# State Dependence in Canadian Welfare Participation*

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**Abstract**

This paper analyzes transitions into and out-of Social Assistance in Canada. We estimate a dynamic Probit model, controlling for endogenous initial conditions and unobserved heterogeneity, using longitudinal data extracted from the Survey of Labour and Income Dynamics (SLID) for the years 1993-2000. The data indicates that there are substantial provincial differences in social assistance participation. The empirical results indicate that a "welfare trap" does exist in Canada, but the extent of it varies across provinces. The results also suggest that there is a link between provincial variations in structural and spurious state dependence and regional differences in welfare generosity. In particular, the existence of structural state dependence, or a "welfare trap", appears to be more likely in provinces with relatively high benefit levels. One implication of this result is that a change in the welfare benefit structure is not likely to lower participation as significantly among less generous provinces as more generous ones.

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# 1 Introduction

Since the mid-1990, both the United States and Canada have experienced large declines in the number of welfare recipients. The decline, however, was greater in the U.S. in the latter half of the 1990s, when the U.S. experienced historically strong economic growth and implemented a major welfare reform in 1996, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA). The reform focused on transforming the welfare system into a temporary assistance program that reduces the number of long-term recipients primarily through emphasizing transitions from welfare to work. A number of studies have investigated the extent to which economic changes, along with welfare policy shifts, have contributed to the declines in caseload. For the most part, the studies have found that economic improvements during the 1990s probably mattered as much as policy changes in bringing about caseload reductions (e.g. Moffit, 1999 and Blank, 2002). It has been suggested that similar changes in the Canadian welfare system would reduce welfare dependency even more, especially long-term welfare dependency.[1]

However, before implementing any welfare reform, it is essential to understand the dynamic processes underlying the observed utilization of welfare programs. Previous work has shown that there exists substantial serial persistence in welfare utilization over time (Blank, 1989; Chay and Hyslop, 2000; Engberg et al, 1990, and Hansen and Lofstrom, 2001). Persistence in welfare may be observed in the data if previous participation directly affects current probability of participation. This is consistent with the concept of a "welfare trap" and can consequently be labeled structural, or true, state dependence. Possible explanations for the existence of a "welfare trap" are human capital depreciation (in which the stock of human capital is depreciated during the period an individual is not active in the work force) or signaling (potential employers believe that a person who has been unemployed or on welfare is not as productive as an identical applicant who has not experienced these events). In either of these cases, wage offers are low-

[1] See for instance Fraser Institute (2001).

ered by participation in the social assistance program and hence, the labor supply decision is affected, holding preferences constant. If state dependence is structural, policies such as changing the benefit levels or introducing labor market training may be relatively effective in reducing utilization of government transfer programs.

However, the relationship between past and current participation in a welfare program may instead be due to time invariant individual differences, and consequently termed spurious. Potential explanations for the source of spurious state dependence are labor market discrimination and differences in time invariant preferences (with respect to leisure and/or so-called stigma effects associated with participation in the transfer program). If these factors contribute to the observed persistence, labor market policies may be less effective. Hence, modeling the dynamics of welfare participation requires a careful treatment of how unobservable factors affect individual choices.

The main objective of this paper is to analyze transitions into and out-of Social Assistance (SA) in Canada and to examine to what extent the observed persistence in SA can be attributed to structural reasons. Another objective is to determine SA transitions at a provincial level. This will enable us to infer to what extent provincial differences in SA 4 participation are due to differences in entry rates and to what extent they are due to differences in exit rates. Moreover, the dynamic analysis will also enable us to determine the extent of a "welfare trap" in each province.

To address these issues, we will estimate dynamic Probit models, controlling for both endogenous initial conditions and unobserved heterogeneity, using longitudinal data extracted from the Survey of Labour and Income Dynamics (SLID). SLID is a rotating panel data, first initiated in 1993. Each panel, consisting of about 15,000 households, follows the same respondents for six years and every third year, a new panel is introduced.

