

# Welfare Reforms and the Living Standards of Single Mothers: Evidence from Canadian Provinces.\*

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## Abstract:

This paper evaluates the impact of the 1995-1998 Ontario welfare reforms on the standard of living among single mothers. I look at how different measures of single mothers' consumption vary in response to transfer income shocks. Because welfare is a provincial responsibility in Canada, this study is able to consider the effects of the welfare reforms in Ontario, in comparison with other Canadian jurisdictions at the same time. By utilizing a *difference in difference* natural experiment design I compare the changes in the standard of living of Ontario single mothers to changes in the standards of living of three distinct control groups. The comparison with control groups under different provincial administrations and the implementation of *difference in difference* propensity score matching estimates sets my approach apart from previous similar work. The results indicate an initial decrease in the relative standard of living among Ontario single mothers. The immediate policy impact has been largely reversed with the complete implementation of welfare reforms and the introduction of National Child Benefit program. I find that the regression adjusted *difference in difference* approach overestimates the immediate negative effects of policy changes and underestimates the subsequent recovery. I find that the results are sensitive to the choice of control group; the inclusion of geographically different but demographically identical control groups adds significant insight to the analysis.

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## 1.Introduction.

The effects of welfare reforms on living standards are of considerable importance to policy makers and researchers. Major changes to welfare policy have both equity and efficiency consequences.<sup>1</sup> In the second half of the 1990's, Canadians experienced significant changes in the rules governing eligibility for social assistance<sup>2</sup> and in the levels of benefits. Welfare reforms were most extensive in the province of Ontario. The segment of the population that is most dependent on social assistance, and thus most affected by changes to the welfare code, is single mothers. They account for 12% of family heads [Statistics Canada, 1996] and 30% of welfare caseload [National Council of Welfare, 1998]. This paper evaluates the impact of the 1995-1998 Ontario welfare reforms on the standard of living among single mothers.

I expand on the methodology adopted by Meyer and Sullivan [2004] to examine how different measures of consumption vary in response to transfer income shocks. They look at the 1996 TANF reforms in the United States, and utilize a *difference in difference* study design similar to that described in the following sections. Using a traditional natural experiment framework, the authors focus on comparing the 'before policy' and 'after policy' consumption estimates for US single mothers relative to estimates for childless single women and married couples with children. Partly as a result of the nationwide nature of the US reforms, Meyer and Sullivan did not differentiate between jurisdictions and, as such, did not use a control group consisting of untreated single mothers.

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<sup>1</sup> For an overview of those efficiency and equity issues in the Canadian context, consult chapter ten of Rosen et al. [2003].

<sup>2</sup> The terms "welfare" and "social assistance" (which is how welfare is often referred to in Canada) are used interchangeably in this paper.

Meyer and Sullivan find evidence of a slight relative improvement in the standard of living among single mothers. Their results should not appear counterintuitive. One could expect that a considerable ‘tightening’ of the welfare system should have negatively affected the group traditionally dependent on social support. However, those changes would be fully reflected by a fall in non-measurable utility. The changes in the US welfare code have made the participation in the workforce more attractive relative to social assistance, and thus, through well-understood, labour-leisure, substitution effects have resulted in an increase in average consumption. These results hold across several sub-samples; for example, they control for effects the reforms had on low educated single mothers, and on those falling below the 15<sup>th</sup> or 25<sup>th</sup> percentile of consumption distribution.

I utilize a *difference in difference* natural experiment design. In it I compare the changes in the standard of living among single mothers in Ontario to changes in the standards of living of three distinct control groups: Ontario single childless women, Ontario married couples with children, and Quebec and British Columbia single mothers. The first two control groups are analogues to those used by Meyer and Sullivan. The ability to use the third control group, and thus to take an advantage of variations in provincial policy, sets my approach apart from their study. The need for a demographically identical control group is justified given that the other two control groups are less suitable in the Canadian context. The suitability of each of the control groups is discussed in the following section.

Recent related Canadian literature evaluates welfare reforms from the perspective of welfare take-up, spell-duration and welfare-to-work related questions [Beaulieu et al

2005, Lemieux and Milligan 2004, Milligan and Stabile 2004, Fortin et al 2004, Green and Warburton 2004, Roy 2004, Sceviour and Finnie 2004, Dooley et al 2000]. To my knowledge this study represents a first attempt to move beyond those issues and to evaluate the effects of Canadian welfare reforms by focusing directly on household consumption.

Total family consumption is the preferred measure of economic well-being. While exact data on consumption is seldom available, it has become standard practice to use estimates of the family budget constraint or total family expenditure. I use reported estimates of individual family total expenditure as proxy measures for consumption, as did Meyer and Sullivan [2004]. I also explore several components of the budget constraint.<sup>3</sup> I find that when total expenditure or total after tax family income are used as measures of family welfare, there is considerable evidence of a temporary fall in the relative standard of living among Ontario single mothers. I also find evidence of a long-term recovery from the initial drop. The results are sensitive to the choice of control group and furthermore, the inclusion of geographically different control groups adds significant insight to the analysis. When Quebec and B.C. single mothers are used as a control group the results are most consistent across various methods and specifications. These results also suggest that the between period variation was much more significant than the variation relative to other control groups. Finally, I find that the commonly used regression adjusted *difference in difference* estimation methods tend to overstate the negative effects of policy and to understate the subsequent relative recovery. I show how propensity score matching adjusted estimation corrects this bias.

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<sup>3</sup> These include net income after taxes, social transfer family income, wage income and change in assets.

The remainder of the paper is composed as follows: Section 2 provides an outline of the relevant policy reforms; Section 3 describes the data and the sample selection methods; Section 4 outlines the methodology; Section 5 discusses the key results; Section 6 concludes.

## **2. Outline of 1995-1998 socio-economic policy changes.**

Ontario, Quebec and British Columbia are the three most populous Canadian provinces, and together they include about three out of four Canadians. The majority of Canadian single mothers and Canadian welfare recipients also inhabit these provinces. The relative stability of Quebec and British Columbia welfare laws, during the 1995-1998 period, makes these provinces very attractive control groups for evaluating Ontario social assistance reforms.

The years from 1995 to 1998 were marked by considerable reductions in the number of welfare recipients within each of the provinces under consideration. Table 1 illustrates this decline. According to the Canadian Council of Social Development [1995, 1998], the number of Ontario welfare recipients decreased by 19% during this period. The proportional fall in British Columbia was 21%, while the fall in Quebec was only 10%. Sceviour and Finnie [2004] show that, over the 1995 to 2000 period, the likelihood of a Canadian single mother receiving social assistance changed considerably more than it did for an average single women or an average married couple with children. This change of a relative likelihood of social assistance dependence was also present in Ontario. Lemieux and Milligan [2004] point out one of the distinguishing features of

Canadian welfare system is the eligibility of singles and non-parents. It thus can be argued that, unlike in US, single childless women were also treated by the Ontario welfare reforms. It is their relative independence of welfare that makes them comparatively much less effected by policy changes and as such suitable as a control group in the experiment. The same rationale applies to the choice of married couples with children as a control group.<sup>4</sup>

*A difference in difference* experimental design allows observing the magnitude of the relative changes in the dependent variable without fully understanding the causality behind those changes. However, in order to interpret the relationships implied by the observed results, one needs to possess a basic understanding of the policy changes underlying the experiment. During the late 1990s several reforms of the social assistance system were implemented across Canada. Both federal and provincial governments initiated these changes. They can be grouped into (i) welfare system related reforms and (ii) National Child Benefit related reforms. Welfare program reforms were provincial initiatives and were typically designed to make dependence on social assistance less attractive in relation to paid employment. The National Child Benefit (NCB) was a joint federal-provincial program that offered new assistance to low-income families with children and, in most provinces, also made participation in the workforce more attractive relative to welfare. What follows is a brief description of these policy changes indicating how they provide a suitable natural experiment.

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<sup>4</sup> Sceviour and Finnie [2004] examine trends in incidence of social assistance over the reform period. They show that between 1995 and 2000 the proportion of Canadian single mothers relying on social assistance fell from 50.1% to 33.6%. At the same time the social assistance rates for Canadian singles fell from 20.1% to 15.9% and the rates for couples with children fell from 8.9% to 5.9%. Within Ontario, single mother social assistance rates fell from 56.1% in 1995 to 33.2% in 2000. The rates for Ontario singles and Ontario married couples with children fell from 20.9% to 14.1% and from 10.3% to 5.6% respectively. Finally, between 1995 and 2000, social assistance rates for single mothers in Quebec fell from 45.7% to 32.0% and in B.C. they fell from 52.7 to 37.1%.

## Welfare Reforms in Ontario, Quebec and B.C.:

Ontario enacted the most extreme welfare reforms of all Canadian provinces in the 1990's. In 1995, welfare benefits were cut by 21 percent<sup>5</sup>. The Ontario Works Act was passed in 1996 and implemented in 1998.<sup>6</sup> Ontario Works was implemented gradually, but the objective of the program remained constant. Its overriding focus is to redirect people from permanent dependence on welfare towards the shortest route to full employment. Couples living in common-law relationships were no longer able to claim sole support for the purpose of increased eligibility. Participation in academic upgrading, retraining and job-search related activities, was no longer optional but a requirement for welfare eligibility. The grounds for exemptions from participation in the above activities were also increasingly restricted during the implementation period.<sup>7</sup> When Ontario Works was fully implemented, the only groups permanently exempted from participation were seniors and the disabled. Temporary exemptions (typically of three month duration) could be granted only on the following grounds (i) having a temporary medical condition, (ii) lacking of an appropriate daycare, (iii) caring for the disabled, (iv) caring for family members suffering from a documented medical condition, (v) caring for seniors with documented special needs, (vi) requiring pregnancy/parental leave and (vii) being a single parent caring for a pre-school age child. This general participation requirement was the most important feature distinguishing the Ontario reforms from the policies adopted in Quebec and B.C.

