimum wage (\$13 559) fell very close to the exit income threshold under the PWA program while the tax credit at that income level was much larger with the Work Premium. The net effective hourly gain thus increased by 52 cents, that is from \$3.93/hour to \$4.45/hour.

These numbers are for a lone parent with a child too old to use childcare services. However, as mentioned previously, the PWA program also included a reimbursement of \$5/day for childcare services. Hence, for lone parents with children in age of using childcare services, the PWA program entailed an additional \$1 300/child<sup>13</sup>, thus decreasing considerably the net financial incentive embedded in the Work Premium for these lone parents.

**TABLE 3**  
**NET HOURLY GAIN FOR A LONE PARENTS WITH ONE CHILD AND WORKING AT MINIMUM WAGE BEFORE AND AFTER THE 2004-2005 BUDGET WHICH INTRODUCED THE WORK PREMIUM**

	2004	2005	Difference
<b>Part-time work at the minimum wage</b>			
Annual work income	\$ 7 748	\$ 7 748	
Disposable income if not working	\$ 12 118	\$ 12 893	
Disposable income if working	\$ 16 446	\$ 16 533	
<b>Net income if working</b>	<b>\$ 4 328</b>	<b>\$ 3 640</b>	<b>(\$ 688)</b>
<b>Net hourly gain (1 040 hours/year)</b>	<b>\$ 4.16</b>	<b>\$ 3.50</b>	<b>- 66 cents</b>
<b>Full-time work at the minimum wage</b>			
Annual work income	\$ 13 559	\$ 13 559	
Disposable income if not working	\$ 12 118	\$ 12 893	
Disposable income if working	\$ 19 272	\$ 20 987	
<b>Net income if working</b>	<b>\$ 7 154</b>	<b>\$ 8 094</b>	<b>\$ 940</b>
<b>Net hourly gain (1 820 hours/year)</b>	<b>\$ 3.93</b>	<b>\$ 4.45</b>	<b>+ 52 cents</b>

Source: Godbout and Arseneau (2005), p.48.

Note: It is assumed here that the child of this household is younger than 7 years old but old enough to go to school (i.e. the household doesn't use childcare services).

These numbers suggest that the financial incentives can be interesting for lone parents that don't have pre-school children and that take on a full-time job at the minimum wage, but that for other lone parents, the previous system provided stronger incentives to go to work. However, it is important to remember that, as was mentioned previously, since the PWA program was complicated and that people needed to apply, the take-up rate was fairly low while the take up rate for the Work Premium is expected to be much higher. Hence, throughout the eligible population, the "net" financial incentives embedded in the Work Premium may be higher than suggested by these numbers since a lot of PWA eligible lone parents didn't take advantage of the program.

<sup>13</sup> The calculation is simple : 5 days/week \* 52 weeks/year \* \$5/day = \$1 300 /pre-school child per year (calculations from Godbout and Arseneau, 2005).

## **2.4 The impact of in-work benefits on labour force participation**

### **2.4.1 Theory**

#### ***2.4.1.1 Theory of labour supply***

It has been emphasized in the literature that there are different margins over which labour supply responses take place: the so-called extensive margin represents the participation decision while the intensive margin represents the choice over the amount of time to spend at work (Saez, 2002).<sup>14</sup> Policies such as work premiums are likely to have an influence on both margins.

To gain a better understanding of the labour supply response among the population, the basic static labour supply model is useful. In this model, it is assumed that individuals have preferences over leisure (to be understood as all non-market activities) and consumption, and that those preferences are determined by personal and family attributes such as education, the number of children, gender, age, etc. Given an exogenous wage rate as well as an exogenous non-wage income that determine the budget constraint, it is assumed that an individual maximizes his utility, thereby leading to a decision on the amount he consumes and the time he works. Moreover, it is assumed that leisure is a normal good (Fortin and Lacroix, 2002). In this setting, the introduction of a work premium can be seen as a change in the effective wage rate and budget set.

##### **2.4.1.1.1 Labour supply decisions under a linear tax system**

In a linear tax system, that is, when the budget constraint is linear, on the intensive margin, the labour supply response to a decrease in the tax rate would depend both on the substitution effect and the income effect. The decrease in the tax rate would mean a relative increase of the price of leisure over that of consumption because of the increased opportunity cost of not working. This would entail a substitution effect of leisure for consumption. However, this increase in the effective wage would also entail an income effect that would tend to increase both leisure and consumption since both are normal goods. The net impact on leisure would depend on the preferences of a given individual. This trade-off is shown in Figure 3, where the

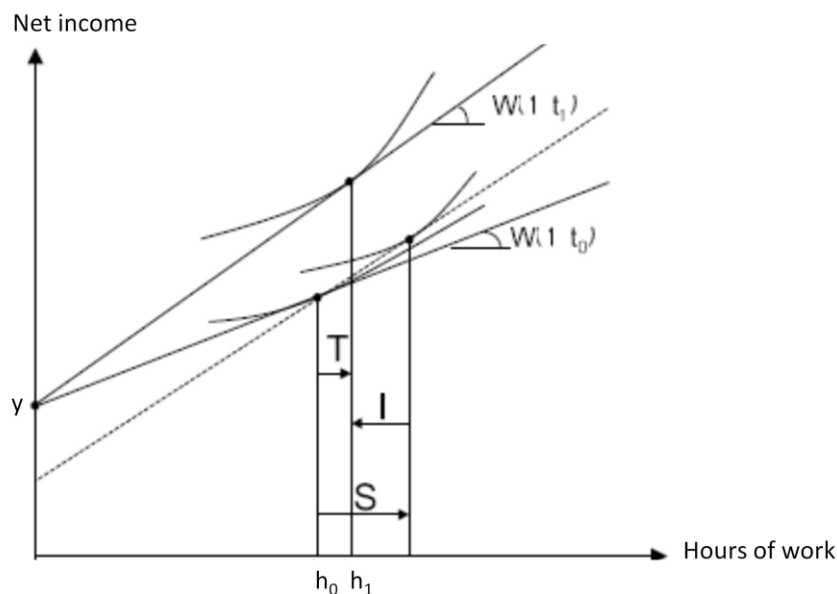
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<sup>14</sup> For highly skilled individuals, there is also another relevant margin: the effort to put into work (Meghir and Phillips, 2010).

substitution effect is assumed to dominate (i.e., leisure time decreases: the individual works more).

The decrease in the tax rate would also have impacts on the extensive margin. An individual works only if his effective wage rate (that is, his wage rate after all taxes and benefits have been taken into account) is superior to his reservation wage. With a tax rate decrease, all individuals who were previously on the labour market would remain on the labour market since the previous effective wage was already above their reservation wage. The tax decrease would, however, increase the number of people for whom the new effective wage rate would be greater than their reservation wage, thus making some previously voluntary non-employed people join the labour force.

**FIGURE 3**  
**LABOUR SUPPLY RESPONSE TO AN INCREASE IN THE EFFECTIVE WAGE RATE:**  
**SUBSTITUTION AND INCOME EFFECTS**



Source: Fortin and Lacroix (2002), p.6.

#### 2.4.1.1.2 Labour supply decisions under a non-progressive tax system (at least over the low-income range)

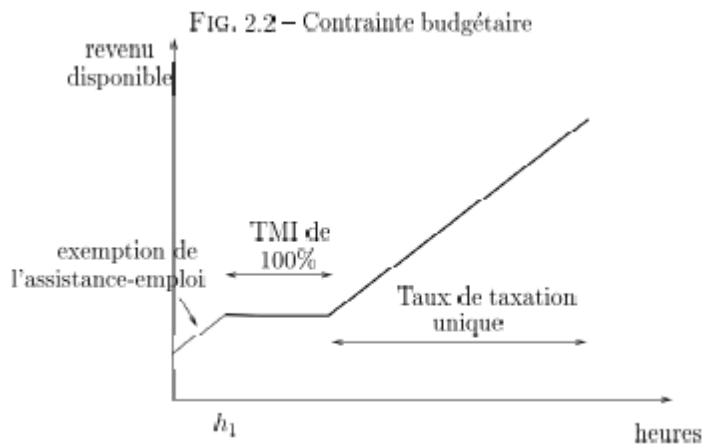
As shown by Duclos, Fortin and Fournier (2009), over the low-income range, the effective tax structure is far from being convex, let alone linear. Indeed, they have shown that low-income individuals can face effective marginal tax rates as high as 100% because of the effect of the retrieval of benefits. Hence, the budget constraint over the low-income range would more accurately be represented by a budget constraint that is not convex, and that is constituted of many linear segments because of the interaction of the tax system with the benefit system. It thus becomes more complex to analyze conceptually labour supply responses to a decrease in the effective marginal tax rate over a segment since a local optimum no longer necessarily is a global optimum. Moreover, as shown by Figures A.1, A.2 and A.3 in the appendix, the effective marginal tax rates faced by individuals are highly variable over the low-income range, so this complicates the conceptual analysis further.

We can, however, provide a big picture of the situation by simplifying the effective tax structure, bringing down the number of effective tax rates to three. Under this simplified tax system, individuals face a null effective tax rate for the first dollars they earn. After that, the effective tax rate spikes (let's assume it spikes to 100%) as benefits start to be withdrawn. Finally, once all benefits have been retrieved, the effective marginal tax rate goes down and stays at that level over the rest of the income range. This simplified tax structure is represented in Figure 4.

The impact of the introduction of a work premium on the budget constraint could be represented schematically in this graph by increasing the slope of the second segment (where the EMTR before the premium is 100%), and by introducing another segment right after with a slope somewhere in-between that of the second and last segment. Indeed, the premium starts to be given at the point where the marginal effective tax rate is 100%, that is, when social assistance benefits start to be retrieved. It then increases up to the point where the effective marginal tax rate is no longer 100%, that is, when the household is no longer eligible for social assistance. After that point, as income increases, the work premium becomes smaller until it is completely phased out.



**FIGURE 4**  
**THE BUDGET CONSTRAINT OVER THE LOW-INCOME RANGE**



- (1) This graph maps disposable income as a function of hours worked.
- (2) The three segments in this graph are, from left to right: the segment where additional earned income doesn't entail the retrieval of welfare benefits, the segment where welfare benefits are retrieved (effective marginal tax rate of 100% assumed), and the segment where all the welfare benefits have been retrieved and the individual faces a lower effective marginal tax rate.

Source: Lafond-Bélanger (2007), p.10.

Let's start by looking at the impact of the introduction of the work premium on labour force participation (extensive margin). Since with the introduction of the work premium, all the possible choices of hours of work on the budget constraint are associated with equal or greater earnings than before (and thus equal or greater utility), an individual that worked before the introduction of the work premium will continue to work (Eissa and Leibman, 1996). For people who didn't work, the greater after-tax income may entice some people to join the labour force. Hence, the total impact on labour force participation is positive. Theory predicts that individuals deciding to join the labour force would be working in the income range where they would receive a work premium. Indeed, the other income ranges were available before the introduction of the program, but these individuals had chosen not to work given those parameters, so they shouldn't change their decision now.

A given individual's reaction in terms of hours (intensive margin) to the introduction of a work premium would vary depending on the segment of the budget constraint on which he was previous to the introduction of such a policy.

- If someone was working over the income range over which social assistance benefits are retrieved (the income range over which the work premium is phased in at a constant rate), the impact of the introduction of the premium on hours worked would be ambiguous since the income effect and the substitution effect work in opposite directions. Indeed, leisure would be more costly, tending to increase hours of work, but the positive income effect would tend to decrease hours of work. However, we know that if the individual was to increase his hours of work, he would not increase his hours of work up to the point where he no longer receives the work premium since that option was available before the program but the individual hadn't chosen it.
- If someone was initially working so that his income was in the income range over which the premium is phased out, hours of work would decrease with the introduction of the program. Indeed, the substitution effect and the income effect would work in the same direction: the phasing out of the credit would increase the effective marginal tax rate above what it was before the program, which would decrease the relative cost of leisure, thus tending to decrease hours of work. Simultaneously, because of the increased earnings associated with the premium, the positive income effect would tend to decrease hours of work since leisure is a normal good. While reducing its hours of work, the individual could either decide to remain in the income range where the credit is phased-out, or move to the income range where the credit is phased-in.
- If someone's income was so low that his social benefits hadn't started to be decreased (i.e., if that person was in the income range for which he was not yet eligible for the premium), that person could decide to keep his hours of work constant or to increase his hours of work so as to benefit from the work premium, depending on its preferences.

- Finally, if before the introduction of the program, someone had earnings so that he wouldn't be eligible to receive the work premium, that individual could either keep his hours of work constant or decide to work less to qualify for the work premium.

The overall impact on hours of work in the population would thus depend on the initial distribution of income in the population.

This partial equilibrium analysis ignores general equilibrium considerations such as those raised by Scarth and Tang (2008). For example, they mention that, depending on the way this program is financed, there could be an adverse effect on the demand for labour. Wages could also be affected by the entry into the labour force of people who were previously voluntarily non-employed. However, the program in Quebec did not represent a significant portion of government spending, and we do not expect this program to have had a dramatic impact on labour force participation because of the relatively small size of its financial incentives, particularly those for singles. Thus, one could argue that those general equilibrium effects are probably quite small.

Moreover, this analysis ignores the fact that couples make joint labour supply decisions. However, since this project focuses only on the labour supply of singles and lone parents, those aspects will not be considered here.

#### **2.4.2 Empirical evidence**

The relevant margin differs by demographic and education groups. Since this project focuses on the impact of the Work Premium on single women and lone mothers, the review of the empirical evidence will focus on the labour supply of these groups.

For women with young children, taxes and benefits tend to affect both the decision to work as well as the number of hours worked. Aaberge et al. (1999) find that participation is more elastic amongst women from poorer families and that participation is likely to be the key margin of adjustment for poorer women. There is a consensus in the literature that the participation elasticity for lone mothers, who tend to be poor and face high costs of work, is among the highest of all demographic groups (Meghir and Phillips, 2010). As for the hours' decision, using a

structural model of lone mothers' labour supply, Blundell, Duncan and Meghir (1992) obtain an elasticity similar to that of married women (the largest elasticity reported is 0.34).

It is important to note that it is not sufficient to look at the size of the elasticity to understand labour supply effects of tax and benefits reform since non-convexities in the budget constraint (such as those introduced by the tax credit system) can induce large behavioural responses even when elasticities are small (Meghir and Phillips, 2010).

#### ***2.4.2.1 The Earned Income Tax Credit (United States)***

Meyer and Rosenbaum (2001), using a long time series of cross-sections, look at the numerous reforms that took place in the US in the 1980s and 1990s and conclude that 62% of the change in employment of lone mothers relative to single women can be attributed to changes in the taxation between 1984 and 1986 (those changes include the expansion of the Earned Income Tax Credit in those years) (Meghir and Phillips, 2010).

Eissa and Liebman (1996) estimate a participation elasticity of 1.16 for lone mothers (Meghir and Phillips, 2010). However, Meghir and Phillips (2010) question the validity of the control group that was used by Eissa and Liebman.

#### ***2.4.2.2 The Working Family Tax Credit and the Working Tax Credit (United Kingdom)***

Brewer et al. (2005) combine the use of a structural labour supply model with the impact of the reform of the Working Family Tax Credit to estimate the impact of the reform of this program on the labour supply of lone mothers. Their results suggest that, for lone mothers, the implied participation elasticity with respect to net work income<sup>15</sup> is 1.02 (Meghir and Phillips, 2010).

#### ***2.4.2.3 The Self-Sufficiency Project (Canada)***

Michalopoulos, Robins and Card (2005) look at the results of the "applicant study" of the Self-Sufficiency Project (SSP) (reminder: the "applicant study" targeted people that had been on welfare for only about a year in the Vancouver area of BC). They compare the overall employment rate, the full-time employment rate, average hours worked per month and average

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<sup>15</sup> The elasticity reported here is the uncompensated wage elasticity.

earnings per month of the recipients in the control and treatment groups (people in the treatment group were also allowed to apply for the supplement but they didn't receive any earnings supplement). They look at the effect of the program for the first 30 months after recipients started to receive the earnings supplement. They estimate that the SSP increased full-time employment from about 12 percentage points for lone parents. Hours worked per month increased by about 20. This big impact on hours is explained by the fact that earnings supplement were given only to those who sought full-time employment.

However, the authors note that there were some people who extended their stay on welfare to become eligible. In fact, they estimate that about 30% of supplement takers were people who would have worked full-time without the supplement ("windfall cases").