The empirical results suggest that a large fraction of the observed state dependence can be attributed to structural reasons in Newfoundland and Labrador, Nova Scotia, Ontario, Saskatchewan and British Columbia. Lower estimates of "structural" state dependence are obtained for Prince Edward

Island, New Brunswick, Quebec, Manitoba and Alberta. The results indicate that a "welfare trap" does exist in Canada, but the extent of it varies across provinces. The results also suggest that there is a link between provincial variations in structural and spurious state dependence and regional differences in welfare generosity. In particular, the existence of structural state dependence, or a "welfare trap", appears to be more likely in provinces with relatively high benefit levels. One implication of this result is that a change in the welfare benefit structure is not likely to lower participation as significantly among less generous provinces as more generous ones.

The paper is organized in the following way. In Section 2 we provide background information about the SA program in Canada and shows trends and differences in welfare use in Canada and in the U.S. Section 3 describes the data and variables while we present the model and empirical specification in Section 4. We discuss the results in Section 5 and conclude in Section 6.

## 2 Social Assistance in Canada

Social Assistance in Canada is the income program of last resort and it is the principal source of income for families who lack earned income and access to insurance programs for unemployment, disability and old age. SA is a provincial responsibility, although the federal government assumes a portion of the program costs. Each province sets their own benefit levels and these have varied substantially across provinces and over time.[2] Until March 1996, welfare was paid under the terms of the Canada Assistance Plan (CAP), an arrangement that allowed the cost to be shared by the federal government and the provinces and territories. In April 1996, the Canada Health and Social Transfer (CHST) replaced CAP which implied that the federal government moved away from a shared-cost program to a

[2]Provinces also have the right to set benefit reduction rates. However, there existed very little variation across provinces in reductions rates during the 1990s, which were close to 100 percent in all provinces.

lump-sum transfer of funds intended to cover not only SA but also health and education. In addition to the change in the method of transferring funds, there were substantial reductions in the dollar value of the transfers.[3] With the introduction of the Canada Child Tax Benefit (CCTB), in July 1998, the federal government assumed a greater share of the cost of welfare for families with children.

Compared to its U.S. counterpart, AFDC/TANF, the Canadian SA program serves a more diverse population of recipients since unattached, childless men and women may qualify for benefits. Nonetheless, SA participation rates in Canada are substantially higher among single mothers (36.5 percent over the period 1993-2000 using our sample in SLID) than among unattached, childless women (11.8 percent over the same period).

In Table 1 we present SA participation rates in Canada by year and province. The entries in the table are obtained using a sample of households in SLID where the response person is between 18 and 65. Furthermore, retirees and students are excluded from the sample. As shown, there have been substantial reductions in the participation rates during the late 1990s. When aggregating all provinces, the entries in the table show that welfare participation increased between 1993 and 1996, from 11.1 percent to 12.9 percent. However, between 1996 and 2000, participation rates dropped by 4.4 percentage points, or by about 34 percent. The table also illustrates the large provincial variations in welfare use in Canada, with an average rate over the 1993-2000 period as high as 18 percent in Newfoundland and Labrador and as low as 7.9 percent in Manitoba. Despite the large provincial variations in SA participation rates, the change in participation over time is similar in all provinces with an increase between 1993 and 1996 and a substantial reduction between 1996 and 2000. A similar pattern has been reported for the U.S. (see for example Blank, 2002), where the cash benefit system was substantially reformed in 1996 when AFDC was replaced with

[3] At the same time, the U.S. also switched from a shared-cost system to a lump-sum transfer program. However, this change was accompanied by legislative changes which altered the fundamental character of U.S. welfare programs. See Blank (2002) for details on the U.S. welfare reform.