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<sup>5</sup> Even after cuts the benefit levels remained the highest of all Canadian provinces when not adjusted for province specific cost of living.

<sup>6</sup> Social Assistance Reform Act.

<sup>7</sup> For a more detailed overview consult *Ontario Works Program Overview* 2001.

In 1998, single mothers lost their automatic exemption from participation in job search or training. Unless they fell under one of the categories listed above, they too were required to demonstrate their efforts to move to paid employment. We can therefore divide the years under consideration into two separate policy periods: (i) the early (pre 1998) reform period of benefit cuts, initial reforms and exemptions, and (ii) the late (post 1998) reform, period after all the reforms had been implemented and exemptions tightened.

By comparison to Ontario, the province of Quebec experienced only minor reforms to welfare policy during the 1995-98 period. The province of Quebec emphasized transition to employment by gradual rather than by fastest possible means. The transition was to be achieved through training and skill improving programs. Benefit levels were not reduced and paid employment was to become more attractive to welfare recipients by means of improvements to the situation of low-income workers. Further changes, legislated in 1999 and after, proceeded in an unchanged spirit: the number of services offered seemed to increase steadily but participation in these programs was not a mandatory requirement for eligibility for social support. [The National Study of Welfare to Work Programs, Phase 1 and Phase 2, Quebec]

British Columbia also adopted a series of welfare reforms during the second half of the 1990s. In 1996: the BC Benefits (Youth Works) Act and the BC Benefits (Income Assistance) Act were passed. The first of the acts was aimed specifically at the reduction of unemployment among youth (age 19-24). According to its provisions, young adults unable to support themselves were eligible for social assistance under conditions similar to those adopted by Ontario for most welfare recipients. In B.C. these young welfare

recipients had to actively seek employment and to participate in job training. In return they were offered an allowance and priority placement both in skills training programs and in employment. For the rest of B.C.'s population, however, participation in job search or training was not an explicit condition for welfare eligibility. [The National Study of Welfare to Work Programs, Phase 1 and Phase 2, British Columbia]

### National Child Benefit<sup>8</sup>

The National Child Benefit (NCB) is a joint federal-provincial program designed to provide financial aid to children of lower-income working families. NCB went into effect in 1998. The aim of the program is to encourage working families to remain in the workforce. New benefits provided by NCB are not available to welfare recipients and thus they provide an additional incentive for continued participation in paid employment. Each of the three provinces under consideration responded differently to the federal initiative. Ontario adopted a social assistance offset approach, in which provincial social assistance benefit levels were reduced by the amount provided federally under the NCB program. These "saved" provincial funds are then redirected towards investments designed to improve the well-being of low-income children. In July 1998, Ontario introduced the Ontario Child Care Supplement for Working Families. This program provides for annual benefits of up to \$1020 per child to cover the child-care expenses of families with earnings above \$5000 (the benefits are reduced if earnings exceed \$20 000). The families eligible are (i) those in which one of the parents is working and the other takes care of children below the age of seven, and (2) one of the parents is a student or trainee and the family incurs child-care expenses. Additional funds were also made

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<sup>8</sup> National Child Benefit Progress Report 1999, Appendix 1.

available specifically to working single parents. Ontario municipalities pay about 20% of the costs of social assistance and hence some of the funds freed by NCB are reinvested into various local programs.

British Columbia had a provincial program similar to the NCB as early as 1996 – the B.C. Family Bonus. In 1998, NCB benefits were integrated into this provincial child benefit transfer program. Because NCB supplemented the provincial program, the “saved” funds were redirected mainly towards the B.C. Earned Income Benefit program that was designed to reduce the disincentives faced by low-income families reentering employment. In B.C., just like in Ontario, NCB provided incentives to leave social assistance and to enter employment [Pennock 2003].

The Quebec government has not officially joined the NCB initiative. Quebec families receive federal NCB transfers that are not integrated with the provincial system and are not contingent on entering or continuing employment [Milligan and Stabile 2004].

The Ontario welfare reforms and the National Child Benefit initiative should have similar consequences for single mothers. The attractiveness of paid employment relative to welfare should have increased as a result of both policy reforms. This effect should be qualitatively similar for married couples with children in Ontario. Single childless women in Ontario, however, would only be affected by provincial welfare changes. Finally, single mothers in B.C. should be affected by the introduction of NCB in a manner similar to Ontario single mothers.

As a consequence of this experimental design neither control group is completely immune to all treatments. Ontario control groups are likely to be partially affected by the

Ontario welfare reforms. Families with children are likely to be at least partially treated by NCB. Independent province specific changes in Quebec and B.C. can obscure the identification of the relative Ontario policy effects. However these effects are not shared across control groups. Quebec and B.C. single mothers are immune to Ontario specific effects. Similarly, any province specific trends present in Quebec and B.C. will be absent in Ontario. Due to low intensity of welfare dependence of Ontario control groups, they are much less likely to be affected by the changes to welfare code than the single mothers. Similarly, the relatively low intensity of policy reforms in Quebec and B.C. is likely to have little comparable impact on consumption of the control group. In this paper the results are stable across control groups that do not share common treatments. This suggests a presence of a consistent effect of Ontario welfare reforms on the province's single mothers, even if various other treatment effects cannot be completely eliminated from the control groups.

Another way to argue for the suitability of the control groups is to agree that the second half of 1990s was a time of widespread welfare reforms all over Canada. Policy changes affecting most of Canadians were bound to happen. Thus the effects of Ontario reforms in the context of a *difference in difference* natural experiment should not be formed around an irrelevant counterfactual of no-policy change. The results relative to other jurisdictions can be interpreted as formed around a counterfactual of less extensive policy reforms. Similarly the results relative to other Ontario based control groups can be thought of as addressing a counterfactual of less effective policy targeting.

### 3. Data.

The data for this paper come from the Canadian Family Expenditure Survey (FAMEX) and its subsequent replacement, the Survey of Household Spending (SHS). Both surveys are based on the same Statistics Canada labor force sampling frame and use the same weighting system. They over- and under-sample the same population and cover the same geographic areas. Finally, both surveys include a number of identically or nearly identically defined variables. As such, merging the surveys for our purposes is a relatively straightforward matter.<sup>9</sup>

I divide the time frame into three periods. Period one includes the years before the 1995 benefit reduction. From this period I use the 1982, 1986 and 1992 surveys. The rest of the available FAMEX surveys have been dropped for the following reasons: The 1984 and 1990 surveys cover only families living in urban areas. It is generally accepted that the cost of obtaining a given standard of living varies between urban and rural areas and hence an inclusion of these years into the analysis would bias the results. It might not be possible to distinguish the effect of particular policies from the effect of living in an urban area. The 1978 survey was dropped because of an inability to match the key variables with the rest of the data.<sup>10</sup>

Period two, the early reform period, refers to the years 1996, 1997 and 1998, the first years after the welfare cuts. These years include the period of gradual implementation of Ontario Works, the narrowing of exemptions from participation in job search and training related - activities, and the introduction of the National Child Benefit.

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<sup>9</sup> For more details consult *Statistics Canada*. (2000)

<sup>10</sup> The 1969 and 1974 surveys were dropped because of their irrelevancy in evaluating the effects of the natural experiment under consideration.

The 1996 survey is the final FAMEX survey and the following two are the first SHS surveys.

The final period, the late reform period, includes all available SHS data after 1998: i.e. the 1999, 2000 and 2001 surveys. It covers the time period when all the Ontario welfare reforms were fully implemented. This division into three time periods makes it possible to construct a two stage *difference in difference* experimental framework in which the immediate transition effects of policy (early reform period) are isolated from the effects after adjustment (late reform period).

The estimated sample was selected using the following guidelines. With the exception of the 1996 survey, only houses headed by persons aged 18 to 64 were included. The demographic information in the 1996 survey is inconsistent with the rest of the surveys. For that year only, households headed by individuals who were 16 or 17 years of age were included. Also, in order to maintain continuity of age definitions between the FAMEX and SHS surveys, all reported age answers were bottom-coded at 25.

The treatment and control groups were selected as follows: single mother households, for both treatment (Ontario) and control (Quebec and B.C.) groups, were defined as those headed by a non-married female and including one person aged 18-64, at least one child aged 15 or younger, and no persons aged 65 and over. Married couples with children were defined as two opposite sex, married people aged 18-64, at least one child aged 15 or younger, and no persons aged 65 and over. The selection of single women living alone, was a trivial process.

The above specification criteria for sample selection are not ideal, and are dictated by the demographic information available. One shortcoming is that only those single mothers who were living in households with no other adults are included. Fortunately, as Dooley [1999] points out, close to 90% of Canadian single mothers with young children reside in single adult households. I was also not able to exclude students, whose standards of living can be interpreted as a consequence of their investment strategy and, as such, do not make suitable control groups. These shortcomings have potential consequences for interpreting labor supply decisions or relative magnitudes of different income components, and provide a strong rationale for the propensity score matching *difference in difference* approach, which is discussed in the next section.

#### **4. Methodology:**

The results discussed in the next section were produced in three stages. First, ‘raw’ *difference in difference* estimates were created by a way of simple comparisons of the means within the traditional ‘before/after treatment/control’ four-cell framework. Second, I followed the methodology adopted by Meyer and Sullivan [2004] and introduced additional information using regression adjusted *difference in difference* analysis. The incorporation of the demographic details allows separating the mean changes in consumption resulting from policy effects from those resulting from the changes in the characteristics of Ontario single mothers and the relevant control groups. Third, I applied propensity score matching adjusted *difference in difference* methodology to further account for differences between treatment and control groups.

In order to account for the household economics of scale, all of the results were estimated on per household and per household member basis. First, separate estimation routines were run with various measures of household consumption as dependent variables. Second, each of these consumption measures was divided by the household size and then otherwise identical estimation routines were performed again. I was therefore able to interpret the results as accounting for the upper and the lower bounds of household economics of scale (with the true result being somewhere in between). As with Meyer and Sullivan [2004], the choice of the exact equivalence scale was inconsequential. The differences in results between per household and per household member estimates are negligible. For ease of interpretation all the results are presented on a per household member basis.