The authors compare these results with those obtained for the "recipient study" and they note that overall, the impacts on labour supply tended to be greater in the applicant study than in the recipient study.<sup>16</sup> Moreover, the impact of the SSP on monthly earnings of recipients in the applicant study was more than three times as high as the impact on monthly earnings of recipients in the recipient study, although the earnings supplement formula was the same in the two studies. The authors note that these differences could possibly be explained by the fact that participants to the applicant study may have had more time to do a good job search, by a change in the BC labour market (the applicant study took place in 1994 and 1995 while the recipient study took place from 1992 to 1995), or by difference in the sample used for these two studies (Michalopoulos, Robins and Card, 2005).

Michalopoulos (2005) looks at the effects of the SSP and three similar US programs that were implemented in the beginning of the 1990s. He notes that for these four programs, the effects on employment and earnings were more important and more persistent for the most disadvantaged families. Indeed, he notes that the effects were often substantial for individuals who had been long-term welfare recipients, who hadn't worked in a while, and who didn't have

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<sup>16</sup> The "recipient study, which took place in the Vancouver area of British Columbia as well as in New Brunswick, targeted people that had been on welfare for at least 11 of the last 12 months. The targeted population thus included a lot of long-term welfare recipients. To make the results of these two studies comparable, they look only at those of the applicant that were eligible and they look only at people from the recipient study who had been on welfare for only about a year at the time of the random assignment.

a high school diploma. Although the persistence of the effect of these programs was bigger for these individuals, the effects still decreased over time.

Michalopoulos (2005) also notes that programs that combined earnings supplement with employment services produced larger and longer-lasting effects than supplements alone. However, he mentions that the program's effect stemmed primarily from the earnings supplement.

#### ***2.4.2.4 The « Action Emploi » program (Quebec)***

Côté (2006) uses a before-after difference-in-difference estimator measuring the average impact of the program on recipients (indeed, since the take-up rate of the program was very low (7.4%), it is better to use the population of recipients as the treatment group instead of the population of eligible individuals). He finds that for single women aged between 18 and 29, the program decreased the average length of social assistance spells by 12.7%. For single women aged between 30 and 45, the impact was larger: the average length of welfare spells decreased by 16%. However, the impact was fairly low for women older than 45, for whom the decrease in the average length of welfare spells was only of 5.6%. For single men, there was no impact on the length of social assistance spell for men between 18-29 and those older than 45. However, the average length of social assistance spell decreased by 15.6% for men between 30 and 45. For single parents, the program did not seem to have an impact on the length of social welfare spells.

Lacroix (2010) also looks at the impact of the "treatment" on the "treated" (i.e., the recipients), this time using a multi-state multi-episode transition model. Looking only at single parents (the majority of recipients were singles and single parents), Lacroix (2010) obtains that the program *Action Emploi* increased the duration of "off-social assistance spells" and decreased the duration of social assistance spells slightly. However, he finds that the response to the program varied considerably with unobserved characteristics.

### **2.4.3 Anticipated impact of the Work Premium in Quebec**

To my knowledge, there is no empirical study assessing the impact of the Work Premium on labour supply “ex-post”. However, some studies have tried to anticipate the impact of the Work Premium on labour supply using structural models of labour supply as well as lab experiments. These results are presented below.

#### ***2.4.3.1 Results from the general equilibrium model of the Ministère des Finances du Québec***

At the time of the 2004-2005 Budget in which this measure was announced, the Ministère des Finances du Québec computed estimates of the anticipated impact of the Work Premium using its computable general equilibrium model (General equilibrium model of the Ministère des Finances du Québec (GEMFQ)). At the time, it was anticipated that the Work Premium would increase employment by 9 % for households whose income was below \$ 15 000 (Ministère des Finances du Québec, 2004 (c)).

#### ***2.4.3.2 Results from a structural model***

Parisé (2007) builds a structural model of labour supply using data from the Survey of Labour and Income Dynamics as well as a program from Fournier (2005) that estimates taxes and benefits for households. Using this model, she simulates the impact of the Work Premium on labour force participation and hours worked of single women with and without children. She assumes a discrete choice over hours: a woman can decide not to work, to work part-time, or to work full-time. Moreover, she assumes that the take-up rate of the PWA program was 50%.<sup>17</sup>

Her model predicts an increase of 0.6 percentage point in the participation rate of women with the program (single women and lone mothers taken together). The increase is slightly higher for lone mothers, whose participation rate is predicted to increase by 1.9 percentage point. Moreover, her model predicts that women entering the labour force are three times as likely to decide to work part-time rather than full-time, according to her model. In addition to that, she estimates that 0.8% of the women who were working full-time (40 hours/week) before the introduction of the work premium will switch to part-time work (20 hours/week) with the

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<sup>17</sup> As mentioned previously, the Parental Wage Assistance program (PWA) was the income support program for working parents that was replaced by the Work Premium tax credit.

introduction of the work premium. Indeed, the majority of women in her sample are in the income range where the work premium is phased out or in the income range where they are no longer eligible for the work premium, two regions where the work premium entails incentives to reduce hours worked.

Overall, she estimates that the net impact on hours worked (including those who move into the labour force and those who decrease or increase their hours of work) is positive but negligible: the average number of hours worked per week in her sample increases from 22.18 to 22.19, an increase of 0.05 percentage point. For single women without children, who are considered less responsive to financial incentives in the literature and for whom the Work Premium is smaller, there is no impact on the average number of hours worked. For lone mothers, her model predicts that the average number of hours worked per week increases slightly from 23.51 to 23.55, an increase of 0.17 percentage point.

#### ***2.4.3.3 Results from a lab experiment***

Brouillette and Fortin (2008) conducted a lab experiment over 13 sessions with 200 participants aged between 18 and 65 who had 12 years of education or less. During each session, participants played five games on a computer. In each of these games, participants received an amount of money that varied with the number of tasks they accomplished correctly on the computer. The incentives in the first game corresponded to those embedded in a system where there is social assistance but no in-work benefits. The financial incentives in the second game mimicked those of a system with social assistance and the PWA program. The financial incentives in the three other games mimicked those of a system with social assistance and a work premium, the generosity of the work premium varying from one game to another. The focus of the study was to examine the impact of the Work Premium on lone parents and singles.

Brouillette and Fortin (2008) use two models to analyze the lab results. First, they analyze the average impact of the work premium by using a tobit model with random effects. They find that, compared to the regime with social assistance but no in-work benefits, work premium regimes have a negative but insignificant impact on the number of tasks accomplished by participants. Only in the regime with the most generous work premium does this negative impact become significantly different from zero. This negative impact is explained by the fact that under the



regime with social assistance but no in-work benefits, the majority of participants accomplished a number of tasks that put their income in the income range where the work premium is withdrawn when such a program is implemented. Theory predicts that the impact of a work premium on hours of work for individuals in this region is unambiguously negative.

The authors also use a structural model (which takes the form of a mixed multinomial logit model) to analyze the results. For lone parents, they obtain that the introduction of the work premium increases the participation rate. For lone parents who didn't do a lot of tasks before the introduction of the work premium, the number of tasks completed increases. However, for lone parents who did a lot of tasks before the introduction of the work premium, the number of tasks accomplished decreased with the introduction of the work premium. The results are similar for singles, although the effects tend to be smaller since the work premium is less generous. The authors note that these results are similar to those obtained by Parisé (2007).

The authors however note certain limitations of their experiment. First, they assumed that the take-up rate for the PWA program is 100%. Moreover, there are certain limitations associated with lab experiments in general. For example, the analysis doesn't take into account the temporal dimension over which individuals do the leisure/work decisions. Moreover, it is possible that some participants had for their goal only to get the maximum financial compensation and so put in the maximum amount of effort no matter what the incentives were. Finally, the sample was representative of the Montreal urban population, so one must be careful when generalizing the results to the province as a whole.

### 3. METHODOLOGY

We use a difference-in-difference (DID) approach to assess empirically the labour supply response to the Work Premium in Quebec. More specifically, we compare the participation in the labour force and hours worked in Quebec in 2004 and 2006 (the year before and the year after the Work Premium was implemented), using the Ontario population as a control group. We restrict our attention to single women and lone mothers. Moreover, because the literature suggests labour supply behaviors differ between demographic groups (Meghir and Phillips, 2010), we consider these two groups separately. For each of these treatment groups, the control group is the corresponding demographic group in Ontario. Since there is no variable indicating the presence of children in our dataset, we use the presence of federal or provincial child benefits as a proxy for the presence of children.

For a given treatment group (ex: single women), following the difference-in-difference (DID) approach, we can write the impact of the Work Premium on this given group,  $\Delta$ , as :

$$\Delta = E(y_{i,2006} - y_{i,2004} | w_i = 1) - E(y_{i,2006} - y_{i,2004} | w_i = 0)$$

where  $y_i$  is a labour supply outcome for individual  $i$ , and where  $w_i$  is a dummy variable indicating whether the individual  $i$  is in the treatment group ( $w_i = 1$  if the individual lives in Quebec and  $w_i = 0$  if the individual lives in Ontario).

The difference-in-difference approach relies on two identifying assumptions. First, there shouldn't be any contemporaneous shocks affecting labour supply outcomes of the treatment and control groups during the years considered in this analysis. There is however one contemporaneous shock in Quebec: in 2006, a deduction for all workers was introduced to compensate partially workers for the expenses associated with working. The amount of this deduction is equivalent to 6% of earned income, and can reach up to \$500. This is a confounding shock and we will thus not be able to differentiate between the impact of the Work Premium and the impact of this deduction. However, both programs have a similar goal and reinforce each other. Hence, our results will reflect the combined impact of the Work Premium and the deduction. The second identifying assumption is that underlying trends in labour force participation and in hours worked do not differ between Quebec and Ontario during the period considered. We will examine the plausibility of that assumption in another section.

In this analysis, as in other analyses using the DID setting (see, for example, Dumont et al, 2008) we will limit ourselves to the estimation of the so-called “Average Treatment effect on the Treated” (ATT), that is, the impact the Work Premium has had in Quebec in the year considered (2006). We will not seek to estimate the more general “Average Treatment Effect” (ATE), that is, the weighted average of the impact of this measure on the treated and of the hypothetical impact of the measure on the control group (Givord, 2010). Indeed, the estimation of the ATE would require us to make assumptions on the impact this measure would have had if it had been applied in Ontario as well. Moreover, if we wish to provide insights for policy making in Quebec, the ATE, which would include information about the impact the program would have if it was implemented in Ontario, may not be an interesting concept.

As mentioned in an earlier section, the labour supply response to the Work Premium should be observed on both the extensive margin (participation in the labour force) and the intensive margin (hours worked). We thus analyze the impact of the Work Premium on both participation in the labour force and hours worked. For the participation outcome, following Eissa and Liebman (1996), the participation variable is defined as a dummy variable taking a value of one if the annual number of hours worked is positive, and taking a value of zero otherwise.

For hours worked, we look at the total number of hours worked during the reference year. It would have been interesting to know whether people who start to work as a result of the Work Premium decide to work full-time or part-time and if those who are already working increase or decrease their hours of work as a result of the Work Premium. Unfortunately, since we don't use panel data, we are not able to separate the effect of the change in the hours worked induced by existing workers changing the number of hours they work as a result of the program from that of changes in the average number of hours worked induced by the entry of new workers in the labour force (if those new workers have a tendency to work on average a different number of hours than existing workers). Thus, just like Eissa and Liebman (1996), we will look at total hours worked per year, which will be impacted by both effects.

Like Eissa and Liebman, we will start by estimating basic labour supply results, that is, use the DID approach on the mean of the participation and hours worked variables to assess the impact

of the Work Premium. A straightforward way to obtain these results is to use a simple regression analysis where we don't introduce any covariates. To estimate the impact on participation, following Eissa and Liebman (1996), we use a probit model, while to estimate the impact on hours worked, we use a simple linear regression model. Both models can be represented by the following equation:

$$y_i = \beta_0 + \beta_1 w_i + \beta_2 t_i + \beta_3 (w_i * t_i) + u_i$$

where  $y_i$  is a dummy variable reflecting the labour force participation status of individual  $i$ <sup>18</sup> or a discrete variable expressing the total number of hours worked per year,  $w_i$  is a dummy variable indicating whether the individual  $i$  is in the treatment group ( $w_i = 1$  if the individual lives in Quebec and  $w_i = 0$  if the individual lives in Ontario), and  $t_i$  is a dummy variable indicating whether the observation is from the period after the Work Premium was implemented ( $t_i = 1$  for the year 2006 and  $t_i = 0$  for the year 2004). The third term of the equation,  $(w_i * t_i)$ , thus takes a value of one for all the observations from Quebec in 2006, that is, all the observations that are exposed to the treatment (the Work Premium). It is easy to show that, in the linear regression<sup>19</sup>, the coefficient of this term,  $\beta_3$ , is equal to the average treatment effect on the treated, defined previously as:

$$\Delta = E(y_{i,2006} - y_{i,2004} | w_i = 1) - E(y_{i,2006} - y_{i,2004} | w_i = 0).$$

We will then refine our analysis by introducing in this regression analysis covariates that also have an impact on labour force participation. This will allow us to reduce the variance of our estimate, but, more importantly, it will allow us to prevent biases that could prevail if we failed to control for other factors affecting labour force participation and hours worked, such as changes in the composition of the groups studied.

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<sup>18</sup> The participation variable takes a value of 1 for all individuals who report at least one hour of work.

<sup>19</sup> However, in non-linear models such as the model we use for participation, the marginal effect of any variable (here, the average treatment effect on the treated) varies depending on the value other covariates take. Thus, the derivation of the average treatment impact on the treated is not as straightforward as in the linear case, even more so when the variable of interest is an interaction term (Norton, Wang and Ai, 2004). To derive the marginal effect associated with the variable of interest to us, as suggested by Norton, Wang and Ai (2004), we use a built-in function in Stata designed to compute marginal effects in non-linear models where there is an interaction term.

The general setting of this model is the following:

$$y_i = \beta_0 + \beta_1 w_i + \beta_2 t_i + \beta_3 (w_i * t_i) + \beta_4 X_i + u_i$$

where  $X_i$  is a vector of personal characteristics of the individuals considered that could affect their labour force participation or the annual number of hours they work: education level (and its square), age (and its square), a dummy indicating whether the person lives in a city or a rural area, a dummy indicating whether the person is a part-time student, and the total of investment income and capital gains<sup>20</sup>. Unfortunately, we don't know the number of children for people in the lone mothers group, so we can't include this variable in the regression even though it probably has an influence on labour supply.

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<sup>20</sup> The objective of including the sum of investment income and capital gains is to somehow take into account that unearned income (defined as income that doesn't result from working) can affect labour force participation and hours worked through an income effect. However, when including this variable, one has to be careful to exclude the types of unearned income that depend on one's market income (and thus, on participation in the labour force and hours worked). This is why we don't look at transfers from the government and focus on two sources of income whose level should be independent from participation in the labour force and hours worked: investment income and capital gains.

## 4. DATA

The public-use microdata files (PUMFs) of the the Survey of Labour and Income Dynamics (SLID) from Statistics Canada are used for this project. While the SLID is a longitudinal dataset, the PUMFs for the SLID are cross-sectional.<sup>21</sup> These datasets have many advantages over other surveys. First, compared to the census, for example, they include a lot of information related to labour, which is useful for this project. Moreover, the interviews for the SLID are conducted annually, while censuses are separated by five years. Since this project involves comparing data before and after the implementation of the Work Premium to identify its impact, to facilitate the identification, it is preferable that the two years used for the comparison aren't far way from each other.

The PUMFs of the SLID consist of four different files: the person file, the key file, the census family file, and economic family file. The person file, in which there is a record for each person aged 16 and over, has been chosen to work with. This choice is motivated by the fact that it contains more demographic and labour information than the economic family file, the census family file or the key file.

### 4.1 Population considered

We consider people aged between 16 and 60, but eliminate from our sample disabled people as well as full-time students. We also eliminate from the sample those whose marital status is unknown, those who report a positive earned income but no hours of work, and those who have negative earnings or a negative unearned income or a negative cumulative amount for investment income and capital gains.

Within that subset of the population, as mentioned previously, we will look at two treatment groups separately: single women and lone mothers (hereafter referred to as treatment groups A). We use as control groups the Ontario counterparts of these demographic groups (hereafter

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<sup>21</sup> In fact, since their first release in 1996, the PUMFs of the SLID have been the primary source of cross-sectional household data in Canada. In that respect, they replace the PUMFs of the Survey of Consumer Finance (SCF) that were produced up to 1997 inclusively (Statistics Canada, 2006).

referred to as control groups A). We will also consider alternative treatment groups where we will focus on people who don't have the potential to have high earnings since they are the one whose behavior is more likely to be affected by the Work Premium. However, since income is endogenous to the participation and hours of work decision, we use the level of education as a way to identify this subset of the population. We thus use as treatment groups the same demographic groups that were used previously, but this time we restrict the sample to people who have only a high school diploma or less (treatment groups B). For these treatment groups, we use as control groups the Ontario corresponding demographic groups with a high school diploma or less (control groups B.1).