TANF, which, among other things, introduced time limits on the use of welfare benefits. As mentioned above, Canada also reformed its welfare system during 1996 and it is reasonable to assume that the reformed welfare system, along with improved labor market conditions, generated the declines in welfare use, as in the United States. Figure 1 shows the respective welfare participation rates in Canada (SA) and in the U.S. (AFDC/TANF) for the period 1980 to 1999. Even though the participation rates for Canada are higher than in the U.S., changes in welfare use over time is similar in both countries, with an increase in the early 1990s and a decline between 1995 and 1999. However, while the increase in the early 1990s appears to be more pronounced for Canada, the decline in the latter half of the 1990s is larger in the U.S. A possible explanation for this pattern is that the reformed system in the U.S. implied stronger welfare participation disincentives than in Canada.

## 3 Data

The data used in this paper is extracted from Statistics Canada's Survey of Labour and Income Dynamics (SLID). SLID is a longitudinal household survey designed to capture the dynamics of the labor market activities and the well-being of individuals and their families living in Canada. Households and individuals are followed for six years during which information on their labor market experience, income and family circumstances are collected.

The target population for SLID are persons residing in Canada, excluding residents living on the reserves or in the Yukon and the Northwest territories, full-time members of the armed forces, and institutionalized persons. The first panel of SLID started in 1993 and the initial sample was drawn from the Labour Force Survey. Approximately 15,000 households, comprising of roughly 31,000 individuals aged 16 and over, were interviewed once or twice per year. The second panel started in 1996, while the third panel started in 1999. The number of households and individuals involved in the later panels were similar to those in the first panel.

The appropriate unit of observation in this study is the household, which we assume can be represented by the person selected by Statistics Canada as the response person. We selected response persons that participated in any of the first two panels. Since data is currently only available for the years 1993-2000, we did not include any persons belonging to the third panel (initiated in 1999). The lack of data for 2001 implies that the maximum number of time periods for persons from panel two is five as opposed to six for participants in panel one. In any given year, we retained households whose response persons were between 18 and 65 years old, not retired,[4] and not enrolled in full- or parttime schooling. This means, for example, that a household whose representative was a student in the initial year of the panel but not during the subsequent years is excluded from our sample the first year, but included for the remaining years.

A household is defined as a welfare participating household, in any given year, if any person belonging to the household received any social assistance at any time during that year. Thus, the dependent variable in our analysis is equal to one if the household received SA in a particular year, and equal to zero otherwise. There are some concerns about the underreporting of social assistance in SLID (see Kapsalis, 2001). In particular, substantial "seaming" appears to be a problem in the reporting of welfare spells. A disproportional large fraction of spells starts in January and ends in December. Further, there is also some evidence that households systematically underreport the social assistance amounts they received. However, none of these concerns are likely to affect the results in our study. Since we are aggregating the time dimension from months to years, the potential problem with "seaming" may not be a concern. Moreover, since we define a household as a welfare household if anyone received any SA benefits during the year, the underreporting of benefits actually received is also likely to be less relevant in this paper, assuming that individuals at least report some participation. In fact, the social assistance participation rates that we obtain using our definition are slightly above those reported in the official

[4] A retiree is defined as a person who reported to have received payment from the Canadian (or Quebec) Pension Plan, or an employer sponsored plan.

statistics, as shown in Table 2.

To control for local labor market conditions, we include information on regional unemployment rates. These annual unemployment rates for each economic region are extracted from CANSIM II (Table 282 – 0055). In addition to regional unemployment rates, we also include controls for age, marital status, education, urban residency, number of children, as well as indicators for gender and disability status.

In table 3, we present transition probability matrices separately for each province. The table reveals several interesting relationships and patterns. First, we examine the issue of state dependence in the raw data. There are relatively large differences in the probability of leaving welfare in any given year across provinces. The highest exit rates out of welfare are found in Prince Edward Island (0.304) and British Columbia (0.282), while the lowest exit rates are found in Quebec (0.173) and Newfoundland and Labrador (0.180). Table 3 also indicates that there is considerable variation in the entry rates across provinces with the highest reported for Newfoundland and Labrador (0.035) and the lowest for Manitoba (0.016).