Meyer and Sullivan point out that expenditure is typically a more reliable measure of consumption (and hence of the material standard of living) than income is. I have therefore constructed a measure of total expenditures on all goods and services that cannot be considered investments. I use the sum of expenditures on a series of specific composite commodities. The composite commodities included in this measure are food purchased from stores, food purchased at restaurants, shelter, household operation, furnishings, car purchase, gasoline, car operation, public transit, personal care services and supplies, alcohol and tobacco, recreation and clothing. I have also used after-tax income as another consumption measure.<sup>11</sup>

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<sup>11</sup> Attempts to use the following three components of budget constraint: (i) government transfer income, (ii) wage income, and (iii) yearly change in assets, as dependent variables are discussed in the appendix and are available from the author.

The 1992-base Consumer Price Index (CPI) has been used to deflate all expenditure and income measures. Alternatives to the CPI include a budget-share-weighted mean of several commodity-specific price indexes, and province-specific deflators. Sensitivity tests revealed no significant differences across these alternative specifications of the deflator.

For the regression adjusted *difference in difference* approach I use the following model to compare responses of Ontario single mothers to those of single mothers in Quebec and B.C.

$$f(c_i) = \beta_1 + (dOntariodper)' \beta_2 + dOntario' \beta_3 + dper' \beta_4 + X' \beta_5 \quad (1)$$

where  $f(c_i)$  is a function measuring per capita consumption by household  $i$ ,  $dOntario$  is an Ontario dummy,  $dper$  is a vector of time period dummies and  $X$  is a vector of demographics.<sup>12</sup>

The regression model used to compare the standard of living among Ontario single mothers to the standards of living among Ontario unmarried childless women or to those among Ontario married couples with children is the following:

$$f(c_i) = \beta_1 + (SMdper)' \beta_2 + SM' \beta_3 + dper' \beta_4 + X' \beta_5 \quad (2)$$

where  $SM$  is a single mother dummy.

The effects of the experiment are the coefficients on  $SMdper$  (the treatment group-time period interaction terms) that capture the *difference in difference* policy effects on the Ontario single mothers. The treatment group dummy accounts for the effect of being an Ontario single mother on the predicted living standards of households. The

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<sup>12</sup> Unfortunately, the only two demographic characteristics that could be successfully traced across all the survey years are the *household size* and the *age of head of household*. The lack of any education level related variables within the Survey of Household Spending precluded the option of focusing on low educated single mothers (like Meyer and Sullivan 2004).

time period dummies account for the general time trend effects, and the pre-policy period is set as base. The interaction terms capture the effects specific to single mothers in respective time periods and, as such, account for the differences in the predicted standard of living between Ontario single mothers and either of the control groups in each of the two policy time periods.

I use one control group at a time and drop the other control groups out of the estimation. Alternative geographic specifications for equation (1) were used, as were control groups made up exclusively of Quebec single mothers, or exclusively of B.C single mothers. The sensitivity of equation (1) results to using either of these provinces alone is marginal<sup>13</sup>.

The transformation chosen for the dependent variable is  $\sinh^{-1}(\theta c)/\theta$  which is the inverse hyperbolic sine proposed by Burbidge et al (1988).  $\theta$  is parameter set equal to one (as in Browning and Crossley 2004) and  $c$  is the measure of consumption. This transformation handles large positive values in a manner similar to logarithms, but, unlike logs, it allows for admitting non-positive values, which is especially practical when government transfer income, wage income, or yearly change in assets and liabilities are used. These measures are positive for only a fraction of a population and, as such, could not be properly accounted for in a traditional log linear framework.<sup>14</sup>

After the ‘raw’ and regression adjusted approaches, the third type of analysis is propensity score matching adjusted *difference in difference*. Matching estimators assign

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<sup>13</sup> Similarly, if equation 1 is estimated using all of Canada’s non-Ontario single mothers as controls, the general conclusion of the *difference in difference* results holds across all specifications. What seems to vary is the level of significance.

<sup>14</sup> For net income and expenditure regressions which transform always positive dependent variable the results from regressions using inverse hyperbolic sine of the dependent variable produce marginal effects nearly identical to their log linear alternatives.

each member of the treatment group to a member(s) in the control group who exhibits similar observable characteristics. Conditional on those characteristics, potential experimental outcomes are assumed independent of treatment or control group membership. Only those members of the treatment group and the control group for whom a suitable match can be found are included in the analysis. In other words, matching adjusted *difference in difference* estimators compare the before and after differences between treatment and control groups only over the so-called common support range.<sup>15</sup>

The larger the number of the characteristics that determine the common support, the more complex and computationally intensive is the resulting matching process. Fortunately, Rosenbaum and Rubin (1983) prove that matching can be obtained by pairing treatment and control subjects according to their propensity scores obtained from a parametric model that estimates the conditional probability of belonging to an experimental treatment group. Logistic regression is used for this purpose.

Matching routines implemented for this paper are conducted as follows. First, propensity scores from a logistic regression on participation within the program are obtained. Those regressions utilize the same demographic characteristics as the regressions in stage two of the analysis, as well as a set of several indicator variables for receipt of social support, engaging in paid employment, receiving alimony payments and others. Second, I perform the matching using the *psmatch2* STATA procedure developed by Leuven and Sianesi (2003). Kernel matching is utilized instead of the typical, single, nearest neighbor matching.<sup>16</sup> This procedure matches each of the members in a treatment group who fall within the common support region to a weighted average of several

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<sup>15</sup> For an in depth summary of different matching estimators consult Smith and Todd (2003).

<sup>16</sup> In the case of nearest neighbor matching, the presence of observations with identical propensity score values can cause the sorting order of the data to affect the results.

subjects within the control group. While the *psmatch2* procedure allows for several different choices of Kernel weighting functions, they all produce very similar results and so the default Epanechnikov Kernel specification has been used.<sup>17</sup>

## 5. Results.

### 5.1. Summary statistics and ‘Raw’ difference in difference results.

Tables 2 and 3 offer an overview of the data. Table 2 provides sample sizes, represented population sizes, and per capita weighted means of various components of the budget constraint. Table 3 further provides a by source of income breakdown of the budget constraint. The numbers in tables 2 and 3 are presented for every year of the data, for the treatment group and for each of the control groups. Several trends appear for both total expenditure and total net income. First, in 1992 and earlier, Ontario single mothers enjoyed higher per capita income and expenditures levels than single mothers in Quebec and B.C. That relationship was reversed with the introduction of welfare reforms in Ontario in 1995. It was not until 2000 that Ontario single mothers again had higher levels of income and expenditure.

Second, average transfer income is only a fraction of the average wage income for each group and year. This is consistent with the government transfer income being designed to provide only a minimal sustainable standard of living. Between 90 to 100 percent of Ontario single mothers reported positive government transfer income, but this

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<sup>17</sup> The Epanechnikov Kernel takes the form: 
$$K|z| = \begin{cases} \frac{3}{4} \left(1 - \frac{1}{5}z^2\right) / \sqrt{5} & \text{if } |z| < \sqrt{5} \\ 0 & \text{otherwise} \end{cases}$$

represents only a fraction of net income on average. In the pre reform period between 60 and 72 percent of Ontario single mothers reported positive wage income, but this figure dropped by about 10 percent during the early policy period. This last finding is especially interesting, given the goal of Ontario policy reform, and the rising employment rates of Quebec and B.C. single mothers during the same period. Table 3 shows that it was not until the post implementation period that the employment rates of Ontario single mothers increased and eventually surpassed the levels in other provinces.

A pair of probit regressions for labor force participation was run to further investigate the employment decisions of Ontario single mothers. Two distinct dependent variables were used: ‘participated in wage employment any time during the reference year’ and ‘participated in wage employment for 52 weeks during the reference year.’<sup>18</sup> The results in table 4 indicate that during the implementation period, Ontario single mothers experienced a decrease in their labor force participation rates relative to Quebec and B.C. single mothers. These results also indicate that, relative to the other two control groups, Ontario single mothers have experienced a considerable increase, of up to 20 percent, in labor force participation during the post implementation period.

Table 3 illustrates another feature, more consistent with the policy timing. This is a decrease in the incidence of reported positive transfer income among Ontario married couples with children starting in 1996. The first period of Ontario welfare reforms is associated with a decrease of up to 30 percent in the proportion of Ontario married couples with children receiving any transfer income at all. It does appear that the Ontario welfare reforms had the immediate effect intended by policymakers. The implementation

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<sup>18</sup> Alternative specifications controlling for the differences between part time and full time employment were also tried. These added little extra information.

of the 1998 National Child Benefit Act, however, had only slight, if any, effects on either the incidence, or the amount of transfer income received. No similar pattern can be observed in the behavior of single childless women in Ontario.

Most of the survey respondents reported changes in assets and liabilities, but on average these were small relative to other measures. The data do imply however that Ontario single mothers tend to dissave between \$300 to \$700 more than Quebec and B.C. single mothers in almost every surveyed year, but there does not appear to be any correlation between policy timing and the magnitude of these asset changes.

Table 5 provides a first set of *difference in difference* estimates. First, differences in after tax income and expenditure between the treatment group and each of the control groups were recorded for each period.<sup>19</sup> These are listed under the *difference* headings. Second, the *difference in difference* figures were obtained by way of simple subtraction of the base period results from the two policy period estimates. The early policy period marks a drastic decrease in mean net income and in total expenditure of Ontario single mothers relative to single mothers in Quebec and B.C, and relative to the other two Ontario based control groups. This decrease is estimated at 1230 dollars of income, and 1045 dollars of expenditure, relative to single mothers in other provinces. Relative to unmarried single women, the decrease is 469 dollars of income and 637 dollars of expenditure. Relative to married couples, the corresponding figures are 1530 dollars of income and 1321 dollars of expenditure. With exception of results relative to single unmarried women all the estimates of the initial relative fall are significant at 5% level. These results suggest that it was not until the post implementation period that the relative

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<sup>19</sup> As shown in the appendix the *difference in difference* results for wage income, transfer income and change in assets cannot be considered reliable.

standard of living of the treatment group has at least partially improved. While the magnitude of the results varies, the overall pattern of initial decline and followed by a recovery repeats across all subsequent specifications.