#### **4.2 Alternative control group for individuals in Quebec with a high school diploma or less**

To test the robustness of the results obtained for people with a high school diploma or less (treatment groups B), we also use an alternative control group. Adopting a methodology similar to that used by Eissa and Liebman to test the robustness of their results, we use differences in education level as a way to obtain a control group instead of using the comparison with Ontario. Indeed, people with a high level of education are not expected to change their behavior with the introduction of the Work Premium, so this part of the population can be used as a control group. Hence, for both single women and lone mothers, we use as a control group single women or lone mothers who have more than a high school diploma (control groups B.2). The general setting of this model is the following:

$$y_i = \beta_0 + \beta_1 w_i + \beta_2 t_i + \beta_3 (w_i * t_i) + \beta_4 X_i + u_i$$

where  $X_i$  is a vector of personal characteristics of the individuals considered that could affect their labour force participation or the number of hours they work: education level (and its square), age (and its square), a dummy indicating whether the person lives in a city or a rural area, a dummy indicating whether the person is a part-time student, and the total of investment income and capital gains. The dependant variable  $y_i$  is a dummy variable reflecting the labour force participation status of individual  $i$ <sup>22</sup> or a discrete variable expressing the total number of

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<sup>22</sup> The participation variable takes a value of 1 for all individuals who report working at least one hour.

hours worked per year,  $w_i$  is a dummy variable indicating whether the individual  $i$  is in the treatment group ( $w_i = 1$  if the individual has a high school diploma or less and  $w_i = 0$  if the individual has more than an high school diploma), and  $t_i$  is a dummy variable indicating whether the observation is from the period after the Work Premium was implemented ( $t_i = 1$  for the year 2006 and  $t_i = 0$  for the year 2004). The third term of the equation,  $(w_i * t_i)$ , thus takes a value of one for all the observations who have a high school diploma or less in 2006, that is, all the observations that are exposed to the treatment (the Work Premium).

### **4.3 Descriptive statistics**

#### **4.3.1 Single women**

Table 4 presents summary statistics for single women in Quebec and Ontario (treatment group A, control group A), for the year prior to the introduction of the Work Premium and the year after its introduction. The participation rate and the total annual hours worked are inferior in Quebec for both of the years considered. On average, single women in Quebec are older than single women in Ontario. The proportion of single women living in rural areas is higher in Quebec, while the proportion of part-time students is similar in the two provinces (slightly higher in Quebec). The average education level is higher in Ontario (around 14 years of education while the average stands at around 13.5 years in Quebec). Earnings are also higher in Ontario for both of the years considered, which is consistent with the higher participation rate and higher total annual hours of work observed in that province. Unearned income is much higher in Quebec, probably reflecting the generosity of transfers. Investment income and capital gains are much higher in Quebec in 2004, but in 2006 there is not much difference between the two provinces on that level.

Table 5 presents summary statistics for the alternative treatment group (single women in Quebec with a high school diploma or less, i.e. treatment group B) and its control groups. Both in Quebec and Ontario, the participation rate and annual hours worked of single women with a low level of education are much lower than those of the average single woman. As for single women in general, both indicators are lower in Quebec than in Ontario for single women with a low level of education. In Quebec, these women are older and more likely to live in a rural area than the



average single women, while we don't observe those marked differences in Ontario. Just like for single women in general, the mean level of education and mean earnings are inferior in Quebec than in Ontario for single women who have a high school diploma or less, but unearned income is higher in Quebec. In 2004, for these women, investment income and capital gains are much higher in Quebec than in Ontario, but the trend reverses in 2006.

When it comes to single women in Quebec who have more than a high school diploma (treatment group B.2), one notes immediately their higher participation rate in the labour force as well as their higher number of hours worked. They are younger on average than single women with a high school diploma or less in Quebec, they are less likely to live in rural areas, more likely to be studying (part-time), and they have higher earnings and a lower unearned income. In terms of investment income and capital gains, in 2004, it is higher than for single women with a high school diploma or less, but the reverse is true for 2006.

These differences in demographic characteristics between the treatment groups and their respective control groups highlight the importance of controlling for those characteristics when doing the regression analysis. Indeed, since these differences imply that demographic characteristics are correlated with at least one of the independent variables in the regression without covariates and that we suspect that these characteristics have an impact on labour supply, failure to control for those could bias the estimated impact of the Work Premium. Additionally, controlling for those demographic characteristics will help to prevent biases if a shock contemporaneous to the Work Premium had an impact on labour supply and that its impact differed depending on demographic characteristics.

**TABLE 4****DESCRIPTIVE STATISTICS FOR SINGLE WOMEN – TREATMENT GROUP A**

(Treatment group A: single women in Quebec; Control group A: single women in Ontario)

	Treatment group A 2004		2006		Control group A 2004		2006	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Participation rate	0.80	0.02	0.81	0.02	0.86	0.01	0.86	0.02
Total annual hours of work	1 337	43	1 319	44	1 493	37	1 513	42
Average weekly hours of work	25.7	0.8	25.4	0.9	28.7	0.7	29.1	0.8
Age	40.3	0.8	41.0	0.8	36.5	0.6	37.4	0.6
Rural area (dummy)	0.10	0.01	0.10	0.01	0.04	0.01	0.03	0.01
Part-time student (dummy)	0.13	0.02	0.15	0.02	0.12	0.01	0.13	0.02
Education level	13.6	0.2	13.5	0.2	14.1	0.1	14.0	0.2
Earnings	22 155	968	22 211	1 028	24 471	885	27 461	1 105
Unearned income	6 028	603	6 090	591	3 706	322	4 974	556
Investment income and capital gains	1 129	264	789	329	579	109	798	134
Number of observations	769		658		1068		874	

Note: The standard errors reported are robust to heteroskedasticity.

**TABLE 5****DESCRIPTIVE STATISTICS FOR SINGLE WOMEN – TREATMENT GROUP B**

(Treatment group B: single women in Quebec with a high school diploma or less; Control group B.1: single women in Ontario with a high school diploma or less; Control group B.2: single women in Quebec with more than a high school diploma)

	Treatment group B				Control group B.1				Control group B.2			
	2004		2006		2004		2006		2004		2006	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Participation rate	0.58	0.04	0.60	0.04	0.76	0.03	0.68	0.04	0.90	0.02	0.89	0.02
Total annual hours of work	911	80	849	73	1 119	70	1 083	82	1 532	49	1 489	51
Average weekly hours of work	17.5	1.5	16.3	1.4	21.5	1.4	20.8	1.6	29.5	0.9	28.6	1.0
Age	47.6	1.4	49.3	1.3	37.4	1.3	38.7	1.6	36.9	0.9	38.0	0.9
Rural area (dummy)	0.16	0.02	0.18	0.03	0.05	0.01	0.03	0.01	0.07	0.01	0.08	0.01
Part-time student (dummy)	0.04	0.02	0.02	0.01	0.05	0.01	0.05	0.02	0.17	0.02	0.19	0.03
Education level	9.3	0.2	9.8	0.2	10.6	0.2	10.2	0.4	15.5	0.2	14.9	0.2
Earnings	11 771	1 263	11 888	1 429	12 519	950	14 689	1 469	26 920	1 218	25 946	1 259
Unearned income	9 357	994	8 569	1 218	4 586	593	5 915	788	4 500	750	5 193	665
Investment income and capital gains	1 521	467	322	71	469	189	864	252	949	320	958	447
Number of observations	258		215		341		233		511		443	

Note: The standard errors reported are robust to heteroskedasticity.

### 4.3.2 Lone mothers

Table 6 presents summary statistics for lone mothers in Quebec and in Ontario (treatment group A, control group A), before and after the introduction of the Work Premium. Just like for single women, annual hours worked are inferior in Quebec for both of the years considered. However, while the participation rate is higher in Ontario in 2004, it is higher in Quebec than in Ontario in 2006. This could potentially indicate a positive impact of the Work Premium on the participation rate of lone mothers, but regression analysis will be required to make sure this difference is not due to other factors. Lone mothers in Quebec tend to be slightly older in Quebec, but the difference is marginal. As for single women, the proportion of lone mothers living in rural areas is higher in Quebec. In 2004, the proportion of lone mothers studying (part-time) was higher in Quebec, but the trend is reversed in 2006. Just as for single women, lone mothers in Ontario are on average more educated, but the difference is quite small, less pronounced than for single women. Additionally, while earnings are similar in Ontario and Quebec in 2004, they are higher in Ontario in 2006. Finally, unearned income is higher in Quebec, as are investment income and capital gains.

Table 7 presents summary statistics for the alternative treatment group (lone mothers in Quebec with a high school diploma or less) and its control groups. The participation rate for lone mothers with a low education is lower than the average participation rate for lone mothers, for all the combinations of year and province considered. In Quebec, total annual hours worked are also superior for lone mothers in general compared to lone mothers with a low level of education, while there is no marked difference between the two groups in Ontario. Among lone mothers with a low level of education, almost none are studying (part-time), both in Quebec and Ontario. Again, for both 2004 and 2006, lone mothers with a high school diploma or less in Quebec work fewer hours per year than their Ontarian counterparts, and have lower earnings. They are also more likely to be living in a rural area. Finally, unearned income is higher in Quebec, as are investment income and capital gains (investment income and capital gains are on average quasi null for Ontarian women with a low level of education).

When the group of lone mothers in Quebec with more than a high school diploma is considered (treatment group B.2), we note that the participation rate and total annual hours of work are

much higher than for lone mothers with a high school diploma or less. Average earnings are also considerably higher. A greater percentage of these women are studying (part-time), although there is an important decrease in that proportion from 2004 to 2006. A lower proportion of these women live in rural areas, and their unearned income is also lower than that of women with a low level of education. Their level of investment income and capital gains in 2004 is similar to that of lone mothers with a high school diploma or less, but in 2006, the investment income and capital gains of the latter group are higher.

Again, for the reasons mentioned previously, these differences in demographic characteristics between the treatment-control group pairs underline the importance of controlling for those characteristics in regression analysis.

**TABLE 6**  
**DESCRIPTIVE STATISTICS FOR LONE MOTHERS – TREATMENT GROUP A**  
(Treatment group A: lone mothers in Quebec; Control group A: lone mothers in Ontario)

	Treatment group A				Control group A			
	2004		2006		2004		2006	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Participation rate	0.83	0.04	0.87	0.04	0.91	0.03	0.85	0.03
Total annual hours of work	1 414	80	1 437	87	1 547	61	1 528	80
Average weekly hours of work	27.2	1.5	27.6	1.7	29.8	1.2	29.4	1.5
Age	38.9	0.7	38.2	1.0	37.5	0.7	38.0	0.8
Rural area (dummy)	0.14	0.02	0.08	0.02	0.06	0.02	0.05	0.01
Part-time student (dummy)	0.08	0.03	0.02	0.01	0.05	0.02	0.07	0.02
Education level	13.6	0.4	13.0	0.3	13.8	0.2	13.4	0.2
Earnings	25 210	1 915	24 547	2 135	25 171	1 596	26 823	942
Unearned income	9 105	640	12 942	977	8 928	579	10 165	680
Investment income and capital gains	484	196	1 172	613	180	71	252	129
Number of observations	215		208		264		246	

Note: The standard errors reported are robust to heteroskedasticity.

**TABLE 7****DESCRIPTIVE STATISTICS FOR LONE MOTHERS – TREATMENT GROUP B**

(Treatment group B: lone mothers in Quebec with a high school diploma or less; Control group B.1: lone mothers in Ontario with a high school diploma or less; Control group B.2: lone mothers in Quebec with more than a high school diploma)

	Treatment group B				Control group B.1				Control group B.2			
	2004		2006		2004		2006		2004		2006	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Participation rate	0.73	0.07	0.80	0.08	0.84	0.06	0.83	0.07	0.90	0.04	0.89	0.04
Total annual hours of work	1 210	136	1 346	182	1 478	137	1 547	179	1 543	92	1 474	98
Average weekly hours of work	23.3	2.6	25.9	3.5	28.4	2.6	29.7	3.4	29.7	1.8	28.3	1.9
Age	39.2	1.3	39.0	1.8	36.0	1.3	37.3	1.8	38.7	0.9	37.8	1.1
Rural area (dummy)	0.18	0.05	0.09	0.03	0.07	0.04	0.05	0.03	0.11	0.02	0.07	0.02
Part-time student (dummy)	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.13	0.05	0.03	0.01
Education level	10.4	0.3	9.9	0.4	11.1	0.2	10.7	0.3	15.7	0.3	14.2	0.3
Earnings	18 981	2 736	17 649	4 041	21 820	2 996	22 084	4 180	29 167	2 439	27 357	2 480
Unearned income	9 566	981	15 815	2 575	8 438	931	12 138	1 682	8 813	830	11 771	847
Investment income and capital gains	455	340	2 144	1 663	37	22	11	5	502	236	776	525
Number of observations	83		61		76		61		132		147	

Note: The standard errors reported are robust to heteroskedasticity.

## **5. TESTING THE VALIDITY OF THE IDENTIFYING ASSUMPTIONS (PARALLEL TRENDS)**

The identification of the impact of the Work Premium relies on the assumption that, from 2004 to 2006, in the absence of the Work Premium, the changes in labour force participation and hours worked would have been the same in Quebec and in Ontario. More generally, to allow the identification of the impact of the Work Premium, the trend in the labour force participation and hours worked that would have prevailed in the two provinces if the Work Premium hadn't been introduced should be parallel in the periods preceding and following the introduction of the Work Premium.

As is commonly done in empirical studies using DID, we thus test for the presence of parallel trends in labour force participation and hours worked during the periods preceding and following the introduction of the Work Premium. We do so for every combination of treatment and control group that we use in our analysis, for the five years that preceded the introduction of the Work Premium (2000 to 2004) and the five years that followed (2006-2010). However, when assessing if the participation rate and the annual number of hours worked follow parallel trends in the treatment and control groups, one has to keep in mind that the mean participation rate and annual number of hours worked estimated for each group for the years considered are only estimates of the population values. Thus, when these estimates do not seem to follow parallel trends, before discarding a combination of treatment-control group, it is useful to look at the average standard error of the estimates reported for each group below the graphs, as it is a good indication of whether the estimates are precise (and thus more reliable to assess if the trends are parallel).

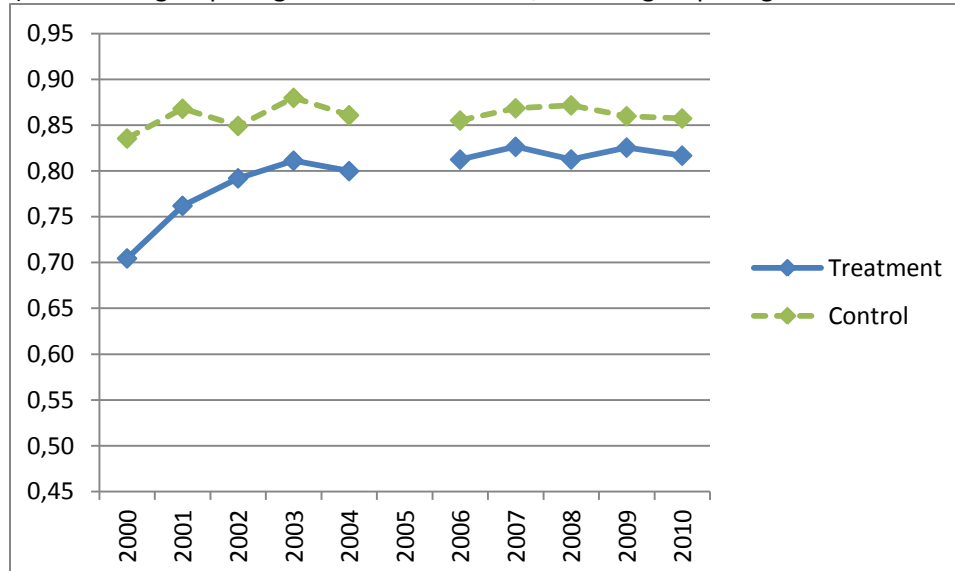
## 5.1 Single women

### 5.1.1 Labour force participation

It appears that the participation rate of single women in Quebec follows a similar evolution to that of single women in Ontario starting in 2002, as shown by Figure 5. We observe a divergence in 2008 but that could perhaps be linked to potential differences in the way the recession affected the labour market in the two provinces. This thus suggests that single women in Ontario are a good control group for single women in Quebec when we consider the labour force participation outcome.