The entry and exit rates reported in table 3 show the anatomy of provincial welfare participation rates. For example, as shown in table 1, for the period 1993-2000 SA participation rates in Quebec are substantially higher than in Ontario (0.132 and 0.115 respectively). However we are unable to determine if the difference in these probabilities exists because of higher entry rates in Quebec or higher exit rates in Ontario or a combination of the two. The entries in table 3 suggest that, in Quebec, the probability of remaining in welfare in the next period is about 10 percent higher than in Ontario (82.7 percent for Quebec compared to 75 percent for Ontario). At the same time, the probability of entering welfare is about the same in both provinces (0.021 in Quebec and 0.02 in Ontario). This suggests that social assistance is more of a temporary income support for households in Ontario than in Quebec, where households, once they have started to receive assistance, appear to have some difficulties leaving welfare, at least relative to welfare participants in Ontario.

Given the differences in transition probabilities across provinces, we

would also expect the distribution of the number of years receiving welfare to differ across provinces. Table 4 shows the number of years households have received SA for a balanced panel, a sub-sample consisting of households who were observed for the whole period 1993-98.[5] The entries in the table suggest that approximately 25 percent of households in Newfoundland and Labrador and in New Brunswick received social assistance during at least one year between 1993 and 1998. However, over half of those who received SA at least once in New Brunswick received it at most two years while the corresponding number for Newfoundland and Labrador is 37 percent. For the other provinces, 84 to 88 percent of households did not utilize social assistance at all during the period 1993-98. The entries in table 4 further illustrate the difference in the composition of welfare users in Quebec and in Ontario. For instance, 44 percent of those households that received SA at all during the period 1993-98, received it for only one year in Ontario between 1993 and 1998, while the corresponding number for Quebec is only 18 percent. Moreover, in Quebec as many as 43 percent of all welfare participants received welfare for the whole period, while this number for Ontario is only 17 percent.

One of the objectives of this paper is to study the determinants of the transitions into and out-of welfare in Canada and to illustrate any provincial differences in these transition rates. However, before we analyze the observed disparity in the behavior of households across provinces, we want to compare observable characteristics of households who remain in welfare (or those who remain in the "no welfare" state) with those who leave welfare (or those who enter welfare). Table 5 shows the mean characteristics by previous year's state. In general, it appears that any movements out of welfare are associated with being married, having less children, having higher educational attainment, not being disabled and being male. Households who leave welfare also seem to live in areas with relatively low unemployment rates. Regarding transitions into welfare, it appears to be associated with being single, lower levels of schooling, and higher unemployment

[5]Note that in this case it is inappropriate to use an unbalanced panel since this would underestimate the number of years receiving SA.

rates. Interestingly, the entries also suggest that older individuals seem to be less likely to move out of previous year's state, regardless of what that state was in the previous period.

The descriptive statistics indicates that there are substantial provincial differences in welfare participation rates. Participation rates are higher in Newfoundland and Labrador and in Quebec than elsewhere in Canada. Furthermore, there have been substantial changes in welfare use over time, and these changes are similar for all provinces. However, some provinces have been more successful in reducing welfare use than others. For instance, between 1996 and 2000, welfare participation rates were reduced by 45 percent in Ontario but by only 19 percent in Quebec. The data also indicate that the composition of welfare users is quite different across provinces. The exit rates out of social assistance is lowest in Newfoundland and Labrador and in Quebec, while the entry rates into welfare is lowest in Manitoba.

Some of the above discussed differences between provinces may be due to differences in schooling levels and family composition as well as differences in benefit levels and in the local labor market conditions. We next discuss potential sources of the observed state dependence and then we present an empirical model that takes the above observable characteristics into account, as well as unobserved heterogeneity and potentially endogenous initial conditions.