The early reform period drop in net income and total expenditure, relative to Quebec and B.C. single mothers is significantly below the one relative to Ontario married couples and significantly above the one relative to Ontario single childless women. The estimates for the change relative to Quebec and B.C. single mothers show a nearly complete reversal of the effects of the initial shock. These late reform *difference in difference* results suggest that the final effect of the policy of welfare reductions was close to zero. Their lack of significance further suggests no long-term policy effect. The late reform *difference in difference* policy effect relative to single unmarried women depends on the choice of the consumption measure; it is positive for net income and negative for total expenditure. The results for married couples with children show only a partial late reform improvement with the net effect being a relative decrease of 728 dollars of expenditure and 641 dollars of income. These results therefore begin to illustrate the importance of administratively distinct but otherwise similar control groups.

## 5.2. Regression adjusted *difference in difference* results

Several regressions were run in order to further investigate the relative changes in the standard of living of Ontario single mothers. Tables 6 and 7 describe the results of two sets of regressions. Table 6 uses total per capita family net income as a dependent variable. Table 7 uses, per capita total expenditure measure. The early reform period is associated with a statistically significant fall in the relative standard of living of Ontario

Single mothers. The magnitude of this relative decrease ranges from just under three and up to fifteen percent depending on the control group chosen. In the first policy period the consumption levels of Ontario single mothers fell most drastically, relative to Ontario married couples with children. This result is difficult to reconcile with what could be expected as a likely policy implication. It should be expected that the standards of living of groups adversely affected by the policy changes fell the most relative to those who were unaffected. Contrary to this logic, it appears that because of the tightening of the welfare system, the standard of living among Ontario single mothers fell by less relative to single mothers outside of Ontario (unaffected by a policy change), or relative to Ontario childless women (less affected by the policy change), than they fell relative to a control group that was affected the most. Thus, the standard of living among Ontario single mothers fell the most relative to those who, because of their reliance on transfer income, in all likelihood would be the ones most negatively affected by the policy change.

The late reform period results suggest an improvement in comparison with the implementation period. Unlike the early policy results, none of the late policy results are statistically significant at 5% level. Only the results relative to married couples with children are almost significant at 10% level. This lack of significance implies no strong long-term policy effect. The results indicate that in the late reform period the standard of living among Ontario single mothers had actually risen relative to Ontario childless single women. The magnitude of the increase is between three and a half and ten percent. Relative to other control groups, the Ontario single mothers' standard of living increased following the early reform period but nevertheless remained lower than the pre reform

estimates. Relative to Married couples with children, the post policy decrease in standard of living ranges between five to eight percent.

Note that, as shown in the following subsection, when matching adjusted *difference in difference* is used, it no longer appears that the standard of living among Ontario single mothers had initially fallen the most relative to Ontario married couples with children. This puzzle can potentially be attributed to the mismatching inherent within the regression adjusted results.

The marginal effects of the time period treatment interaction dummy variable that summarizes the *difference in difference* component of the regression results are presented in Table 8. All figures are presented per household member. The results are similar, regardless of whether total expenditure or net income is chosen as the dependent variable. The first panel in table 8 indicates that the net income of Ontario single mothers relative to that of Quebec and B.C. single mothers fell by 1247 dollars, and total expenditure fell by 1327 dollars during the early reform period. Again, the importance of geographically different but otherwise similar control groups needs to be emphasized. Unlike the case of 'raw' results, these effects were much smaller relative to the other control groups.

The post implementation policy effects are again statistically insignificant. Their magnitudes however consistently point towards an improvement in the relative standard of living of Ontario single mothers. As table 8 shows, change during the late reform period, relative to Quebec and B.C. single mothers, turns out to be a decrease of 404 dollars of income and 319 dollars of expenditure per household member. The decrease relative to married couples is about a hundred dollars. Relative to single childless women in Ontario the real income of Ontario single mothers increased by 496 dollars of income

and total expenditure increased by 235 dollars. The early to late policy changes, are much greater when the control group is similar but living in different jurisdictions (single mothers in Quebec and B.C.) than when the inverse is true (single childless women or married couples in Ontario).

### 5.3. Propensity Score Matching *difference in difference* results.

The final set of results has been obtained through the implementation of the propensity score matching adjusted *difference in difference* techniques. As described in the methodology section, subjects within the treatment group were matched to a weighted average of subjects in the control group. The matching was done based on a number of observable characteristics. The variables used to determine propensity scores were age, household size, and a dummy for car ownership. Dummy variables that reflected positive transfer income, positive wage income, or a different from zero change in family assets, were also used. In each period, observations in the treatment group were matched to observations in one of the control groups. The average difference in the standard of living, during each period, was then calculated. Finally, in order to obtain *difference in difference* results, the average mean difference during the base period was subtracted from the average mean differences in each of the policy periods. Matching was done over a determined common support range and, therefore, excluded those subjects for whom no suitable match could be found.

Table 9 contains the results of the matched *difference in difference* natural experiment. The early reform fall in the total expenditure relative to Quebec and B.C. single mothers is now only 539 dollars and the fall in net income is 494 dollars. These

declines are much smaller than those for the ‘raw’ and regression adjusted *difference in difference* estimates in tables 5 and 8. The results for the late reform period also indicate that the standard of living among Ontario single mothers has improved more than can be suggested by ‘raw’ or regression adjusted procedures. An increase of 147 dollars of income and 309 dollars of total expenditure is noted relative to single mothers in Quebec and B.C. The strength of this conclusion however is undermined by low significance of the matched results.

Matching to Ontario married couples also indicates an overall positive long-term policy effect. Total expenditure increases by 399 dollars and net income increases by 20 dollars. The latter is small but non negative, unlike the results presented by ‘raw’ and regression adjusted estimates. Matching to unmarried childless women shows mixed late reform results similar to those obtained by ‘raw’ estimates. Net income increases by 673 dollars and total expenditure decreases by 371 dollars.

## **6. Conclusions.**

This paper looks at the effects of a series of 1995-1998 Ontario welfare reforms on the standard of living of the province’s single mothers. I merge several Canadian Family Expenditure Surveys and Surveys of Household Spending. I use net income and total expenditure as measures of household consumption. Based on available data I divide the timeframe into three periods: the pre reform period (1982-1992), the early reform period (1996-1998), and the late reform period (1998-2000). A two stage *difference in difference* natural experiment design is used to evaluate the relative changes in the

standard of living among Ontario single mothers. I compare these treatment group changes to changes in the standards of living of three different control groups, namely single mothers in Quebec and B.C., single childless women in Ontario and married couples with children in Ontario. The natural experiment is set during the era of widespread welfare reforms in Canadian. Consequently, the counterfactual for the experiment is that of less extensive policy changes rather than of absolute policy stability.

I provide three sets of *difference in difference* estimates. First, I look at changes in mean differences in reported incomes and expenditures. Second, I provide regression adjusted *difference in difference* results. Finally, I use propensity score matching *difference in difference* estimators in order to eliminate possible sources of bias, resulting from comparing groups with potentially different average characteristics.

Table 10 summarizes the key results discussed in the preceding section. I find that the early reform period had significant negative effects on the standard of living among Ontario single mothers. Those effects were negative relative to either control group and remained so across all the *difference in difference* specifications. This initial impact however, was offset by positive changes in the late reform period. The late reform effects are positive for all net income changes and for all expenditure changes. The net policy effects are positive with the exception of those relative to single childless Ontario women, where the effects of negative changes of the early reform period are only partly reversed.

The choice of dependent variable matters least when Quebec and B.C. single mothers are used as a control group; the relative changes in net income and total expenditure suggest the same pattern, and are of similar magnitude. When Ontario based

control groups are used, an a priori choice of the dependent variable affects the conclusions drawn from the experiment. Finally, the *difference in difference* results obtained through propensity score matching estimates suggest that ‘raw’ and regression adjusted *difference in difference* measures overstate the immediate negative effects of the policy and understate the subsequent recovery. However, the low significance of the matched *difference in difference* results weakens the last conclusion.

To my knowledge, the use of control groups from different jurisdictions and the utilization of matching estimators differentiate my approach from previous related work. As shown, I find that both innovations add potential new information to the overall picture of the welfare reform.

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Table 1. By province: number of welfare recipients 1995 and 1998.

| Year                    | Ontario   | Quebec  | B.C.    |
|-------------------------|-----------|---------|---------|
| 1995                    | 1,344,600 | 802,200 | 374,300 |
| 1998                    | 1,091,300 | 725,700 | 297,400 |
| Reduction <sup>20</sup> | 19%       | 10%     | 21%     |

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<sup>20</sup> The reduction is expressed as percentage of the 1995 figures.