**FIGURE 5**

**MEAN LABOUR FORCE PARTICIPATION OF SINGLE WOMEN – TREATMENT GROUP A**  
(Treatment group: single women in Quebec; Control group: single women in Ontario)



- (1) The participation variable is a binary variable taking a value of 1 when the annual number of hours worked is positive.
- (2) The average standard errors for the means presented are respectively 0.02 and 0.02 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

Figure 6 shows that the mean participation rate in treatment group B and control group B.1 don't evolve as similarly as those of treatment group A and control group A. The average standard errors are, however, a little larger (0.04 percentage point versus 0.02 percentage point) because the sample size is smaller, so this doesn't mean that we should reject altogether this combination of treatment-control group. Indeed, the fact that the trends aren't exactly parallel could be due to imprecision of the estimates. Moreover, if it wasn't for divergences in



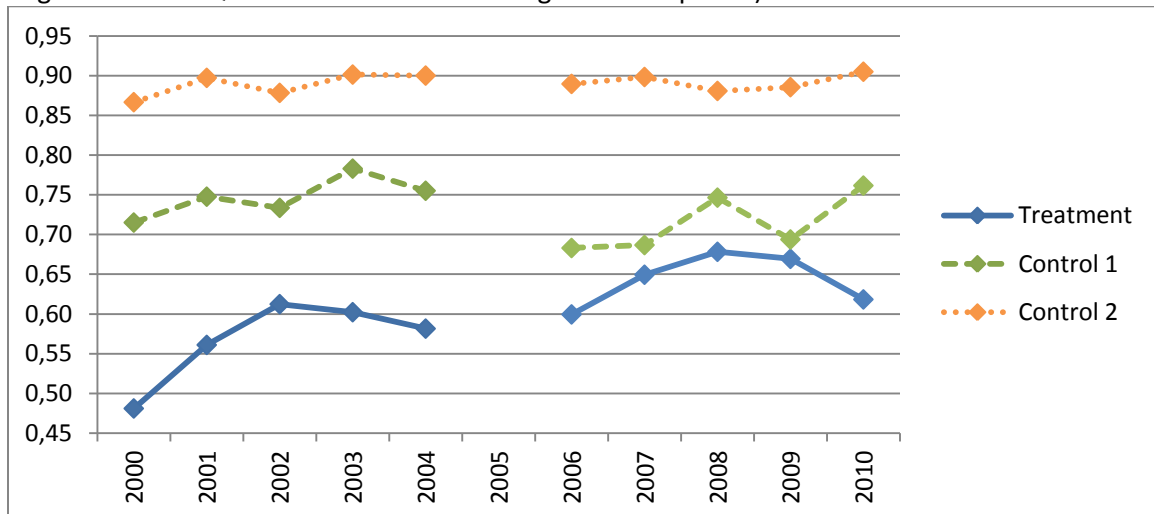
2002 and 2007, one could say that the participation has evolved similarly in the two provinces from 2000 to 2008. Thus, although we should be more careful with the estimates we will derive from this combination of treatment/control group, we should not discard it.

As for the alternative control group, Figure 6 suggests that the evolution of the participation rate for that group differs from that of the treatment group. Thus, this suggests that the this alternative control group may not be as good as the first one and that estimates derived using this alternative treatment group are likely less reliable.

**FIGURE 6**

**MEAN LABOUR FORCE PARTICIPATION OF SINGLE WOMEN – TREATMENT GROUP B**

(Treatment group: single women in Quebec with a high school diploma or less; Control group 1: single women in Ontario with a high school diploma or less; Control group 2: single women in Quebec with more than a high school diploma)



(1) The participation variable is a binary variable taking a value of 1 when the annual number of hours worked is positive.

(2) The average standard errors for the means presented are respectively 0.04, 0.04 and 0.02 for the treatment group, the first control group and the second control group.

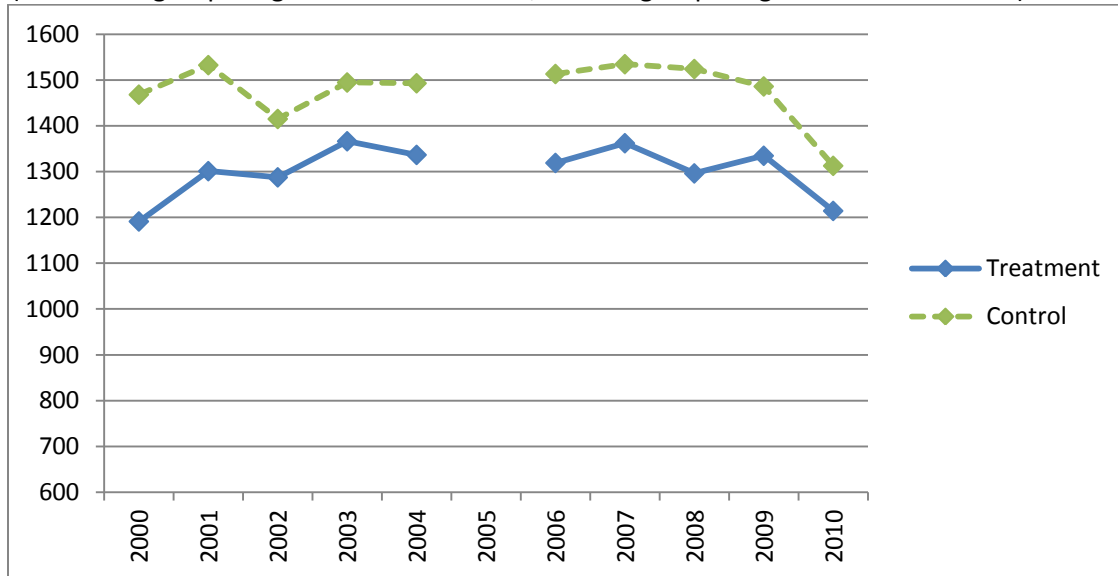
Source: PUMFs of the SLID (person file).

**5.1.2 Annual hours worked**

Annual hours worked by single women in Quebec and in Ontario in Figure 7 evolve quite similarly starting from 2002, the year 2008 once again standing out as a year where we can see a divergence between the trends. As mentioned previously, this divergence could be attributed to a differentiated impact of the recession in the two provinces and doesn't seem to

compromise the use of single women in Ontario as a good control group to assess variations in hours worked for single women in Quebec.

**FIGURE 7**  
**MEAN ANNUAL HOURS WORKED OF SINGLE WOMEN – TREATMENT GROUP A**  
 (Treatment group: single women in Quebec; Control group: single women in Ontario)



(1) The average standard errors for the means presented are respectively 45 and 39 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

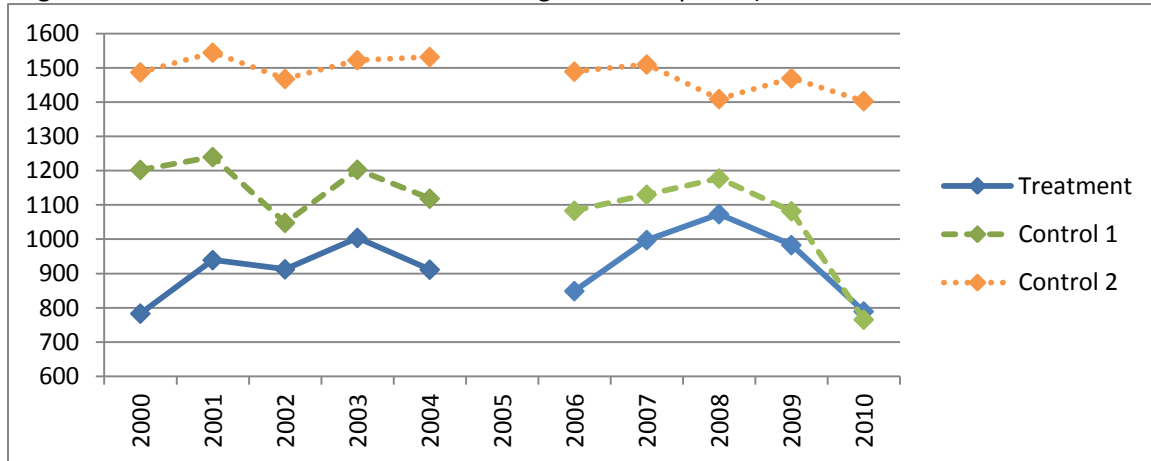
Figure 8 shows that over the period 2002 to 2007, annual hours worked by single women in Quebec with a high school diploma or less and their Ontarian counterparts also seem to follow parallel trends, while this doesn't seem to be true after that. Since we are more concerned about the trend in hours worked in the years closer to the reform, it seems reasonably safe to use this combination of treatment and control group.

The alternative control group used (single women in Quebec with more than a high school diploma) here again doesn't seem to be as good as the previous one, as shown in Figure 8. We should thus interpret the estimates produced for the impact of the Work Premium on annual hours worked using this control group with some degree of caution.

**FIGURE 8**

**MEAN ANNUAL HOURS WORKED OF SINGLE WOMEN – TREATMENT GROUP B**

(Treatment group: single women in Quebec with a high school diploma or less; Control group 1: single women in Ontario with a high school diploma or less; Control group 2: single women in Quebec with more than a high school diploma)



(1) The average standard errors for the means presented are respectively 77, 75 and 52 for the treatment group, the first control group and the second control group.

Source: PUMFs of the SLID (person file).

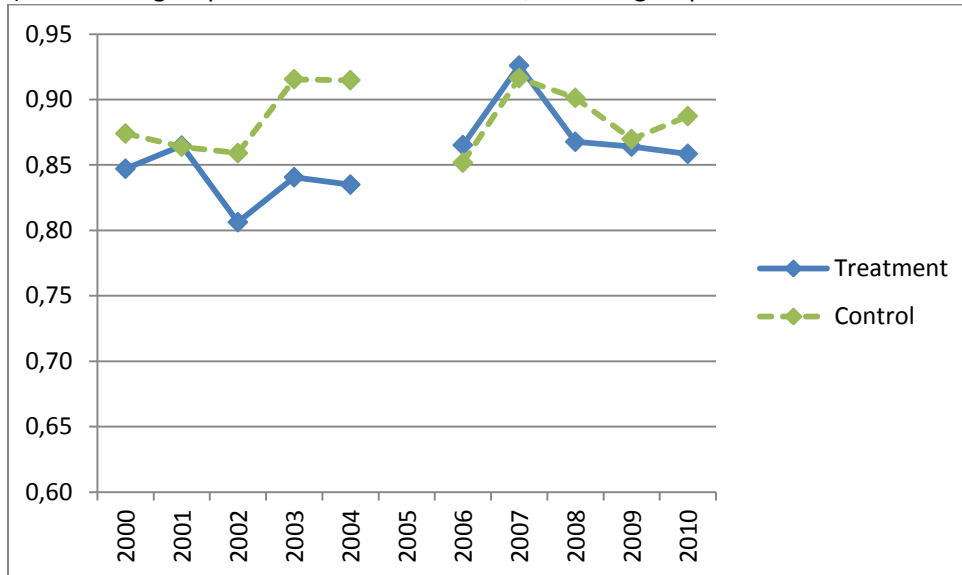
## 5.2 Lone mothers

### 5.2.1 Labour force participation

Over the period 2002 to 2007 inclusively (and even more so after 2002), the participation rate of lone mothers in Quebec and lone mothers and Ontario follow parallel trends, as shown by Figure 9. However, this is not true for years prior to 2002 and from 2008 on. Hence, locally we could say we have parallel trends and thus that single women in Ontario are a good control to evaluate the impact of the Work Premium on the participation rate of lone mothers in Quebec, but given the short span of years for which this is true, it will be important to also consider alternative treatment groups to make sure our results are robust to other combinations of treatment/control groups.

Fortunately, it appears that the participation rate of lone mothers with a high school diploma or less in Quebec follows a trend parallel to that of the Ontarian counterpart of these women after 2002 (except again for the year 2008), as shown in Figure 10. This will thus provide us with an alternative combination of treatment and control group to test the robustness of our results.

**FIGURE 9**  
**MEAN LABOUR FORCE PARTICIPATION OF LONE MOTHERS – TREATMENT GROUP A**  
 (Treatment group: lone mothers in Quebec; Control group: lone mothers in Ontario)



(3) The participation variable is a binary variable taking a value of 1 when the annual number of hours worked is positive.

(4) The average standard errors for the means presented are respectively 0.04 and 0.03 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

As for single women, however, the participation rate of the alternative control group (lone mothers with more than a high school diploma in Quebec) doesn't follow a trend parallel to that of lone mothers in Quebec with a high school diploma or less, as shown in Figure 10. This control group is thus not as good as the previous one and we should not put too much weight on the estimates derived using it.

### 5.2.2 Annual hours worked

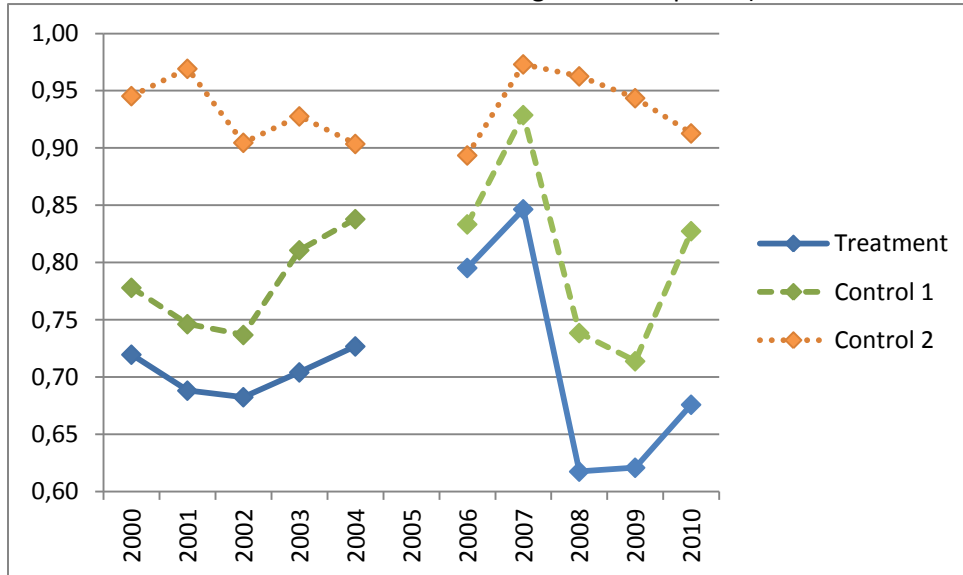
From 2000 to 2007, annual hours worked by lone mothers in Quebec and in Ontario follow parallel trends, as shown by Figure 11. Hence, this suggests that lone mothers in Ontario are a good control group to assess the impact of the Work Premium on annual hours worked of lone mothers in Quebec.

When looking at the other treatment group (lone mothers in Quebec with a high school diploma or less), there are noticeable divergences between the trend in annual hours worked of this group and the trend of its Ontarian counterpart, as shown in Figure 12. One has to take into

**FIGURE 10**

**MEAN LABOUR FORCE PARTICIPATION OF LONE MOTHERS - TREATMENT GROUP B**

(Treatment group: lone mothers in Quebec with a high school diploma or less; Control group 1: lone mothers in Ontario with a high school diploma or less; Control group 2: lone mothers in Quebec with more than a high school diploma)



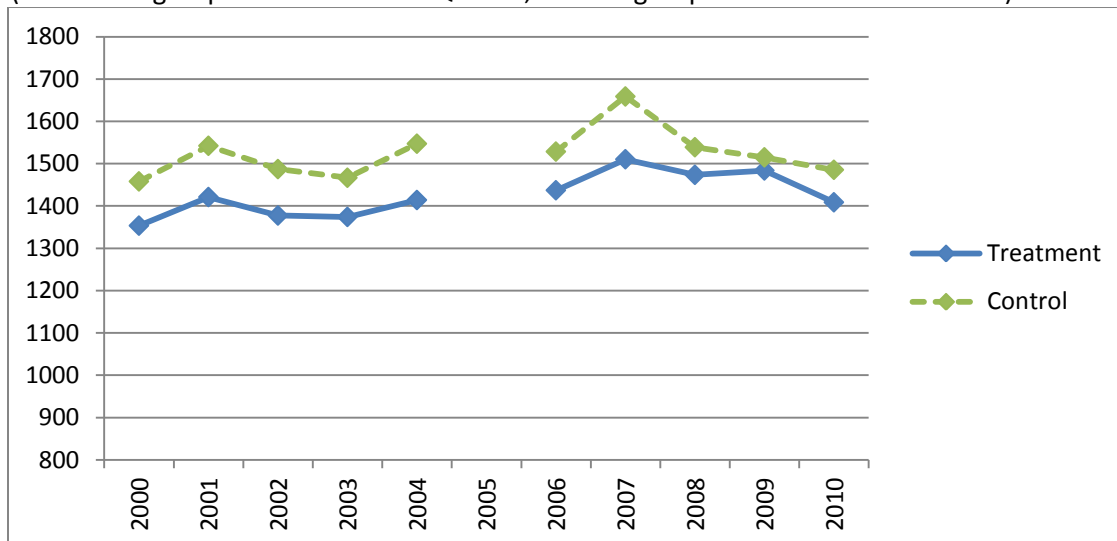
- (1) The participation variable is a binary variable taking a value of 1 when the annual number of hours worked is positive.
- (2) The average standard errors for the means presented are respectively 0.09, 0.06 and 0.03 for the treatment group, the first control group and the second control group.