## 4 State Dependence: Structural v. Spurious

The empirical strategy utilized in this paper allows us to estimate to what extent the observed state dependence is "structural" and "spurious". However, before empirically analyzing the data, we address what the potential sources are for the different types of serial persistence. The goal of this section is to first define the forms of state dependence and to examine alternative sources of structural and spurious serial persistence respectively. Policy implications of the form of state dependence are discussed in the results section below.

Economists have frequently observed that individuals who collected

social assistance in the previous period are more likely to collect social assistance in the future than person who did not collect social assistance (e.g. Blank, 1989; Engberg, Gottschalk and Wolf, 1990; Hyslop, 1999; Chay and Hyslop, 2000; Hansen and Lofstrom, 2001). The source of this observed serial persistence is not clear and may be due to two distinctive explanations. Following Heckman (1981), we define the state dependence to be "structural" or "true" if past experience, i.e. what state the individual was observed in the previous period, has a real effect on the probability of observing the individual in a given current state. According to this definition, past experience has an actual behavioral effect. However, the observed serial persistence may alternatively be due to time invariant, and unobservable, differences across individuals. Under this assumption, the state dependence is termed "spurious" since the persistence is not due to the previous experience of an event.

The notion that previous participation directly affects current probability of welfare participation is consistent with the concept of a "welfare trap" and can consequently be labeled structural, or true, state dependence. Possible explanations for the existence of a "welfare trap" are human capital depreciation, (in which the stock of human capital is depreciated during the period an individual is not active in the work force) or signaling (potential employers believe that a person who has been on welfare is not as productive as an identical applicant who has not experienced this event). In either of these cases, wage offers are lowered by participation in the social assistance program and hence, the labor supply decision is affected, holding preferences constant. However, preferences themselves, and consequently the reservation wage, may be affected by participation in a welfare or unemployment compensation program. Nonetheless, if state dependence is structural, policies aimed to reduce participation in social assistance through changes in benefit rules are likely to reduce participation. The main mechanism to lower welfare dependence is through lower entry rates into the program, but exit probabilities are also likely to be affected.

The relationship between observed past and current states may instead be due to time invariant individual differences to experiencing the event,

and hence termed spurious. Clearly, some of the differences across individuals are due to observable characteristics, such as age, education, marital status and number of children, and can easily be controlled for in a model estimating these state propensities. The empirical methodology applied here also allows us to purge the data from time invariant unobserved individual heterogeneity and hence gives us an estimate of spurious state dependence. An important point is that the source is unobserved and permanent, at least in the sense of spanning the whole period analyzed. Potential explanations for the source of spurious state dependence are labor market discrimination and differences in time invariant preferences (with respect to leisure and/or so-called stigma effects associated with participation in the transfer program). Although our empirical approach does not allow us to separate between these two potential sources, the results presented below will allow us to assess how these two distinct explanations contribute to the observed state dependence in social assistance.

# 5 Model and Empirical Specification

To analyze transitions into and out of social assistance, we estimate a dynamic Probit model with random effects. We assume that the dynamic structure can be approximated by a first-order Markov model. The usage of longitudinal data allows us to control for unobserved heterogeneity and to distinguish between "structural" and "spurious" state dependence.

The model can be described as follows. Assume that households (indexed by $h, h = 1, 2, \ldots, n$), residing in province $j$, choose between receiving welfare and not receiving welfare benefits in any time period $t$. Let the latent variable $y^*_{h,j,t}$, which represents the value for household $h$ residing in province $j$ from receiving welfare benefits at time $t$, be specified as:

$$\begin{aligned} y^*_{h,j,t} =& \beta_{1,j} + X_{h,j,t}\beta_{2,j} + y_{h,j,t-1}\beta_{3,j} + \varepsilon_{h,j,t} \\ y_{h,j,t} =& 1\left(\beta_{1,j} + X_{h,j,t}\beta_{2,j} + y_{h,j,t-1}\beta_{3,j} + \varepsilon_{h,j,t} > 0\right) \end{aligned}$$