Table 2. Treatment and control group sample sizes, population represented, mean components of budget constraint and mean total expenditure, by year of survey.<sup>21</sup>

| Year | Variable                       | SM Ontario | SM Que. & BC | Single no child, Ontario | Married with Child, Ontario |
|------|--------------------------------|------------|--------------|--------------------------|-----------------------------|
| 1982 | Sample size                    | 71         | 118          | 164                      | 708                         |
|      | Population size                | 78637      | 94609        | 210868                   | 801976                      |
|      | Transfer Income ( if > 0 )     | 2235       | 2839         | 5193                     | 733                         |
|      | Wage Income ( if > 0 )         | 9311       | 8445         | 23272                    | 12264                       |
|      | Net Income                     | 8988       | 7958         | 21681                    | 11512                       |
|      | Total Expenditure              | 8424       | 7832         | 18210                    | 9361                        |
|      | Change in assets ( if ~ = 0 )  | 157        | -331         | 863                      | 1084                        |
|      | Alimony (if > 0)               | 2315       | 1913         |                          |                             |
| 1986 | Sample size                    | 86         | 122          | 183                      | 562                         |
|      | Population size                | 99920      | 105890       | 231460                   | 747230                      |
|      | Transfer Income ( if > 0 )     | 2681       | 3200         | 5735                     | 656                         |
|      | Wage Income ( if > 0 )         | 7802       | 7754         | 27941                    | 13176                       |
|      | Net Income                     | 7612       | 7318         | 23462                    | 11696                       |
|      | Total Expenditure              | 7710       | 7235         | 19706                    | 10326                       |
|      | Change in assets ( if ~ = 0 )  | -510       | -157         | 2109                     | 273                         |
|      | Alimony (if > 0)               | 2478       | 1973         |                          |                             |
| 1992 | Sample size                    | 100        | 106          | 143                      | 463                         |
|      | Population size                | 171660     | 146395       | 218829                   | 794600                      |
|      | Transfer Income ( if > 0 )     | 3381       | 2843         | 4533                     | 1062                        |
|      | Wage Income ( if > 0 )         | 8105       | 8537         | 32497                    | 13656                       |
|      | Net Income                     | 8687       | 8359         | 24095                    | 12250                       |
|      | Total Expenditure <sup>1</sup> | 9460       | 8219         | 20270                    | 10493                       |
|      | Change in assets ( if ~ = 0 )  | -1052      | -400         | 661                      | 434                         |
|      | Alimony (if > 0)               | 1933       | 2425         |                          |                             |
| 1996 | Sample size                    | 70         | 113          | 166                      | 429                         |
|      | Population size                | 119344     | 154712       | 247754                   | 717704                      |
|      | Transfer Income ( if > 0 )     | 3539       | 2919         | 5323                     | 1117                        |
|      | Wage Income ( if > 0 )         | 7718       | 10978        | 29030                    | 14413                       |
|      | Net Income                     | 7632       | 9448         | 22520                    | 12513                       |
|      | Total Expenditure              | 7353       | 8585         | 18711                    | 9974                        |
|      | Change in assets ( if ~ = 0 )  | -140       | 309          | 1584                     | 1199                        |
|      | Alimony (if > 0)               | 1385       | 2002         |                          |                             |
| 1997 | Sample size                    | 114        | 235          | 144                      | 505                         |
|      | Population size                | 170229     | 197243       | 259994                   | 859234                      |
|      | Transfer Income ( if > 0 )     | 3371       | 2611         | 4636                     | 982                         |
|      | Wage Income ( if > 0 )         | 8756       | 8764         | 30359                    | 15638                       |
|      | Net Income                     | 7673       | 8140         | 21517                    | 12730                       |
|      | Total Expenditure              | 7721       | 8094         | 18218                    | 10861                       |
|      | Change in assets ( if ~ = 0 )  | -685       | -388         | 1424                     | 697                         |
|      | Alimony (if > 0)               | 1728       | 1883         |                          |                             |

<sup>21</sup> Transfer income refers to total government transfer income  
Change in assets refers to a yearly net change in assts and liabilities

Table 2. Cts. Treatment and control group sample sizes, population represented, mean components of budget constraint and mean total expenditure, by year of survey.

| Year | Variable                      | SM Ontario | SM Que. & BC | Single no child, Ontario | Married with Child, Ontario |
|------|-------------------------------|------------|--------------|--------------------------|-----------------------------|
| 1998 | Sample size                   | 96         | 188          | 126                      | 489                         |
|      | Population size               | 147061     | 186924       | 247142                   | 893165                      |
|      | Transfer Income ( if > 0 )    | 2825       | 2728         | 3262                     | 968                         |
|      | Wage Income ( if > 0 )        | 8122       | 8593         | 30711                    | 15784                       |
|      | Net Income                    | 8215       | 8220         | 24195                    | 12834                       |
|      | Total Expenditure             | 8439       | 7943         | 20713                    | 11013                       |
|      | Change in assets ( if ~ = 0 ) | -845       | -207         | 1325                     | 622                         |
|      | Alimony (if > 0)              | 1775       | 1971         |                          |                             |
| 1999 | Sample size                   | 103        | 207          | 130                      | 484                         |
|      | Population size               | 177508     | 190903       | 236991                   | 835365                      |
|      | Transfer Income ( if > 0 )    | 2862       | 2816         | 6127                     | 1040                        |
|      | Wage Income ( if > 0 )        | 7404       | 8104         | 34321                    | 15684                       |
|      | Net Income                    | 8477       | 8445         | 23708                    | 12799                       |
|      | Total Expenditure             | 8518       | 8557         | 19767                    | 11014                       |
|      | Change in assets ( if ~ = 0 ) | -477       | -558         | 2787                     | 520                         |
|      | Alimony (if > 0)              | 1585       | 1952         |                          |                             |
| 2000 | Sample size                   | 82         | 153          | 122                      | 449                         |
|      | Population size               | 175541     | 182962       | 226583                   | 862015                      |
|      | Transfer Income ( if > 0 )    | 2559       | 2549         | 4963                     | 907                         |
|      | Wage Income ( if > 0 )        | 11187      | 8502         | 29068                    | 15962                       |
|      | Net Income                    | 9407       | 8841         | 21294                    | 13384                       |
|      | Total Expenditure             | 9513       | 8417         | 19252                    | 11293                       |
|      | Change in assets ( if ~ = 0 ) | -701       | 36           | 113                      | 999                         |
|      | Alimony (if > 0)              | 1413       | 1835         |                          |                             |
| 2001 | Sample size                   | 74         | 168          | 133                      | 489                         |
|      | Population size               | 152616     | 176874       | 224102                   | 884209                      |
|      | Transfer Income ( if > 0 )    | 2397       | 2724         | 4275                     | 1039                        |
|      | Wage Income ( if > 0 )        | 9785       | 8016         | 35943                    | 16335                       |
|      | Net Income                    | 10107      | 8685         | 24748                    | 13561                       |
|      | Total Expenditure             | 10420      | 8469         | 21491                    | 11197                       |
|      | Change in assets ( if ~ = 0 ) | -743       | -360         | 930                      | 1117                        |
|      | Alimony (if > 0)              | 2010       | 1699         |                          |                             |

Table 3. Income sources by group and year. Proportion of families reporting selected budget constraint components greater than or not equal to zero. All figures reported in percentage terms.

| Year | Variable                      | SM Ontario | SM Que. & BC | Single no child, Ontario | Married with Child, Ontario |
|------|-------------------------------|------------|--------------|--------------------------|-----------------------------|
| 1982 | Sample size                   | 71         | 118          | 164                      | 708                         |
|      | % of Transfer Income (if > 0) | 100        | 100          | 41                       | 100                         |
|      | Wage Income (if > 0)          | 72         | 62           | 80                       | 96                          |
|      | Change in assets (if ~ = 0)   | 58         | 62           | 45                       | 31                          |
|      | Alimony (if > 0)              | 41         | 49           |                          |                             |
| 1986 | Sample size                   | 86         | 122          | 183                      | 562                         |
|      | % of Transfer Income (if > 0) | 100        | 100          | 36                       | 99                          |
|      | Wage Income (if > 0)          | 60         | 53           | 74                       | 96                          |
|      | Change in assets (if ~ = 0)   | 77         | 80           | 45                       | 44                          |
|      | Alimony (if > 0)              | 41         | 34           |                          |                             |
| 1992 | Sample size                   | 100        | 106          | 143                      | 463                         |
|      | % of Transfer Income (if > 0) | 99         | 99           | 63                       | 99                          |
|      | Wage Income (if > 0)          | 64         | 59           | 74                       | 96                          |
|      | Change in assets (if ~ = 0)   | 74         | 70           | 47                       | 42                          |
|      | Alimony (if > 0)              | 37         | 52           |                          |                             |
| 1996 | Sample size                   | 70         | 113          | 166                      | 429                         |
|      | % of Transfer Income (if > 0) | 96         | 94           | 64                       | 77                          |
|      | Wage Income (if > 0)          | 54         | 64           | 64                       | 93                          |
|      | Change in assets (if ~ = 0)   | 74         | 60           | 51                       | 34                          |
|      | Alimony (if > 0)              | 39         | 43           |                          |                             |
| 1997 | Sample size                   | 114        | 235          | 144                      | 505                         |
|      | % of Transfer Income (if > 0) | 96         | 94           | 69                       | 70                          |
|      | Wage Income (if > 0)          | 51         | 67           | 70                       | 98                          |
|      | Change in assets (if ~ = 0)   | 68         | 65           | 52                       | 39                          |
|      | Alimony (if > 0)              | 41         | 39           |                          |                             |
| 1998 | Sample size                   | 96         | 188          | 126                      | 489                         |
|      | % of Transfer Income (if > 0) | 94         | 98           | 60                       | 70                          |
|      | Wage Income (if > 0)          | 68         | 65           | 80                       | 98                          |
|      | Change in assets (if ~ = 0)   | 76         | 66           | 49                       | 40                          |
|      | Alimony (if > 0)              | 44         | 42           |                          |                             |
| 1999 | Sample size                   | 103        | 207          | 130                      | 484                         |
|      | % of Transfer Income (if > 0) | 98         | 95           | 57                       | 69                          |
|      | Wage Income (if > 0)          | 80         | 71           | 72                       | 98                          |
|      | Change in assets (if ~ = 0)   | 61         | 74           | 44                       | 43                          |
|      | Alimony (if > 0)              | 47         | 43           |                          |                             |
| 2000 | Sample size                   | 82         | 153          | 122                      | 449                         |
|      | % of Transfer Income (if > 0) | 93         | 95           | 79                       | 88                          |
|      | Wage Income (if > 0)          | 72         | 75           | 71                       | 99                          |
|      | Change in assets (if ~ = 0)   | 55         | 63           | 52                       | 42                          |
|      | Alimony (if > 0)              | 43         | 46           |                          |                             |
| 2001 | Sample size                   | 74         | 168          | 133                      | 489                         |
|      | % of Transfer Income (if > 0) | 91         | 96           | 65                       | 69                          |
|      | Wage Income (if > 0)          | 78         | 71           | 68                       | 98                          |
|      | Change in assets (if ~ = 0)   | 61         | 59           | 59                       | 38                          |
|      | Alimony (if > 0)              | 43         | 49           |                          |                             |