Source: PUMFs of the SLID (person file).

**FIGURE 11**

**MEAN ANNUAL HOURS WORKED OF LONE MOTHERS – TREATMENT GROUP A**

(Treatment group: lone mothers in Quebec; Control group: lone mothers in Ontario)



- (1) The average standard errors for the means presented are respectively 81 and 72 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

account, though, that the sample size for this combination of treatment and control group is much smaller and that the average standard errors for the mean annual hours worked are thus much higher (usually more than 10% of the estimate). Some of the point estimates mapped here might perhaps be off their actual value in the population by a large amount and there is a possibility that the trends in the population would actually be much more parallel. For example, between 2002 and 2008, if it wasn't for a divergence in 2003, which might be due to an estimation error, we could say that annual hours worked follow a similar pattern in the two provinces. Nonetheless, since we don't know for sure whether those divergences in trends are due to estimation errors or to actual differences in the population, we will have to be very careful when interpreting those estimates.

Finally, the alternative control group (lone mothers in Quebec with more than a high school diploma) is, here again, not a very convincing control group for lone mothers in Quebec with a high school diploma or less when it comes to annual hours of work, as shown by Figure 12. The estimated impact of the Work Premium on annual hours worked obtained using this control group is thus not very reliable.

**FIGURE 12**

**MEAN ANNUAL HOURS WORKED OF LONE MOTHERS – TREATMENT GROUP B**

(Treatment group: lone mothers in Quebec with a high school diploma or less; Control group 1: lone mothers in Ontario with a high school diploma or less; Control group 2: lone mothers in Quebec with more than a high school diploma)



(1) The average standard errors for the means presented are respectively 169, 151 and 79 for the treatment group, the first control group and the second control group.

Source: PUMFs of the SLID (person file).

## **6. RESULTS**

### **6.1 Participation results**

Both a logit and probit model were tested to assess the participation response to the Work Premium. The estimates obtained with the two models were very similar, but overall the probit model fitted the data marginally better, so the results reported are those from the probit model. For the regression with covariates, different specifications of the model were considered (for example, testing if we should include the squares of age, education, and investment income and capital gains). Only the results for the specification with the best fit are reported here.

As we saw earlier, descriptive statistics differ between the treatment and control groups for both lone mothers and single women. Since this means that these demographic characteristics are correlated with at least one of the independent variables in the regression without covariates, excluding them from the regression could bias our estimate for the impact of the Work Premium if those demographic characteristics have an impact on labour force participation, which is likely. Moreover, as mentioned previously, if a shock contemporaneous to the Work Premium had an impact on labour supply and that its impact differed depending on demographic characteristics, controlling for those will help to limit biases in the estimation of the impact of the Work Premium. Hence, we report the basic participation and hours results (i.e., the regressions without covariates) but we do not rely on those results to assess the impact the Work Premium has had.

#### **6.1.1 Single women**

As mentioned earlier, in all of the regressions presented, the key coefficient is either the interaction term between the dummy variable indicating whether the person lives in Quebec and the dummy variable for year 2006, or the interaction term between the dummy variable indicating whether the person has a low level of education and the dummy variable for the year 2006. For the probit models of participation in the labour force, since the marginal impact of the Work Premium is not given directly by those coefficients, it is reported at the bottom of the tables.

The results presented in Table 8 suggest that, strictly speaking, the Work Premium did not have an impact on the participation in the labour force of single women in general and single women with a high school diploma or less, as none of the estimates of the impact of the Work Premium are significantly different from zero. Their associated standard errors in the regressions with covariates are at least twice as large as the point estimates for the impact of the Work Premium, so we can't say within a reasonable level of confidence that the Work Premium has increased the labour supply of single women, but we nonetheless note that all the coefficients for this variable are positive.

Moreover, it is interesting to note that the estimated impact of the Work Premium on labour force participation is in the same order of magnitude across the three regressions ran with covariates, ranging between 1.0 and 2.1 percentage points. Additionally, even though the size of the standard errors relative to the point estimates for the estimated impact of the Work Premium do not allow us to make reliable comparisons of the magnitude of the impact for different groups, we note that the estimated impact of the Work Premium is higher for single women with a high school diploma or less (treatment group B) than for single women in general (treatment group A), which is consistent with what we would expect. Despite the fact that our results are not significant in the technical sense of the term, this consistency across results and between the results and our expectations may suggest that it is possible that the Work Premium has had an impact, albeit small, on labour force participation of single women. However, if there was an impact, because of the size of the standard errors reported, we wouldn't be able to know its magnitude with precision.

### **6.1.2 Lone mothers**

The results presented in Table 9 indicate that the Work Premium has had a significant impact on the labour force participation of lone mothers in general (treatment group A). We reject the null hypothesis that the Work Premium did not increase labour force participation at a 5 % level. Results suggest that this policy increased the labour force participation of lone mothers by 14.0 percentage points. This definitely points out to a positive impact of the Work Premium on



labour force participation of lone mothers, but given the large size of the standard error for that estimate (8.4 percentage point), the magnitude of this impact remains fairly uncertain.

When only lone mothers with a high school diploma or less are considered (treatment group B), the estimates also suggest a big impact of the Work Premium on labour force participation, but none of them are significant. However, the sample size for the regressions using treatment group B and control group B.1 is much smaller than that used to assess the impact of the Work Premium on all lone mothers (281 observations versus 933 observations), so it is quite possible that the Work Premium did also have a significant impact on the participation rate of lone mothers with a high school diploma or less, but that the smaller sample size translated into big standard errors that do not allow us to estimate precisely this impact. Indeed, among all lone mothers, those with a high school diploma or less should be the one most affected by the Work Premium because they have a lower earnings potential.

For lone mothers with a high school diploma or less, there is a big discrepancy between the estimates obtained using different control groups. This can be explained by the fact that, given the relatively small sample size, estimates are quite imprecise, as reflected by the large standard errors. Moreover, the parallel trends test suggested that the second control group (lone mothers with more than a high school diploma in Quebec, i.e., control group B.2) was not very good, so we consider the estimates obtained using the first control group more reliable.

## **6.2 Hours results**

For the model of annual hours worked including covariates, we also tested different specifications across the different groups considered (for example we tested if we should include the squares of age, education, and investment income and capital gains). The covariates that were kept are the same as the one in the participation equation, and only the results for the specification with the best fit are reported. As we saw earlier, descriptive statistics differ between the treatment and control groups for both lone mothers and single women, so we report the basic hours results (i.e., the results of the regressions without covariates), but we do

not rely on those results to assess the impact the Work Premium has had on annual hours worked.

### **6.2.1 Single women**

The Work Premium does not seem to have had an impact on annual hours worked of single women, since none of the estimates of the coefficient of interest are significant at a reasonable level of confidence despite the fact that the sample size is not that small. The fact that all the coefficients depicting the impact of the Work Premium are negative, as shown in Table 10, does not affect our conclusion that the Work Premium did not have an impact on annual hours worked of single women. Indeed, for the regression for all single women (treatment group A) and for that for single women with a high school diploma or less which uses the alternative control group B.2, the standard errors are larger than the coefficients estimated so within one standard error from the mean, the impact estimated could be positive.

### **6.2.2 Lone mothers**

The results presented in Table 11 suggest that, for lone mothers either, the Work Premium does not seem to have had an impact on annual hours worked. This time, all the coefficients estimated for the impact of the Work Premium are positive, but none of them are significant at a reasonable significance level. For treatment group A and treatment group B/control group B.1, the standard errors are larger than the estimates of the coefficient of interest, so the sign of the estimates is very unreliable. Given the small sample size of the regressions for treatment group B (both the regressions using control group B.1 and the ones using control group B.2), the large standard errors could be a reflection of the small sample size rather than an indication that the Work Premium did not have any significant impact on annual hours worked of lone mothers with a high school diploma or less. However, the sample size for treatment group A is larger (933 observations) but we still get very big standard errors and find no significant impact on annual hours worked. This suggests that the Work Premium may indeed not have had any significant impact on annual hours worked of lone mothers, despite the impact it appears to have had on the participation of this group.

**TABLE 8**

**IMPACT OF THE WORK PREMIUM ON THE PARTICIPATION IN THE LABOUR FORCE OF SINGLE WOMEN**

(A: single women in Quebec vs. single women in Ontario; B.1: single women in Quebec with a high school diploma or less vs. their Ontario counterparts; B.2: single women in Quebec with a high school diploma or less vs. single women in Quebec with more than a high school diploma)

	<b>Treatment group A, control group A (A)</b>				<b>Treatment group B, control group B.1 (B.1)</b>				<b>Treatment group B, control group B.2 (B.2)</b>			
	<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>	
Prob. > F	0.0332		0.0000		0.0030		0.0000		0.0000		0.0000	
Nb. of observations	3369		3369		1047		1047		1427		1427	
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1.084	0.064	-3.963	0.534	0.691	0.099	-4.021	0.677	1.282	0.129	-2.917	0.941
Quebec	-0.243	0.098	-0.045	0.125	-0.485	0.145	-0.157	0.177				
2006	-0.026	0.100	-0.021	0.133	-0.214	0.159	-0.084	0.201	-0.058	0.170	0.027	0.200
<b>Quebec*2006</b>	<b>0.072</b>	<b>0.145</b>	<b>0.072</b>	<b>0.188</b>	<b>0.260</b>	<b>0.221</b>	<b>0.113</b>	<b>0.266</b>				
Low education level									-1.076	0.166	-0.340	0.232
<b>Low education level*2006</b>									<b>0.104</b>	<b>0.230</b>	<b>0.099</b>	<b>0.281</b>
Age			0.189	0.020			0.189	0.026			0.178	0.033
Age squared			-0.003	0.000			-0.003	0.000			-0.003	0.000
Rural area			-0.275	0.120			-0.372	0.166			-0.349	0.156
Student (part-time)			0.095	0.152			0.119	0.328			0.390	0.268
Education			0.344	0.063			0.370	0.118			0.301	0.105
Education squared			-0.010	0.002			-0.014	0.008			-0.010	0.004
Investment income and capital gains			-0.000003	0.000006			-0.000012	0.000011			0.000009	0.000007
<b>Estimated impact of the Work Premium</b>	<b>0.018</b>	<b>0.037</b>	<b>0.010</b>	<b>0.025</b>	<b>0.090</b>	<b>0.081</b>	<b>0.021</b>	<b>0.050</b>	<b>0.028</b>	<b>0.067</b>	<b>0.015</b>	<b>0.036</b>

(1) The marginal impact of the Work Premium on labour force participation is computed fixing all covariates at their mean value.

(2) The standard errors reported are robust to heteroskedasticity.

**TABLE 9**

**IMPACT OF THE WORK PREMIUM ON THE PARTICIPATION IN THE LABOUR FORCE OF LONE MOTHERS**

(A: lone mothers in Quebec vs. lone mothers in Ontario; B.1: lone mothers in Quebec with a high school diploma or less vs. their Ontarian counterparts; B.2: lone mothers in Quebec with a high school diploma or less vs. lone mothers in Quebec with more than a high school diploma)

	<b>Treatment group A, control group A (A)</b>				<b>Treatment group B, control group B.1 (B.1)</b>				<b>Treatment group B, control group B.2 (B.2)</b>			
	<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>	
Prob. > F	0.3362		0.0001		0.6203		0.0512		0.0777		0.2759	
Nb. of observations	933		933		281		281		423		423	
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1.371	0.170	-4.647	1.348	0.986	0.257	-1.402	2.385	1.303	0.223	-2.565	2.572
Quebec	-0.397	0.227	-0.543	0.229	-0.383	0.333	-0.482	0.358				
2006	-0.327	0.222	-0.357	0.224	-0.018	0.369	0.027	0.370	-0.057	0.325	-0.130	0.320
<b>Quebec*2006</b>	<b>0.457</b>	<b>0.322</b>	<b>0.597</b>	<b>0.327</b>	<b>0.240</b>	<b>0.508</b>	<b>0.341</b>	<b>0.503</b>				
Low education level									-0.699	0.307	-0.826	0.362
<b>Low education level*2006</b>									<b>0.278</b>	<b>0.477</b>	<b>0.512</b>	<b>0.491</b>
Age			0.268	0.059			0.182	0.081			0.172	0.106
Age squared			-0.003	0.001			-0.002	0.001			-0.002	0.001
Rural area			0.277	0.222			0.482	0.355			0.176	0.287
Student (part-time)			-0.208	0.383			-0.619	0.773			-0.458	0.452
Education			0.116	0.116			-0.424	0.410			0.108	0.206
Education squared			-0.002	0.004			0.028	0.023			-0.004	0.007
Investment income and capital gains			-0.000012	0.000032			0.000006	0.000029			-0.000023	0.000029
<b>Estimated impact of the Work Premium</b>	<b>0.093*</b>	<b>0.069</b>	<b>0.140**</b>	<b>0.084</b>	<b>0.073</b>	<b>0.140</b>	<b>0.068</b>	<b>0.096</b>	<b>0.079</b>	<b>0.120</b>	<b>0.155</b>	<b>0.142</b>

(1) The marginal impact of the Work Premium on labour force participation is computed fixing all covariates at their mean value.

(2) The standard errors reported are robust to heteroskedasticity.

**TABLE 10**

**IMPACT OF THE WORK PREMIUM ON TOTAL ANNUAL HOURS WORKED OF SINGLE WOMEN**

(Treatment group B: lone mothers in Quebec with a high school diploma or less; Control group B.1: lone mothers in Ontario with a high school diploma or less; Control group B.2: lone mothers in Quebec with more than a high school diploma)

	<b>Treatment group A, control group A (A)</b>				<b>Treatment group B, control group B.1 (B.1)</b>				<b>Treatment group B, control group B.2 (B.2)</b>			
	<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>	
Prob. > F	0.0005		0.0000		0.0259		0.0000		0.0000		0.0000	
Nb. of observations	3369		3369		1047		1047		1427		1427	
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1493.0	36.7	-2060.0	197.5	1118.6	70.4	-2139.7	275.2	1531.7	49.2	-1409.9	322.9
Quebec	-156.4	56.7	-72.0	45.7	-207.2	106.8	-57.6	92.0				
2006	20.2	56.1	9.7	47.3	-35.3	108.4	24.3	90.7	-42.5	70.9	-13.1	58.6
<b>Quebec*2006</b>	<b>-37.8</b>	<b>83.6</b>	<b>-40.6</b>	<b>67.9</b>	<b>-27.2</b>	<b>153.5</b>	<b>-132.0</b>	<b>123.8</b>				
Low education level									-620.2	94.2	-133.3	94.7
<b>Low education level*2006</b>									<b>-19.9</b>	<b>129.8</b>	<b>-67.6</b>	<b>102.8</b>
Age			142.9	7.1			149.5	10.8			133.6	10.5
Age squared			-1.9	0.1			-1.9	0.1			-1.8	0.1
Rural area			-70.5	45.4			-156.9	77.9			-91.6	55.0
Student (part-time)			-106.8	49.0			-104.8	144.2			-77.4	61.5
Education			165.3	24.0			113.7	50.7			112.8	38.6
Education squared			-5.0	0.9			-2.3	3.3			-3.7	1.4
Investment income and capital gains			-0.010	0.003			-0.007	0.007			-0.005	0.004

Note: The standard errors reported are robust to heteroskedasticity.