Table 4. Probit for labor force participation.

| Control group            |                                   | Probability of participating in LF |                                |                                   |                  |  |                  | Probability of working 52 weeks |                  |                                   |                  |  |                  |
|--------------------------|-----------------------------------|------------------------------------|--------------------------------|-----------------------------------|------------------|--|------------------|---------------------------------|------------------|-----------------------------------|------------------|--|------------------|
|                          |                                   | Quebec & BC single mothers         |                                | Single Women, no children Ontario |                  | Married Couples with Children, Ontario |                  | Quebec & BC single mothers      |                  | Single Women, no children Ontario |                  | Married Couples with Children, Ontario |                  |
|                          |                                   | dF/dx <sup>22</sup>                | Robust Std. Err. <sup>23</sup> | dF/dx                             | Robust Std. Err. | dF/dx                                  | Robust Std. Err. | dF/dx                           | Robust Std. Err. | dF/dx                             | Robust Std. Err. | dF/dx                                  | Robust Std. Err. |
| Period<br>x<br>Treatment | Pre reform:<br>1982, 1986, 1992   | base                               | ---                            | base                              | ---              | base                                   | ---              | base                            | ---              | base                              | ---              | base                                   | ---              |
|                          | Early reform:<br>1996, 1997, 1998 | <b>** -0.153</b>                   | 0.060                          | <b>0.010</b>                      | 0.053            | <b>** 0.063</b>                        | 0.017            | <b>* -0.093</b>                 | 0.054            | <b>0.025</b>                      | 0.060            | <b>** 0.078</b>                        | 0.045            |
|                          | Late reform:<br>1999, 2000, 2001  | <b>-0.058</b>                      | 0.064                          | <b>** 0.190</b>                   | 0.040            | <b>** 0.103</b>                        | 0.010            | <b>0.017</b>                    | 0.061            | <b>** 0.199</b>                   | 0.060            | <b>* 0.145</b>                         | 0.043            |
|                          | treatment group                   | <b>0.070</b>                       | 0.042                          | <b>** -0.219</b>                  | 0.057            | <b>** -0.473</b>                       | 0.039            | <b>0.035</b>                    | 0.044            | <b>** -0.201</b>                  | 0.055            | <b>** -0.393</b>                       | 0.034            |
| Period                   | Pre reform:<br>1982, 1986, 1992   | base                               | ---                            | base                              | ---              | base                                   | ---              | base                            | ---              | base                              | ---              | base                                   | ---              |
|                          | Early reform:<br>1996, 1997, 1998 | <b>* 0.059</b>                     | 0.035                          | <b>-0.052</b>                     | 0.033            | <b>** -0.132</b>                       | 0.018            | <b>** 0.074</b>                 | 0.037            | <b>-0.015</b>                     | 0.034            | <b>** -0.098</b>                       | 0.020            |
|                          | Late reform:<br>1999, 2000, 2001  | <b>** 0.109</b>                    | 0.036                          | <b>** -0.102</b>                  | 0.037            | <b>** -0.137</b>                       | 0.019            | <b>0.060</b>                    | 0.038            | <b>-0.054</b>                     | 0.037            | <b>** -0.065</b>                       | 0.020            |
|                          | Age of head                       | <b>** 0.015</b>                    | 0.002                          | <b>** -0.012</b>                  | 0.001            | <b>** 0.003</b>                        | 0.001            | <b>** 0.015</b>                 | 0.002            | <b>** -0.007</b>                  | 0.001            | <b>** 0.011</b>                        | 0.001            |
|                          | Household size                    | <b>** -0.064</b>                   | 0.014                          | <b>** -0.068</b>                  | 0.020            | <b>** -0.026</b>                       | 0.006            | <b>** -0.045</b>                | 0.014            | <b>** -0.063</b>                  | 0.022            | <b>** -0.026</b>                       | 0.009            |

Apart for age and household size dF/dx is for discrete change of dummy variable from 0 to 1

<sup>22</sup> \*\* significant at 5% level

\* significant at 10% level

<sup>23</sup> Here and thereafter 'Robust' refers to heteroscedasticity consistent White variance estimator.

Table 5. 'Raw' *difference in difference* estimates<sup>24</sup>. All numbers expressed in 1992 dollars.

| Control group                     | Time period                       | Net income |   | Total expenditure |   |
|-----------------------------------|-----------------------------------|------------|---|-------------------|---|
|                                   |                                   | Difference | <b>Difference in difference</b><br>[std. error] | Difference        | <b>Difference in difference</b><br>[std. error] |
| Single mothers<br>Quebec and B.C. | Pre reform:<br>1982, 1986, 1992   | 546        | ---   | 738               | ---   |
|                                   | Early reform:<br>1996, 1997, 1998 | -684       | <b>** -1230</b><br>[525]                        | -307              | <b>** -1045</b><br>[469]                        |
|                                   | Late reform:<br>1999, 2000, 2001  | 606        | <b>60</b><br>[531]                              | 702               | <b>-37</b><br>[475]                             |
| Single women, no<br>children      | Pre reform:<br>1982, 1986, 1992   | -14288     | ---   | -10593            | ---   |
|                                   | Early reform:<br>1996, 1997, 1998 | -14757     | <b>-469</b><br>[1182]                           | -11230            | <b>-637</b><br>[923]                            |
|                                   | Late reform:<br>1999, 2000, 2001  | -13666     | <b>622</b><br>[1211]                            | -10783            | <b>-190</b><br>[946]                            |
| Married couples with<br>children  | Pre reform:<br>1982, 1986, 1992   | -3303      | ---   | -1339             | ---   |
|                                   | Early reform:<br>1996, 1997, 1998 | -4833      | <b>** -1530</b><br>[530]                        | -2659             | <b>** -1321</b><br>[401]                        |
|                                   | Late reform:<br>1999, 2000, 2001  | -4032      | <b>-728</b><br>[538]                            | -1979             | <b>-641</b><br>[408]                            |

<sup>24</sup> The first columns under net income and total expenditure respectively describe the average difference between the treatment and the relevant control groups within each period. For example: during the late policy period Ontario single mothers on average reported net incomes 606 dollars higher than Quebec and B.C. single mothers. The second columns under net income and total expenditure summarize the average *difference in difference* result. For example: relative to Quebec and B.C. single mothers the average net income of Ontario single mothers increased by 60 dollars between the pre reform period and the late reform period.

\*\* significant at 5% level

Table 6. Net Income Regression. (inv sinh)

| control groups:       |                                   | Quebec & BC<br>single mothers |                  | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  |
|-----------------------|-----------------------------------|-------------------------------|------------------|--------------------------------------|------------------|---|------------------|
|                       |                                   | Coef <sup>25</sup>            | Robust Std. Err. | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>** -0.121</b>              | 0.051            | <b>-0.027</b>                        | 0.058            | <b>** -0.124</b>                          | 0.043            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.036</b>                 | 0.055            | <b>0.100</b>                         | 0.067            | <b>-0.070</b>                             | 0.049            |
| Treatment group dummy |                                   | <b>**0.078</b>                | 0.035            | <b>** -0.569</b>                     | 0.056            | <b>** -0.641</b>                          | 0.030            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.003</b>                 | 0.031            | <b>-0.063</b>                        | 0.041            | <b>0.014</b>                              | 0.016            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.008</b>                 | 0.032            | <b>-0.074</b>                        | 0.048            | <b>**0.055</b>                            | 0.017            |
| Age of head           |                                   | <b>**0.024</b>                | 0.002            | <b>0.000</b>                         | 0.001            | <b>**0.014</b>                            | 0.001            |
| Household size        |                                   | <b>** -0.234</b>              | 0.013            | <b>** -0.245</b>                     | 0.021            | <b>** -0.236</b>                          | 0.008            |
| Constant              |                                   | <b>**9.362</b>                | 0.070            | <b>**10.845</b>                      | 0.066            | <b>**10.416</b>                           | 0.051            |

<sup>25</sup> \*\* significant at 5% level

Table 7. Total Expenditure Regression. (inv sinh)

| control groups:       |                                   | Quebec & BC<br>single mothers |                  | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  |
|-----------------------|-----------------------------------|-------------------------------|------------------|--------------------------------------|------------------|---|------------------|
|                       |                                   | Coef <sup>26</sup>            | Robust Std. Err. | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>** -0.130</b>              | 0.049            | <b>* -0.087</b>                      | 0.052            | <b>** -0.145</b>                          | 0.041            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.028</b>                 | 0.051            | <b>0.048</b>                         | 0.058            | <b>-0.066</b>                             | 0.044            |
| Treatment group dummy |                                   | <b>**0.125</b>                | 0.036            | <b>** -0.393</b>                     | 0.053            | <b>** -0.430</b>                          | 0.031            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.006</b>                 | 0.030            | <b>-0.021</b>                        | 0.033            | <b>0.023</b>                              | 0.015            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>0.014</b>                  | 0.030            | <b>-0.002</b>                        | 0.039            | <b>**0.081</b>                            | 0.015            |
| Age of head           |                                   | <b>**0.018</b>                | 0.001            | <b>** -0.002</b>                     | 0.001            | <b>**0.009</b>                            | 0.001            |
| Household size        |                                   | <b>** -0.228</b>              | 0.012            | <b>** -0.249</b>                     | 0.020            | <b>** -0.214</b>                          | 0.008            |
| Constant              |                                   | <b>**9.534</b>                | 0.063            | <b>**10.802</b>                      | 0.054            | <b>**10.378</b>                           | 0.045            |