**TABLE 11**

**IMPACT OF THE WORK PREMIUM ON TOTAL ANNUAL HOURS WORKED OF LONE MOTHERS**

(A: lone mothers in Quebec vs. lone mothers in Ontario; B.1: lone mothers in Quebec with a high school diploma or less vs. their Ontarian counterparts; B.2: lone mothers in Quebec with a high school diploma or less vs. lone mothers in Quebec with more than a high school diploma)

	<b>Treatment group A, control group A (A)</b>				<b>Treatment group B, control group B.1 (B.1)</b>				<b>Treatment group B, control group B.2 (B.2)</b>			
	<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>		<b>Without covariates</b>		<b>With covariates</b>	
Prob. > F	0.5001		0.0000		0.3941		0.0000		0.2124		0.0392	
Nb. of observations	933		933		281		281		423		423	
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1547.0	60.9	-2643.8	733.1	1478.1	136.6	-1617.1	1277.4	1543.2	92.4	-2203.3	1677.2
Quebec	-133.1	100.6	-174.1	93.4	-267.7	192.6	-311.3	194.3				
2006	-18.7	100.9	-5.2	93.4	68.8	224.8	112.4	216.6	-69.2	134.5	-49.3	122.6
<b>Quebec*2006</b>	<b>41.8</b>	<b>155.6</b>	<b>77.9</b>	<b>147.0</b>	<b>67.1</b>	<b>319.3</b>	<b>134.8</b>	<b>298.7</b>				
Low education level									-332.9	164.2	-309.0	183.2
<b>Low education level*2006</b>									<b>205.1</b>	<b>263.7</b>	<b>283.6</b>	<b>245.1</b>
Age			183.1	31.0			164.2	50.8			171.0	71.0
Age squared			-2.3	0.4			-1.9	0.7			-2.1	0.9
Rural area			77.7	112.1			83.1	215.8			51.0	141.0
Student (part-time)			-83.2	176.3			-596.4	319.9			-45.1	255.0
Education			81.1	68.2			-131.4	181.8			52.2	113.3
Education squared			-2.2	2.3			10.1	10.6			-1.9	3.7
Investment income and capital gains			-0.02	0.01			-0.02	0.01			-0.02	0.01

Note: The standard errors reported are robust to heteroskedasticity.

## **7. TESTING THE ROBUSTNESS OF THE RESULTS : REACTION TO A PLACEBO REFORM**

Another test that is common in the literature is to simulate a placebo reform and see if the results suggest a statistically significant impact for that placebo reform. If it is the case, it can be an indication that the impacts obtained from the difference and difference methodology are driven by confounding shocks rather than by the program whose impact we are trying to estimate. There are many different ways to simulate a placebo reform. For example, we could use the difference in difference methodology on years prior to the implementation of the program, or apply the DID methodology to groups whom we know weren't affected by the program. Here, we go along the lines of the second method by focusing on people who have a high earning potential, thus trying to consider people whose labour supply should not be affected much by the program. We thus use as a basis for our treatment group the part of the population who has at least a university degree, and use their Ontarian counterparts as the control group.

### **7.1 Single women**

Table 12 presents summary statistics for single women with a bachelor's degree or more in Quebec and in Ontario, before and after the introduction of the Work Premium. The participation rate in the labour force of these women in the two provinces is fairly similar. However, these single women work more hours per year. Single women in Quebec with a bachelor's degree or more are older on average than their Ontarian counterparts, and they are more likely to be studying (part-time). In 2004, the proportion of these women living in rural areas is similar in the two groups, while that in Quebec increases in 2006 relative to that of Ontario. The earnings in the two groups are similar. Average unearned income is similar in both provinces in 2006, but higher in Quebec in 2004. In terms of the level of investment income and capital gains, it is similar in the two provinces in 2004, but it increases in Quebec in 2006 relative to Ontario. As mentioned previously, these differences in demographic characteristics between

the treatment and control group pairs underline the importance of controlling for those characteristics in regression analysis.

**TABLE 12**  
**DESCRIPTIVE STATISTICS FOR SINGLE WOMEN – PLACEBO TEST**

(Treatment group: single women in Quebec with a bachelor’s degree or more; Control group: single women in Ontario with a bachelor’s degree or more)

	Treatment group				Control group			
	2004		2006		2004		2006	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Participation rate	0.91	0.04	0.94	0.03	0.93	0.02	0.93	0.02
Total annual hours of work	1 601	93	1 640	90	1 798	73	1 746	81
Average weekly hours of work	30.8	1.8	31.5	1.7	34.6	1.4	33.6	1.6
Age	38.0	1.6	39.1	1.7	35.6	1.0	36.6	1.2
Rural area (dummy)	0.03	0.01	0.06	0.02	0.03	0.01	0.02	0.01
Part-time student (dummy)	0.21	0.05	0.20	0.05	0.14	0.03	0.12	0.03
Education level	17.7	0.2	17.0	0.2	17.7	0.1	17.2	0.1
Earnings	35 787	2 633	37 779	2 985	35 745	2 048	39 201	2 064
Unearned income	5 247	1 760	6 607	1 658	3 194	842	6 060	1 219
Investment income and capital gains	748	283	2 428	1 480	846	254	1 059	293
Number of observations	132		109		210		206	

Note: The standard errors reported are robust to heteroskedasticity.

Figure 13 shows that the participation rate of single women with a bachelor’s degree or more doesn’t seem to follow parallel trends in Quebec and in Ontario. However, given the fact that the standard errors are relatively large (0.04 and 0.03 for the treatment and control groups respectively) compared to the difference between the two curves, it is possible that the trends in the population are more parallel. Nonetheless, we will have to interpret carefully the results obtained with this control group for the impact of the Work Premium on the participation rate.

Table 13 presents the results of the placebo test for the participation of single women with a high earnings potential. Since the participation rate didn’t follow parallel trends in the treatment and control groups, we can’t have a lot of confidence in the results presented, and thus, in this

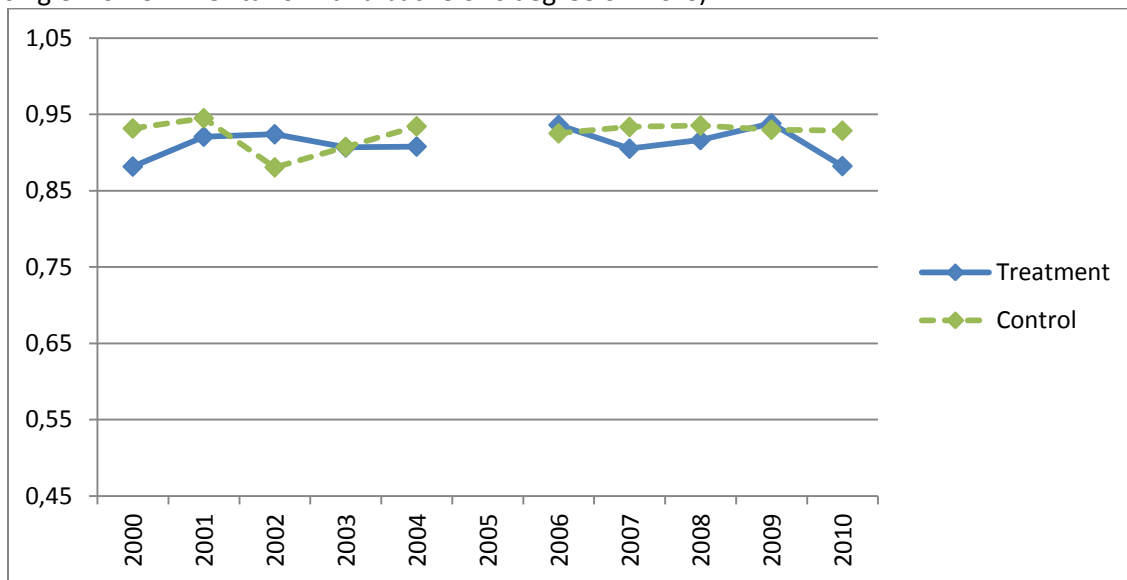


placebo test. We present the results nonetheless, but we should not put too much weight on the conclusions derived from this test. In both the regression without covariates and in the one including them, we find that the impact of the Work Premium on the labour force participation of single women with a high level of education is not significant (the standard errors are very large compared to the estimated impact of the Work Premium, despite a reasonable sample size). These results (although not reliable because of the flaws mentioned previously) are consistent with our expectation that the Work Premium should not have changed the behavior of people with a high level of education. Nonetheless, we can't use the results from this test to validate or disprove our methodology.

**FIGURE 13**

**MEAN LABOUR FORCE PARTICIPATION OF SINGLE WOMEN- PLACEBO TEST**

(Treatment group: single women in Quebec with a bachelor's degree or more; Control group: single women in Ontario with a bachelor's degree or more)



- (1) The participation variable is a binary variable taking a value of 1 when the annual number of hours worked is positive.
- (2) The average standard errors for the means presented are respectively 0.04 and 0.03 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

**TABLE 13****IMPACT OF THE WORK PREMIUM ON THE PARTICIPATION RATE OF SINGLE WOMEN WITH A HIGH LEVEL OF EDUCATION - PLACEBO TEST**

(Treatment group: single women in Quebec with a bachelor's degree or more; Control group: single women in Ontario with a bachelor's degree or more)

	Without covariates		With covariates	
Prob.>F	0.9388		0.0000	
Nb. of observations	657		657	
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1.509	0.168	-14.629	7.045
Quebec	-0.181	0.313	0.037	0.337
2006	-0.068	0.234	0.206	0.307
<b>Quebec*2006</b>	<b>0.264</b>	<b>0.442</b>	<b>0.485</b>	<b>0.505</b>
Age			0.076	0.066
Age squared			-0.002	0.001
Rural area			-0.418	0.359
Student (part-time)			-0.487	0.325
Education			1.894	0.837
Education squared			-0.054	0.025
Investment income and capital gains			0.00002	0.00002
<b>Estimated impact of the Work Premium</b>	<b>0.038</b>	<b>0.063</b>	<b>0.063</b>	<b>0.085</b>

(1) The marginal impact of the Work Premium on labour force participation is computed fixing all covariates at their mean value.

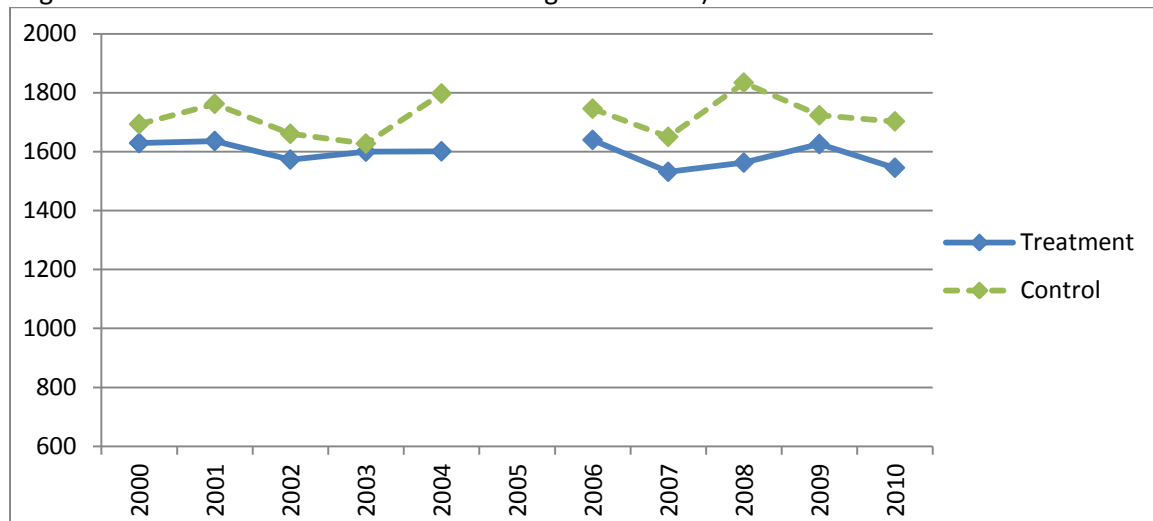
(2) The standard errors reported are robust to heteroskedasticity.

Figure 14 shows the evolution of average annual hours worked by single women with a bachelor's degree or more in Quebec and Ontario. We can't say that the two curves follow parallel trends, but their evolution nonetheless shows a similar pattern before 2008, except for year 2003. The control group hence seems reasonably good to do a placebo test, although, again, great caution is thus recommended when interpreting the results of this placebo test on annual hours worked.

Table 14 shows that the estimated impact of the Work Premium on annual hours worked of single women with a high earnings potential is insignificant, as standard errors are big relative to the estimates of the coefficient of interest, despite the fact that the sample size is reasonable (657 observations). Since we were not expecting any impact of the Work Premium on annual hours worked of these women, these results support the validity of our methodology.

**FIGURE 14****MEAN ANNUAL HOURS WORKED OF SINGLE WOMEN - PLACEBO TEST**

(Treatment group: single women in Quebec with a bachelor's degree or more; Control group: single women in Ontario with a bachelor's degree or more)



(1) The average standard errors for the means presented are respectively 95 and 76 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

**TABLE 14****IMPACT OF THE WORK PREMIUM ON ANNUAL HOURS WORKED OF SINGLE WOMEN WITH A HIGH LEVEL OF EDUCATION - PLACEBO TEST**

(Treatment group: single women in Quebec with a bachelor's degree or more; Control group: single women in Ontario with a bachelor's degree or more)

	Without covariates		With covariates	
Prob.>F		0.3074		0.0000
Nb. of observations		657		657
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1797.6	73.3	236.5	4759.2
Quebec	-196.2	118.0	-148.3	94.7
2006	-51.5	109.2	-14.3	85.8
<b>Quebec*2006</b>	<b>90.2</b>	<b>169.3</b>	<b>98.0</b>	<b>131.4</b>
Age			119.5	21.5
Age squared			-1.7	0.3
Rural area			12.4	88.6
Student (part-time)			7.8	90.6
Education			-4.2	533.4
Education squared			-0.7	15.0
Investment income and capital gains			-0.013	0.003

Note: The standard errors reported are robust to heteroskedasticity.

## 7.2 Lone mothers

Table 15 presents summary statistics for lone mothers with a bachelor's degree or more in Quebec and Ontario. The sample size in each group is very small so these statistics should be interpreted with caution. The small sample size also introduces more variance in the estimates so it becomes more difficult to compare means between the two groups. The participation rate seems to be similar in the two provinces (it is higher in Ontario in 2004, but given the high standard errors, we don't know for sure if this would also be true in the population). Lone mothers with a bachelor's degree or more work more hours annually than their Ontario counterparts. There doesn't seem to be a substantial difference in the mean age of these women in the two provinces, but the proportion of these women living in rural areas is higher in Quebec. While the proportion of student (part-time) seems to be higher in Quebec in 2004, the reverse seems to be true for 2006. Average earnings appear to be higher in Quebec than in Ontario. It also seems to be the case for investment income and capital gains. In 2004, unearned income is higher in Ontario than in Quebec, but differences seem to level out in 2006.

Figure 15 shows that the participation rates of lone mothers with a bachelor's degree or more in Quebec and in Ontario do not quite follow parallel trends throughout the period considered. However, except for the year 2007, the trends are almost parallel if we consider the period after 2002. Hence, this combination of treatment-control groups seems satisfactory to do a placebo test, although caution when interpreting the results is again necessary.

The impact of the Work Premium on the labour force participation of lone mothers with a high earnings potential is not significant, as shown in Table 16. This is in line with what we would expect and could thus be interpreted as a validation of our methodology. However, as mentioned when presenting descriptive statistics for this group, the sample size for this placebo test is very small (117 observations) and it probably explains in part why the standard errors are so big relative to the estimates. Hence, it is possible that the sample size of this placebo test is too small to provide us with any reliable conclusion on the validity of our methodology.

**TABLE 15**  
**DESCRIPTIVE STATISTICS FOR LONE MOTHERS – PLACEBO TEST**

(Treatment group: lone mothers in Quebec with a bachelor’s degree or more; Control group: lone mothers in Ontario with a bachelor’s degree or more)

	Treatment group		2006		Control group		2006	
	2004		Mean	S.E.	2004	S.E.	Mean	S.E.
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Participation rate	0.82	0.10	0.93	0.07	0.88	0.10	0.96	0.04
Total annual hours of work	1 416	196	1 489	188	1 514	203	1 768	119
Average weekly hours of work	27.2	3.8	28.6	3.6	29.1	3.9	34.0	2.3
Age	40.0	2.6	38.0	1.7	40.6	3.2	41.1	1.2
Rural area (dummy)	0.06	0.03	0.05	0.05	0.00	0.00	0.01	0.01
Part-time student (dummy)	0.26	0.14	0.03	0.02	0.07	0.06	0.11	0.06
Education level	18.0	0.3	16.4	0.3	18.3	0.4	17.4	0.3
Earnings	36 267	6 019	42 542	4 543	23 402	5 533	37 071	6 086
Unearned income	6 686	1 632	9 373	2 348	13 982	2 545	8 451	1 700
Investment income and capital gains	961	767	2 501	2 342	143	74	334	179
Number of observations	31		26		28		32	

Note: The standard errors reported are robust to heteroskedasticity.