<sup>26</sup> \*\* significant at 5% level

\* significant at 10% level

Table 8. *Difference in difference* regression adjusted results - marginal effects of treatment interaction dummies for the early and late policy periods. All numbers expressed in 1992 dollars.<sup>27</sup>

| Control groups                    | Time period                       | Net income      | Total expenditure |
|-----------------------------------|-----------------------------------|-----------------|-------------------|
| Single mothers<br>Quebec and B.C. | Early reform:<br>1996, 1997, 1998 | <b>** -1247</b> | <b>** -1327</b>   |
|                                   | Late reform:<br>1999, 2000, 2001  | <b>-404</b>     | <b>-319</b>       |
| Single women, no<br>children      | Early reform:<br>1996, 1997, 1998 | <b>-108</b>     | <b>* -336</b>     |
|                                   | Late reform:<br>1999, 2000, 2001  | <b>496</b>      | <b>235</b>        |
| Married couples with<br>children  | Early reform:<br>1996, 1997, 1998 | <b>** -140</b>  | <b>** -179</b>    |
|                                   | Late reform:<br>1999, 2000, 2001  | <b>-95</b>      | <b>-122</b>       |

<sup>27</sup> Each number represents a change in average differences between the treatment group and the control groups. For example: relative to Quebec and B.C. single mothers the average net income of Ontario single mothers fell by 915 dollars between the pre reform period and the early reform period.

\*\* indicates a marginal effect derived from a coefficient significant at 5% level

\* indicates a marginal effect derived from a coefficient significant at 10% level

Table 9. *Difference in difference* propensity score adjusted matching estimates. Matching on propensity score from a logistic regression on presence in the treatment group. Epanechnikov Kernel matching. All numbers expressed in 1992 dollars.<sup>28</sup>

| Control groups                    | Time period                       | Net income |                           | Total expenditure |                           |
|-----------------------------------|-----------------------------------|------------|---------------------------|-------------------|---------------------------|
|                                   |                                   | Difference | Difference in difference. | Difference        | Difference in difference. |
| Single mothers<br>Quebec and B.C. | Pre reform:<br>1982, 1986, 1992   | 500        | ---                       | 719               | ---                       |
|                                   | Early reform:<br>1996, 1997, 1998 | 7          | <b>-494</b><br>[485]      | 180               | <b>-539</b><br>[463]      |
|                                   | Late reform:<br>1999, 2000, 2001  | 648        | <b>147</b><br>[598]       | 1029              | <b>309</b><br>[501]       |
| Single women, no<br>children      | Pre reform:<br>1982, 1986, 1992   | -8647      | ---                       | -7708             | ---                       |
|                                   | Early reform:<br>1996, 1997, 1998 | -9044      | <b>-397</b><br>[1400]     | -8570             | <b>-862</b><br>[1179]     |
|                                   | Late reform:<br>1999, 2000, 2001  | -7974      | <b>673</b><br>[1558]      | -8079             | <b>-371</b><br>[1388]     |
| Married couples with<br>children  | Pre reform:<br>1982, 1986, 1992   | -726       | ---                       | 164               | ---                       |
|                                   | Early reform:<br>1996, 1997, 1998 | -884       | <b>-159</b><br>[444]      | -165              | <b>-328</b><br>[466]      |
|                                   | Late reform:<br>1999, 2000, 2001  | -705       | <b>20</b><br>[544]        | 563               | <b>399</b><br>[569]       |

<sup>28</sup> The first columns under net income and total expenditure respectively describe the average difference between the treatment and the relevant control groups within each period. For example: during the late policy period Ontario single mothers on average reported net incomes 648 dollars higher than Quebec and B.C. single mothers. The second columns under net income and total expenditure summarize the average *difference in difference* result. For example: relative to Quebec and B.C. single mothers the average net income of Ontario single mothers increased by 147 dollars between the pre reform period and the late reform period.

Table 10. Summary of *difference in difference* results form tables 5, 8 and 9.

| Control groups                    | Time period                       | Raw             |                   | Regression adjusted |                   | Propensity score matching adjusted |                   |
|-----------------------------------|-----------------------------------|-----------------|-------------------|---------------------|-------------------|------------------------------------|-------------------|
|                                   |                                   | Net Income      | Total Expenditure | Net Income          | Total Expenditure | Net Income                         | Total Expenditure |
| Single mothers<br>Quebec and B.C. | Early reform:<br>1996, 1997, 1998 | <b>** -1230</b> | <b>** -1045</b>   | <b>** -1247</b>     | <b>** -1327</b>   | <b>-494</b>                        | <b>-539</b>       |
|                                   | Late reform:<br>1999, 2000, 2001  | <b>60</b>       | <b>-37</b>        | <b>-404</b>         | <b>-319</b>       | <b>147</b>                         | <b>309</b>        |
| Single women, no<br>children      | Early reform:<br>1996, 1997, 1998 | <b>-469</b>     | <b>-637</b>       | <b>-108</b>         | <b>* -336</b>     | <b>-397</b>                        | <b>-862</b>       |
|                                   | Late reform:<br>1999, 2000, 2001  | <b>622</b>      | <b>-190</b>       | <b>496</b>          | <b>235</b>        | <b>673</b>                         | <b>-371</b>       |
| Married couples with<br>children  | Early reform:<br>1996, 1997, 1998 | <b>** -1530</b> | <b>** -1321</b>   | <b>** -140</b>      | <b>** -179</b>    | <b>-159</b>                        | <b>-328</b>       |
|                                   | Late reform:<br>1999, 2000, 2001  | <b>-728</b>     | <b>-641</b>       | <b>-95</b>          | <b>-122</b>       | <b>20</b>                          | <b>399</b>        |

**Appendix 1. A look at various components of the budget constraint - a regression adjusted *difference in difference* approach. *Will be made available on internet.***

Tables A1, A2 and A3 contain results of regressions on government transfer income, wage income, and net yearly change in assets and liabilities respectively. The majority of these results are not statistically significant. As the large standard errors indicate, most of these coefficients could take on either a negative or a positive value and still fall within any commonly used confidence intervals. The relative magnitude of several of these dummy variable coefficients is implausible. Several of the marginal effects appear to be either negligible (all change in assets regressions and married couples wage income regression), or clearly pointing in a direction opposite to what is logically plausible (Quebec and B.C. single mothers or childless women transfer income regressions).

Table A1. Government Transfer Income regression (inverse sinh) *Will be made available on internet.*

| control groups:       |                                   | Quebec & BC<br>single mothers |                  | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  |
|-----------------------|-----------------------------------|-------------------------------|------------------|--------------------------------------|------------------|---|------------------|
|                       |                                   | Coef                          | Robust Std. Err. | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>0.288</b>                  | 0.186            | <b>-1.135</b>                        | 0.330            | <b>1.719</b>                              | 0.181            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>0.044</b>                  | 0.195            | <b>-1.688</b>                        | 0.356            | <b>1.260</b>                              | 0.184            |
| Treatment group dummy |                                   | <b>-0.167</b>                 | 0.107            | <b>4.616</b>                         | 0.283            | <b>1.467</b>                              | 0.105            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.332</b>                 | 0.104            | <b>0.875</b>                         | 0.277            | <b>-1.762</b>                             | 0.094            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.282</b>                 | 0.114            | <b>1.001</b>                         | 0.306            | <b>-1.493</b>                             | 0.093            |
|                       | Age of head                       | <b>-0.071</b>                 | 0.007            | <b>0.081</b>                         | 0.008            | <b>-0.070</b>                             | 0.006            |
|                       | Household size                    | <b>0.076</b>                  | 0.048            | <b>0.120</b>                         | 0.082            | <b>0.241</b>                              | 0.045            |
|                       | Constant                          | <b>10.505</b>                 | 0.255            | <b>0.455</b>                         | 0.384            | <b>8.356</b>                              | 0.259            |

Table A2. Wage Income Regression. (inv sinh) *Will be made available on internet.*

| control groups:       |                                   | Quebec & BC<br>single mothers |                  | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  |
|-----------------------|-----------------------------------|-------------------------------|------------------|--------------------------------------|------------------|---|------------------|
|                       |                                   | Coef                          | Robust Std. Err. | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-1.354</b>                 | 0.518            | <b>-0.115</b>                        | 0.537            | <b>-0.726</b>                             | 0.421            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.287</b>                 | 0.527            | <b>2.126</b>                         | 0.570            | <b>0.822</b>                              | 0.431            |
| Treatment group dummy |                                   | <b>0.718</b>                  | 0.390            | <b>-2.086</b>                        | 0.527            | <b>-4.297</b>                             | 0.315            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>0.658</b>                  | 0.332            | <b>-0.169</b>                        | 0.296            | <b>0.235</b>                              | 0.083            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>1.104</b>                  | 0.331            | <b>-0.451</b>                        | 0.339            | <b>0.426</b>                              | 0.081            |
|                       | Age of head                       | <b>0.174</b>                  | 0.015            | <b>-0.117</b>                        | 0.009            | <b>0.035</b>                              | 0.007            |
|                       | Household size                    | <b>-0.739</b>                 | 0.119            | <b>-0.869</b>                        | 0.200            | <b>-0.454</b>                             | 0.053            |
|                       | Constant                          | <b>1.104</b>                  | 0.661            | <b>14.131</b>                        | 0.451            | <b>10.048</b>                             | 0.299            |

Table A3. Yearly Net Change in Assets and liabilities regression. (inv sinh) *Will be made available on internet.*

| control groups:       |                                   | Quebec & BC<br>single mothers |                  | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  |
|-----------------------|-----------------------------------|-------------------------------|------------------|--------------------------------------|------------------|---|------------------|
|                       |                                   | Coef                          | Robust Std. Err. | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.793</b>                 | 0.727            | <b>1.675</b>                         | 0.789            | <b>0.534</b>                              | 0.630            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>0.629</b>                  | 0.809            | <b>2.719</b>                         | 0.875            | <b>1.844</b>                              | 0.711            |
| Treatment group dummy |                                   | <b>-0.412</b>                 | 0.557            | <b>-4.517</b>                        | 0.746            | <b>-4.655</b>                             | 0.495            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>1.633</b>                  | 0.467            | <b>-0.718</b>                        | 0.557            | <b>0.299</b>                              | 0.292            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>1.190</b>                  | 0.484            | <b>-0.652</b>                        | 0.599            | <b>-0.041</b>                             | 0.299            |
|                       | Age of head                       | <b>0.056</b>                  | 0.021            | <b>-0.020</b>                        | 0.016            | <b>0.058</b>                              | 0.016            |
|                       | Household size                    | <b>-0.257</b>                 | 0.174            | <b>0.054</b>                         | 0.261            | <b>-0.467</b>                             | 0.132            |
|                       | Constant                          | <b>-3.194</b>                 | 0.936            | <b>2.663</b>                         | 0.844            | <b>1.584</b>                              | 0.771            |

**Appendix 2: Extensions of initial results - a look at various components of total expenditure. Regression adjusted *difference in difference* approach. *Will be made available on internet.***

This section looks at how the consumption patterns of lower income single mothers differed from the mean estimates. The output of bootstrapped quintile regressions<sup>29</sup> on the 25<sup>th</sup> percentile of net income and expenditure distributions is summarized in tables A4 and A5 summarize respectively. These results indicate that the early reform relative fall in the net income and total expenditure of Ontario single mothers was less severe at the 25<sup>th</sup> percentile of income or expenditure distributions than at their respective means. This finding is potentially important given the previously suggested trend of a proportion of Ontario single mothers dropping out of the labor force in response to the early reforms and returning only during the late reform period. This result, combined with information from the tables 2 and 3 in the main body of the paper, indicates that the relative fall in the early reform period in the Ontario single mother standards of living was more severe among those whose major source of income was wages and not social transfers.

Tables A6 and A7 summarize regression output when per capita expenditure on durables and on necessities respectively are used as the dependent variable. Similarly to Browning and Crossley (2004), I find that expenditure on durables<sup>30</sup> decreased more significantly than the overall expenditure in response to the negative income shock. Table

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<sup>29</sup> 200 repetitions each.

<sup>30</sup> Durables are defined as the sum of expenditures on furnishings, car purchases and clothing.

A6 shows that during the early reform period, relative expenditure on durables decreased by 26 to 50 percent depending on the control group. These numbers are significantly larger than those reported for total expenditure. In times of negative financial shock, Ontario single mothers responded with delaying the purchases of goods that were not of immediate need. This hypothesis is further reinforced by the results indicated in table A7. A regression on necessities<sup>31</sup> reveals that the relative household response was much lower, and that during the post policy period it returned very close to pre policy levels.

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<sup>31</sup> Necessities are defined as the sum of food at home, household operation and clothing

Table A4. Bootstrapped Quintile regression, 25% percentile of income, 200 repetitions.  
*Will be made available on internet.*

| control groups:       |                                   | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  | Quebec & BC<br>single mothers |                  |
|-----------------------|-----------------------------------|--------------------------------------|------------------|---|------------------|-------------------------------|------------------|
|                       |                                   | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. | Coef                          | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                                 | ---              | base                                      | ---              | base                          | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>0.065</b>                         | 0.090            | <b>-0.077</b>                             | 0.051            | <b>-0.096</b>                 | 0.050            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>0.189</b>                         | 0.098            | <b>-0.031</b>                             | 0.055            | <b>-0.055</b>                 | 0.059            |
| Treatment group dummy |                                   | <b>-0.612</b>                        | 0.081            | <b>-0.724</b>                             | 0.042            | <b>0.077</b>                  | 0.042            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                                 | ---              | base                                      | ---              | base                          | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.117</b>                        | 0.074            | <b>0.001</b>                              | 0.021            | <b>0.007</b>                  | 0.032            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.182</b>                        | 0.078            | <b>0.025</b>                              | 0.022            | <b>0.028</b>                  | 0.030            |
| Age of head           |                                   | <b>-0.003</b>                        | 0.002            | <b>0.012</b>                              | 0.001            | <b>0.016</b>                  | 0.002            |
| Household size        |                                   | <b>-0.204</b>                        | 0.018            | <b>-0.217</b>                             | 0.011            | <b>-0.194</b>                 | 0.011            |
| Constant              |                                   | <b>10.537</b>                        | 0.094            | <b>10.202</b>                             | 0.050            | <b>9.210</b>                  | 0.063            |

Table A5. Bootstrapped Quintile regression, 25% percentile of expenditure, 200 repetitions. *Will be made available on internet.*

| control groups:       |                                   | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  | Quebec & BC<br>single mothers |                  |
|-----------------------|-----------------------------------|--------------------------------------|------------------|---|------------------|-------------------------------|------------------|
|                       |                                   | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. | Coef                          | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                                 | ---              | base                                      | ---              | base                          | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.059</b>                        | 0.054            | <b>-0.113</b>                             | 0.039            | <b>-0.103</b>                 | 0.048            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>0.125</b>                         | 0.086            | <b>-0.082</b>                             | 0.051            | <b>-0.036</b>                 | 0.060            |
| Treatment group dummy |                                   | <b>-0.407</b>                        | 0.058            | <b>-0.487</b>                             | 0.034            | <b>0.099</b>                  | 0.040            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                                 | ---              | base                                      | ---              | base                          | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.027</b>                        | 0.040            | <b>0.004</b>                              | 0.018            | <b>0.003</b>                  | 0.035            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.080</b>                        | 0.061            | <b>0.062</b>                              | 0.019            | <b>0.018</b>                  | 0.036            |
| Age of head           |                                   | <b>-0.003</b>                        | 0.001            | <b>0.009</b>                              | 0.001            | <b>0.015</b>                  | 0.002            |
| Household size        |                                   | <b>-0.244</b>                        | 0.023            | <b>-0.199</b>                             | 0.007            | <b>-0.214</b>                 | 0.011            |
| Constant              |                                   | <b>10.529</b>                        | 0.062            | <b>10.104</b>                             | 0.052            | <b>9.345</b>                  | 0.065            |

Table A6. Durable Expenditure Regression (furnishings, car purchase and clothing). *Will be made available on internet.*

| control groups:       |                                   | Quebec & BC<br>single mothers |                  | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  |
|-----------------------|-----------------------------------|-------------------------------|------------------|--------------------------------------|------------------|---|------------------|
|                       |                                   | Coef                          | Robust Std. Err. | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.488</b>                 | 0.169            | <b>-0.264</b>                        | 0.176            | <b>-0.289</b>                             | 0.131            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.214</b>                 | 0.169            | <b>0.047</b>                         | 0.183            | <b>-0.141</b>                             | 0.131            |
| Treatment group dummy |                                   | <b>0.400</b>                  | 0.119            | <b>-0.478</b>                        | 0.148            | <b>-0.463</b>                             | 0.080            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.165</b>                 | 0.125            | <b>-0.339</b>                        | 0.132            | <b>-0.344</b>                             | 0.063            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.064</b>                 | 0.122            | <b>-0.223</b>                        | 0.143            | <b>-0.095</b>                             | 0.050            |
| Age of head           |                                   | <b>0.022</b>                  | 0.006            | <b>-0.014</b>                        | 0.004            | <b>0.007</b>                              | 0.004            |
| Household size        |                                   | <b>-0.152</b>                 | 0.033            | <b>-0.205</b>                        | 0.046            | <b>-0.167</b>                             | 0.026            |
| Constant              |                                   | <b>6.843</b>                  | 0.230            | <b>9.066</b>                         | 0.168            | <b>8.232</b>                              | 0.167            |

Table A7. Expenditure on Necessities Regression (food at home, household operation and clothing). *Will be made available on internet.*

| control groups:       |                                   | Quebec & BC<br>single mothers |                  | Single Women,<br>no children Ontario |                  | Married Couples<br>with Children, Ontario |                  |
|-----------------------|-----------------------------------|-------------------------------|------------------|--------------------------------------|------------------|---|------------------|
|                       |                                   | Coef                          | Robust Std. Err. | Coef                                 | Robust Std. Err. | Coef                                      | Robust Std. Err. |
| Period*SM             | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.134</b>                 | 0.048            | <b>-0.102</b>                        | 0.051            | <b>-0.120</b>                             | 0.040            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.005</b>                 | 0.051            | <b>0.077</b>                         | 0.057            | <b>0.014</b>                              | 0.044            |
| Treatment group dummy |                                   | <b>0.066</b>                  | 0.034            | <b>-0.216</b>                        | 0.051            | <b>-0.238</b>                             | 0.030            |
| Period                | Pre reform:<br>1982, 1986, 1992   | base                          | ---              | base                                 | ---              | base                                      | ---              |
|                       | Early reform:<br>1996, 1997, 1998 | <b>-0.092</b>                 | 0.030            | <b>-0.103</b>                        | 0.033            | <b>-0.098</b>                             | 0.016            |
|                       | Late reform:<br>1999, 2000, 2001  | <b>-0.044</b>                 | 0.029            | <b>-0.083</b>                        | 0.038            | <b>-0.046</b>                             | 0.016            |
| Age of head           |                                   | <b>0.016</b>                  | 0.001            | <b>0.000</b>                         | 0.001            | <b>0.010</b>                              | 0.001            |
| Household size        |                                   | <b>-0.159</b>                 | 0.012            | <b>-0.193</b>                        | 0.019            | <b>-0.162</b>                             | 0.008            |
| Constant              |                                   | <b>8.433</b>                  | 0.065            | <b>9.322</b>                         | 0.055            | <b>8.938</b>                              | 0.047            |