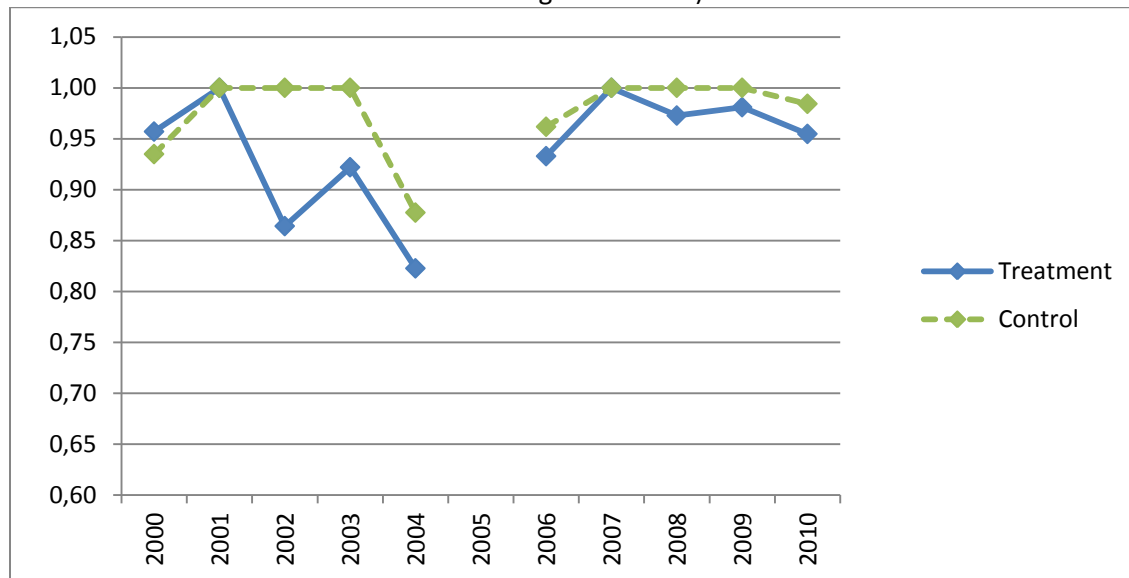
Figure 16 depicts the evolution of mean annual hours worked of lone mothers with a university degree in Quebec and in Ontario. Before 2008, the curves are roughly parallel. This suggests that Ontarian lone mothers with a bachelor’s degree or more are a good control group for their Quebec counterpart.

With respect to the impact of the Work Premium on annual hours of work of lone mothers with a high level of education, the problem of the small sample size still prevails. The results presented in Table 17 suggest that the Work Premium did not have a significant impact on annual hours worked of these women, which is what we would expect. However, as mentioned previously, the magnitude of the standard errors might be an indication that this group is simply too small to provide any reliable results. Thus, both for the participation and annual hours worked of lone mothers, the placebo test doesn’t lead to reliable conclusions on the validity of our methodology.

**FIGURE 15**

**MEAN LABOUR FORCE PARTICIPATION OF LONE MOTHERS - PLACEBO TEST**

(Treatment group: lone mothers in Quebec with a bachelor's degree or more; Control group: lone mothers in Ontario with a bachelor's degree or more)



(1) The participation variable is a binary variable taking a value of 1 when the annual number of hours worked is positive.

(2) The average standard errors for the means presented are respectively 0.05 and 0.02 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

**TABLE 16**

**IMPACT OF THE WORK PREMIUM ON THE PARTICIPATION RATE OF LONE MOTHERS WITH A HIGH LEVEL OF EDUCATION - PLACEBO TEST**

(Treatment group: lone mothers in Quebec with a bachelor's degree or more; Control group: lone mothers in Ontario with a bachelor's degree or more)

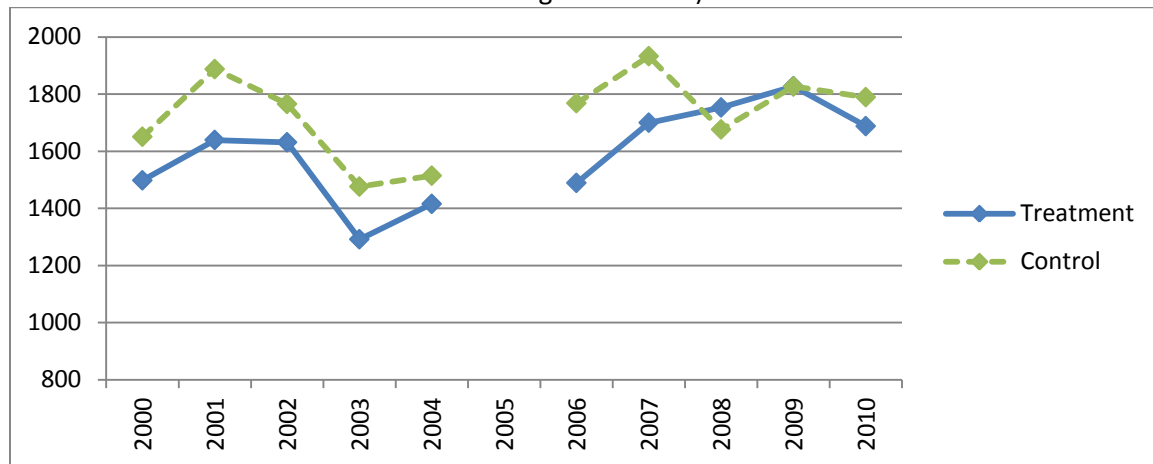
	Without covariates		With covariates	
Prob.>F		0.5153		0.0000
Nb. of observations		117		111
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1.162	0.497	-26.135	19.368
Quebec	-0.237	0.624	-0.742	0.898
2006	0.609	0.674	-0.333	0.909
Quebec*2006	-0.037	0.920	2.586	0.950
Age			1.025	0.317
Age squared			-0.013	0.004
Rural area			(omitted)	-
Student (part-time)			0.170	0.794
Education			0.831	2.004
Education squared			-0.019	0.057
Investment income and capital gains			-0.00019	0.00004
<b>Estimated impact of the Work Premium</b>	<b>0.026</b>	<b>0.160</b>	<b>0.322</b>	<b>0.381</b>

(1) The marginal impact of the Work Premium on labour force participation is computed fixing all covariates at their mean value.

(2) The standard errors reported are robust to heteroskedasticity.

**FIGURE 16**  
**MEAN ANNUAL HOURS WORKED OF LONE MOTHERS - PLACEBO TEST**

(Treatment group: lone mothers in Quebec with a bachelor's degree or more; Control group: lone mothers in Ontario with a bachelor's degree or more)



(1) The average standard errors for the means presented are respectively 156 and 130 for the treatment group and the control group.

Source: PUMFs of the SLID (person file).

**TABLE 17**  
**IMPACT OF THE WORK PREMIUM ON ANNUAL HOURS WORKED OF LONE MOTHERS WITH A HIGH LEVEL OF EDUCATION - PLACEBO TEST**

(Treatment group: lone mothers in Quebec with a bachelor's degree or more; Control group: lone mothers in Ontario with a bachelor's degree or more)

	Without covariates		With covariates	
Prob.>F	0.3376		0.0000	
Nb. of observations	117		117	
<b>Variables</b>	<b>Coeff.</b>	<b>S.E.</b>	<b>Coeff.</b>	<b>S.E.</b>
Constant	1514.2	203.0	-7679.9	5632.7
Quebec	-98.7	282.0	-230.8	191.3
2006	253.8	235.5	-52.9	178.2
<b>Quebec*2006</b>	<b>-180.4</b>	<b>359.5</b>	<b>42.5</b>	<b>277.3</b>
Age			253.6	58.1
Age squared			-3.1	0.6
Rural area			477.2	235.8
Student (part-time)			159.3	282.9
Education			554.9	598.7
Education squared			-17.2	17.5
Investment income and capital gains			-0.048	0.009

Note: The standard errors reported are robust to heteroskedasticity.

## **8. DISCUSSION OF THE RESULTS AND OF THE LIMITATIONS OF THE ANALYSIS**

### **8.1 Discussion of the results**

From this analysis, it appears that the Work Premium has had a significant impact on the labour force participation of lone mothers, but no impact on the labour force participation of single women (or, perhaps, a small one, but strictly speaking, this impact is not significant). For both groups, we don't find evidence of a significant impact of this policy on annual hours worked. However, it has to be pointed out that, as mentioned previously, since a tax deduction for workers was introduced in the year in which we analyze the impact of the Work Premium, and that the latter deduction is expected to have had an impact on labour supply, the labour supply responses estimated encompass the impact of both the Work Premium and the deduction for workers.

Our results are consistent with those found in the literature. Indeed, there is a consensus among researchers that the participation elasticity for lone mothers is among the highest of all demographic groups (Meghir and Phillips, 2010), and Aaberge et al. (1999) conclude that participation is likely to be the key margin of adjustment for poorer women. Additionally, Parisé (2007), who used a structural model to predict the impact of the Work Premium on the labour supply of single women and lone mothers in Quebec, had estimated that the Work Premium would have a bigger impact on the participation rate of lone mothers (1.9 percentage point increase) than on that of single women. Moreover, her model suggested that the Work Premium's net impact on hours worked would be negligible, which is again consistent with our findings.

As mentioned previously, even though we find evidence of a significant impact of the Work Premium on the participation rate of lone mothers, our estimate is too imprecise to provide a reliable conclusion on the magnitude of this impact (we estimate an impact of 14.0 percentage points, with a standard error of 8.4 percentage points). Although we know that, for the aforementioned reasons, comparison of the magnitude of our estimates with other results is



not straightforward, we note that this is much higher than the 1.9 percentage point predicted by Parisé (2007). In the 2004-2005 Budget, in which the Work Premium was announced, the Ministère des Finances du Québec mentioned that it expected this measure to increase the participation rate in the group of people earning \$15 000 or less by 9% (Ministère des Finances du Québec, 2004 (c)). Unfortunately, the anticipated impact of the Work Premium was not presented by demographic group so we don't know what was projected for lone mothers. We note, however, that the results we found for lone mothers mean that the Work Premium would have increased the labour force participation of this group by 16% in 2006 compared to the 2004 baseline. If, as the literature suggests, lone mothers are more responsive to financial incentives than other demographic groups, this result could be compatible with the projections from the computable general equilibrium model of the Ministère des Finances du Québec.

The differences in the participation results obtained for single women and lone mothers could be due to the greater responsiveness of lone mothers to financial incentives, but it is likely mostly explained by the different magnitude of the Work Premium for those two groups. The maximum premium that could be received by singles in 2006 was \$512, while it was \$2 196 for lone parents<sup>23</sup>. As pointed out by Godbout and Arseneau (2005), looking at the Work Premium received by singles working part-time (20 hours/week) and full-time (35 hours/week) at the minimum wage, one can understand that the design of the Work Premium for singles does not create big incentives to join the labour force. Indeed, as highlighted by Table 18, for people working full-time at the minimum wage, a likely outcome for people leaving social assistance, the Work Premium is almost completely phased-out. This is not true for lone parents, for whom the Work Premium is relatively high both when working part-time or full-time at the minimum wage. However, some lone parents benefited from the Parental Wage Assistance (PWA) program prior to the introduction of the Work Premium. For those individuals, the net impact of the Work Premium is positive for those choosing to work full-time at the minimum wage, but negative for those working part-time at the minimum wage.<sup>24</sup>

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<sup>23</sup> Calculations of the author made using Schedule P (Tax Credit Respecting the Work Premium) of the 2006 Income tax return.

<sup>24</sup> This analysis doesn't take into account that lone parents can have children that are too young to be in school. For those parents, both those that previously benefited from the PWA program and those that didn't, the incentives embedded in the Work Premium may be smaller. Indeed, the former group benefited from an additional \$1 300/child with the PWA, and, while on welfare, lone parents on social assistance did not need to pay for childcare.

**TABLE 18**  
**NET FINANCIAL IMPACT OF THE WORK PREMIUM FOR INDIVIDUALS WORKING PART-TIME**  
**AND FULL-TIME AT THE MINIMUM WAGE IN 2005<sup>1</sup>**

(part-time: 20 hours/week, full-time: 35 hours/week)

	Single individuals	Lone parents that didn't benefit from the PWA program <sup>2</sup>	Lone parents that benefited from the PWA program <sup>2</sup>
Part-time work	\$374	\$1 604	-\$688
Full-time work	\$125	\$1 804	\$940

(1) We refer to the year 2005 here because Godbout and Arseneau (2005) consider only that year and their comparison with the PWA program is useful for this analysis. The parameters of the Work Premium were very similar in 2006 so the conclusions should be the same.

(2) It is assumed here that the lone parent has one child and that this child is too old to use childcare services. If the child used childcare services, the incentives embedded in the Work Premium would be lower (both for lone parents who benefited from the PWA program, which entailed an additional \$1 300/child for parents with children in age of using childcare services, and those who didn't).

Sources: Godbout and Arseneau (2005), p.43 and 48, and calculations of the author.

However, it has to be remembered that the tax deduction for workers, which was introduced in 2006, provides an additional incentive to join the labour force. For people working part-time at the minimum wage in 2006, this deduction provided an additional incentive of \$480, while it reached \$500 for individuals working full-time at the minimum wage.<sup>25</sup>

Albeit the differences in the magnitude of the Work Premium for single women versus lone mothers are likely to be the primary explanation for differences in their labour force participation response, other factors might also have played a role. Until January 2009, only households with children were eligible for advance payments of the Work Premium. A common assumption in economics is that present benefits have more value for an individual than future benefits, and one may think that this is even truer for low-income individuals. Hence, this component of the design of the Work Premium might explain part of its failure to stimulate labour force participation among single women.

Another likely explanation for the differences observed in the response of lone mothers and single women has to do with awareness of this policy. To benefit from the Work Premium, individuals need to file an income tax return. It is likely that many individuals on social assistance do not file an income tax return, and might thus not have been aware of the existence of the

<sup>25</sup> Calculations of the author made using the average minimum wage for 2006, \$7.70/hour (Commission des normes du travail du Québec), and the same definitions of part-time and full-time as Godbout and Arseneau (2005), i.e., 20 hours/week and 35 hours/week, respectively.

Work Premium. However, lone mothers might have been more aware of it for two reasons. First, parents who want to benefit from the child assistance supplement (quite generous for low-income parents) need to file an income tax return for the year, even if they have no income to report<sup>26</sup>. Doing so, they are more likely to learn about the existence of the Work Premium. Second, even though a lot of eligible lone parents did not take advantage of the PWA program when it existed, those who did are likely to have been informed that a new measure, the Work Premium, was to replace it.

## **8.2 Limitations of the analysis**

The most important limitation of our analysis is that we can't separate the impact of the Work Premium from that of the deduction for workers that was introduced in 2006. Even though the two measures have similar goals and are expected to reinforce each other, to provide useful insights for policy-making, it would have been better to isolate individual impacts. Considering additional years in this analysis (either using more cross-sections or panel data) would have been a way to do this. Indeed, the Work Premium was introduced in 2005, the deduction for workers, in 2006, and the latter was greatly enhanced in 2007. Exploiting these differences in timing of introduction could provide us with a better idea of the individual impact of the Work Premium.

A second limitation of the analysis is that, given the refinement of the subgroups considered, the sample sizes were often quite small and didn't allow us to obtain precise estimates. As a consequence, even though we found the Work Premium to have had a significant impact on the labour force participation of lone mothers, there is a lot of uncertainty surrounding the magnitude of this impact. Similarly, we didn't find evidence of a significant impact of the Work Premium on the labour force participation of single women, but given the large standard errors we have obtained for those estimates, one may wonder if it is because the labour supply response of single women was indeed not affected, or because we don't have enough data to

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<sup>26</sup> Régie des rentes du Québec.

come up with conclusive results. Again, expanding the horizon of the analysis over several years would be a way to tackle this limitation.

Third, the fact that we use cross-sectional data allows us to see aggregate changes in the population from one year to another, but it does not allow us to isolate the effects leading to this aggregate result. For example, we mentioned in the analysis that the impact on hours worked would be the result of two distinct effects: change in hours worked of people already in the labour force, and differences in the mean number of hours worked between people that were already in the labour force and people joining it following the introduction Work Premium. The net impact on hours worked was not significant but it is possible that these individual impacts were significant. Using panel data would allow us to separate these effects and shed light on the dynamics of the transition from social assistance to work.

Finally, the public-use microdata files from the Survey of Labour and Income Dynamics (SLID) did not include information on the number of children or the age of those children, while these are variables that are likely to have a big impact on the labour force participation of lone mothers. The longitudinal data from the SLID provides information on the number of children (but not on their age), so using panel data from the SLID could attenuate this limitation.

## 9. CONCLUSION

This paper aimed at assessing the impact of the Work Premium, introduced in Quebec in January 2005, on the participation in the labour force and hours worked of single women and lone mothers. To do so, we used the public-use microdata files from the Survey of Labour and Income Dynamics (SLID). For each of the two demographic groups considered, we adopted a difference-in-difference approach, comparing the changes in the participation rate and annual hours worked in Quebec between 2004 and 2006 to the changes observed in Ontario during the same period.

We find that the Work Premium had a significant impact on the participation to the labour force of lone mothers in 2006, although we couldn't obtain a precise estimate of the magnitude of this impact. In contrast, our results suggest that the Work Premium did not have a significant impact on the labour force participation of single women. However, the consistency across estimates and between those estimates and our expectations suggests that it is possible that this policy had a small impact on the labour supply of single women in the population, but that our sample size is too small to allow us to estimate it with sufficient precision. For both single women and lone mothers, it appears that the Work Premium did not have a significant impact on annual hours worked.

The previous section underlined some limitations of the analysis, notably that the decision to consider only cross-sectional data from years 2004 and 2006 did not permit us to isolate the impact of the Work Premium from that of the tax deduction for workers, which was introduced in January 2006. All the labour supply responses estimated are thus the fruit of the combined work of these two policies. Accordingly, a promising avenue of research would be to repeat the analysis with many years of data, preferably using longitudinal data such as that from the SLID. This would allow us to obtain more precise estimates because of the greater number of observations, and it would also permit to gain additional insights on the labour supply responses to the Work Premium. For example, we could see whether people who join the labour force do so part-time or full-time, and whether the impact of the Work Premium varied over time.

Apart from the aforementioned suggestions, this paper raises many questions and paves the way for further research. First of all, it would be interesting to find out the proportion of individuals on social assistance aware of the existence of this credit, and the take-up rate for the tax credit, i.e., the proportion of eligible individual who actually claim it. This was an issue with the program that the Work Premium replaced, the Parental wage Assistance program, and the Work Premium was thought to be more likely to be used, but this yet has to be shown. Second, even though the Ontario population overall seemed to be a good control group, for some of the treatment/control group combinations, the fit was not as good. We could improve our estimates by using matching to create a counterfactual control group. Third, we could extend the analysis to men and couples. Finally, given the labour supply responses estimated, in the current context of budgetary restraint, it would be useful to assess the net cost of the Work Premium, that is, the cost of this program for the government minus the additional taxes collected and the social assistance benefits no longer paid.

Despite the limitations mentioned previously and the avenues of research that yet have to be explored, this research provides insights for policy-making. The difference between the response of single women and lone mothers draws attention to features of the Work Premium that bear implications for its effectiveness. We start by noting that two factors may have hindered the impact of the Work Premium on the labour force participation of single women. As mentioned earlier, in 2006, advance payments were only available to households with children. This is potentially a serious drawback of the Work Premium for singles. Our recommendation would have been to extend advance payments to singles, but this change was adopted in January 2009. Second, it is quite likely that the Work Premium for singles is too small to have an impact on labour force participation, even when combined with the deduction for workers. Indeed, even though some research shows that the participation of women from poorer families is known to be very elastic (Aaberge et al., 1999), we don't find any significant increase in the labour supply of single women. We will come back on the policy implications of this conclusion.

Moreover, in addition to the fact that the maximum Work Premium that can be received by singles is fairly small, we mentioned previously that the tax credit is almost completely phased-out for someone working full-time at the minimum wage. This is the consequence of the fact that the Work Premium is designed to decrease the high effective marginal tax rates (EMTRs)

associated with the retrieval of social assistance benefits: the Work Premium increases as social assistance benefits are retrieved, and then decreases gradually past the point where all social assistance benefits are withdrawn. Since social assistance benefits are generally not high for singles, the Work Premium remains small and is phased-out over a short income range.

One could question this emphasis on EMTRs in the design of the Work Premium. Indeed, EMTRs are likely to be considered when making marginal decisions about labour supply, such as adjustments in the number of hours worked. However, the literature suggests that for poor women (Aaberge et al., 1999) and for men with low education (Meghir and Phillips, 2010), participation is the key margin of labour supply response. In that context, if the labour supply decision consists of choosing between working (full-time or part-time) and not working, it seems that the net financial gain of working part-time or full-time compared to staying on social assistance would be the relevant decision criteria, instead of the return of an additional hour of work. Godbout and Arseneau (2005) show that in 2006, the net financial incentive to go to work at the minimum wage instead of staying on social welfare was \$2 420 for people working part-time and \$5 894 for people working full-time<sup>27</sup>. This shows that the net financial incentive to go to work part-time at the minimum wage is relatively low. While it is higher for people taking a full-time job at the minimum wage, the disposable income remains low, perhaps insufficient to provide an actual incentive to start working.

Hence, an avenue for policy improvement could be to part from a scheme focused on reducing EMTRs, and to move toward a scheme paying greater attention to global net financial incentives. This would entail increasing the generosity of this tax credit for singles, and modifying the range of income over which the Work Premium is phased-out so that individuals have good incentives to take on a full-time job at the minimum wage. There are different ways to achieve this objective. The deduction for workers, a universal tax deduction introduced in the 2005-2006 Budget and increased the year after, seems to be a step in the right direction. Obviously, universal programs are costly for the government so an alternative would be to stick with the refundable tax credit formula, but to make it more generous, increasing the amounts paid and extending the income range over which non-negligible tax credits are received. This would raise EMTRs in the income range over which the Work Premium is phased-out, but our

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<sup>27</sup> For those individuals, the disposable income stood, respectively, at \$9 313 and \$12 787.

analysis suggests that for low-income individuals, hours of work are not very sensitive to financial incentives. Hence, the gains in terms of labour force participation could potentially outweigh the costs associated with a reduction in hours worked. This is corroborated by the literature: Meghir and Piliavin (2010) mention that for men with low education, hours tend to be insensitive to changes in taxes and benefits, and Aaberge et al. (1999) mention that participation is the key margin of adjustment for poorer women.

Finally, it has to be remembered that, even if in-work benefits policies generate enthusiasm among policy-makers, and that there is empirical evidence suggesting that these measures do have an impact on labour force participation, we should not forget that the lack of financial incentives is far from being the sole problem in the low-skilled/low-income labour market. The potential frictions in the matching of vacancies with low-skilled jobseekers, the lack of training of those unemployed individuals, as well as labour demand weakness should also be considered when trying to tackle the issues related to the dynamics of social assistance, low-skilled jobs, and in-work poverty.



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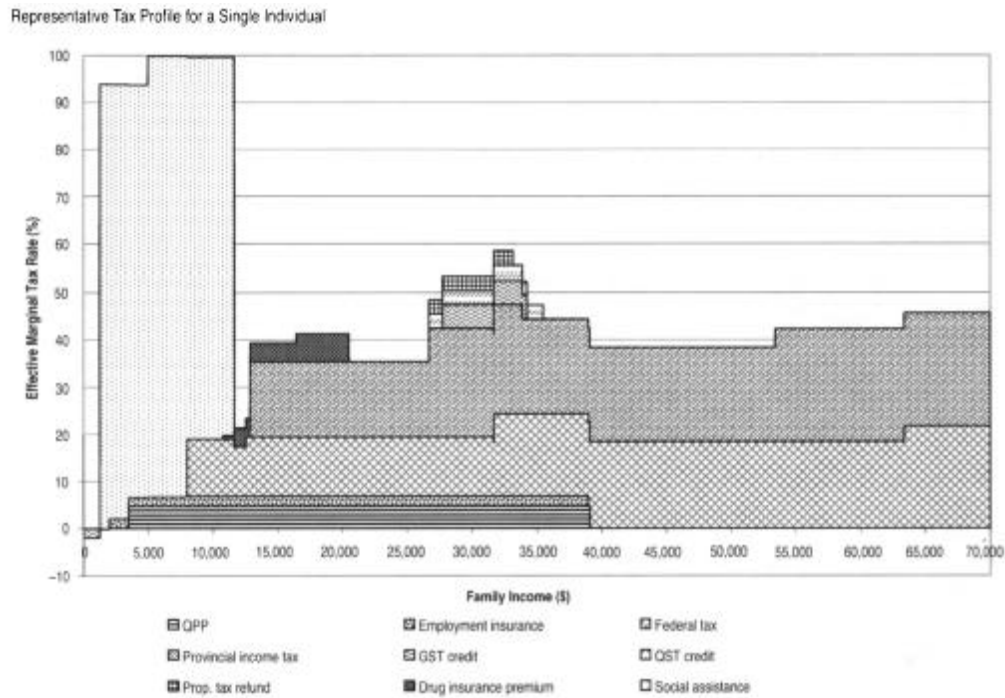
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# APPENDIX

**FIGURE A.1**  
**EFFECTIVE MARGINAL TAX RATES FOR SINGLES IN QUEBEC IN 2002**

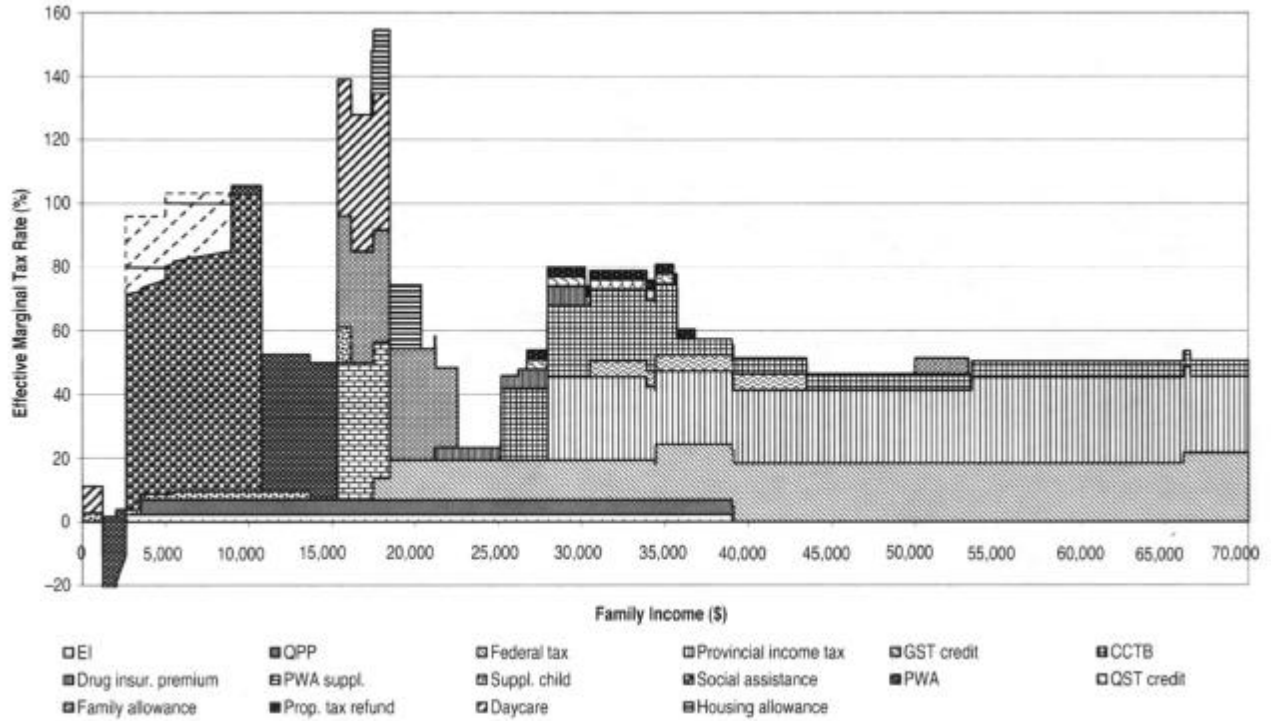


Note: The colour versions of Figures 2, 3, and 4 can be viewed at [www.ecn.ulaval.ca/~jyves](http://www.ecn.ulaval.ca/~jyves) and at the journal's website. QPP = Quebec Pension Plan. QST = Quebec Sales Tax.

Source: Duclos, Fortin and Fournier (2009), p.351.

**FIGURE A.2**  
**EFFECTIVE MARGINAL TAX RATES FOR LONE PARENTS IN QUEBEC IN 2002**

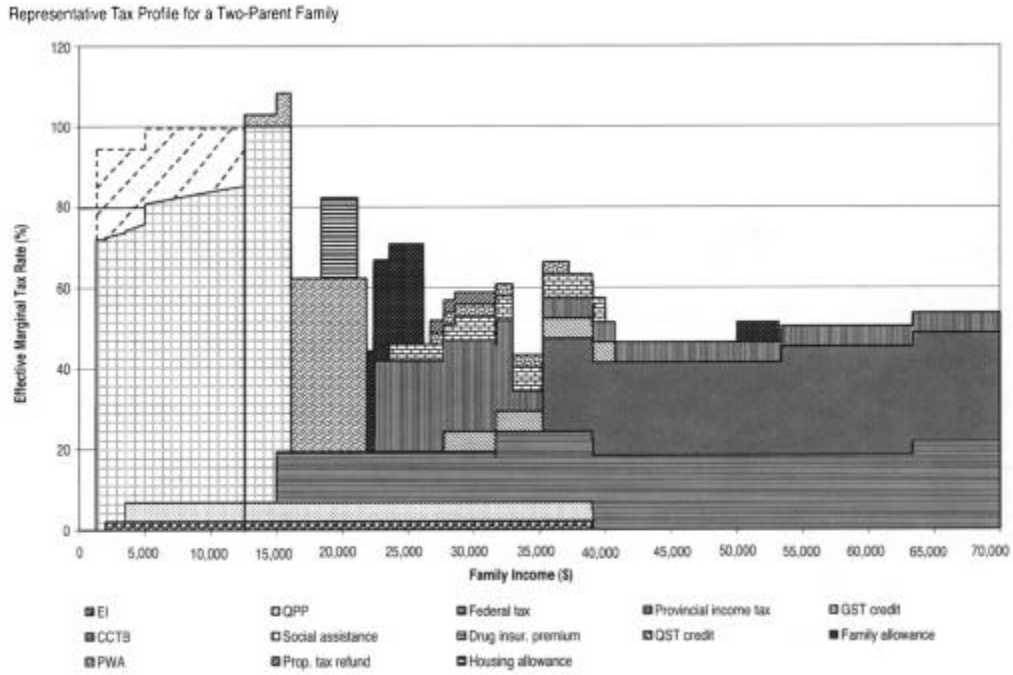
Representative Tax Profile for a Single-Parent Family



Note: CCTB = Canada Child Tax Benefit. EI = Employment Insurance. PWA = Parental Wage Assistance. QPP = Quebec Pension Plan. QST = Quebec Sales Tax.

Source: Duclos, Fortin and Fournier (2009), p.353.

**FIGURE A.3**  
**EFFECTIVE MARGINAL TAX RATES FOR TWO-PARENTS FAMILIES IN QUEBEC IN 2002**



Note: CCTB = Canada Child Tax Benefit. EI = Employment Insurance. QPP = Quebec Pension Plan. PWA = Parental Wage Assistance. QST = Quebec Sales Tax.

Source: Duclos, Fortin et Fournier (2009), p.354.

**TABLE A.1**  
**WORK PREMIUM BY EMPLOYMENT INCOME AND HOUSEHOLD TYPE – 2005**  
(dollars)

Employment income	Person living alone	Couple without children	Single-parent family	Couple with children
0	0	0	0	0
1 000	0	0	0	0
2 000	0	0	0	0
3 000	42	0	180	0
4 000	112	28	480	100
5 000	182	98	780	350
10 000	481	448	2 160	1 600
15 000	0	764	1 660	2 780
20 000	0	264	1 160	2 280
25 000	0	0	660	1 780
30 000	0	0	160	1 280
35 000	0	0	0	780
40 000	0	0	0	280
45 000	0	0	0	0
50 000	0	0	0	0

Source: Ministère des Finances du Québec (2004) (c), p.16.