where $X_{h,j,t}$ is a vector of observable characteristics, including marital status, age, urban residency, number of children, educational attainment, disability status, and local labor market conditions. $1(\cdot)$ is an indicator function equal to one if the enclosed statement is true and zero otherwise, and $y_{h,j,t-1}$ is a dummy variable indicating whether the family received welfare in the previous time period. We follow Heckman (1981) and Cameron and Heckman (2001) and assume that $\varepsilon_{h,j,t}$ is characterized by a factor structure as follows;

$$\varepsilon_{h,j,t} = \mu\eta_h + \nu_{h,j,t}$$

where $\eta_h$ represents an unobserved household specific and time-invariant effect and $\mu$ is a factor loading parameter. The second term, $\nu_{h,j,t}$, represents a white-noise error term and is assumed to be serially uncorrelated, independent of $X_{h,j,t}$, and $y_{h,j,t-1}$, and to follow a Normal distribution.[6] We also assume that $\eta_h$ is independent of $\nu_{h,j,t}$, $X_{h,j,t}$, and $y_{h,j,t-1}$.

The vector $\beta_{2,j}$ as well as the scalars $\beta_{1,j}$ and $\beta_{3,j}$ are parameters to be estimated, and given the distribution assumption of $\nu_{h,j,t}$, the probability that household $h$ received SA at time $t$ $(t > 1)$, conditional on $X_{h,j,t}$, $y_{h,j,t-1}$, and $\eta_h$, can be written as:

$$Pr\left(y_{h,j,t} = 1 | X_{h,j,t}, y_{h,j,t-1}, \eta_h\right) = \Phi\left(\beta_{1,j} + X_{h,j,t}\beta_{2,j} + y_{h,j,t-1}\beta_{3,j} + \mu\eta_h\right)$$

Because the state in which a family is initially observed is likely to be endogenous, we adopt a procedure similar to that suggested by Heckman (1981). For the initial period the household is observed (t=1), we estimate a static Probit model including $X_{h,j,1}$ as control variables. This procedure approximates the initial conditions for the model, and Heckman (1981) reports that this approximation, in a binary choice model, performs well and that the procedure leads to only a small asymptotic bias.[7] Let the value of

[6] Note however that the permanent factor, $\eta_i$, allows for a particular form of serial correlation in $\varepsilon$.

[7] A simple and naïve approach would be to assume that the initial conditions are ex-

the latent variable $y^*_{h,j,t}$ at the initial time period $(t = 1)$ be specified as:

$$y^*_{h,j,1} = \theta_{1,j} + X_{h,j,1}\theta_{2,j} + \varepsilon_{h,j,1}$$

where

$$\varepsilon_{h,j,1} = \alpha\eta_h + \nu_{h,j,1}$$

and where $\vartheta_{l,j}\ l = 1, 2$ are parameters to be estimated. As before, we assume that $\nu_{h,j,1}$ follows standard Normal distribution.

The probability that household $h$ received SA in the initial time period, conditional on $X_{h,j,1}$ and $\eta_h$, can be written as:

$$Pr\left(y_{h,j,1} = 1 | X_{h,j,1}, \eta_h\right) = \Phi\left(\theta_{1,j} + X_{h,j,t}\theta_{2,j} + \alpha\eta_h\right)$$

The presence of the unobserved household specific effects, $\eta_h$, in the latent variable equations allows for a particular correlation between the stochastic terms $\varepsilon_{h,j,t}$ and $\varepsilon_{h,j,1}$ and lets us relax the assumption that the initial conditions are exogenous. However, the parameters $\mu$ and $\alpha$ are not non-parametrically identified without further normalizations. We follow Cameron and Heckman (2001) and normalize the first two moments of $\eta_h$ : $E(\eta_h) = 0$ and $Var(\eta_h) = 1$, and given these normalizations, the

ogenous (uncorrelated with the unobserved individual-specific effects). However, this is a very strong assumption and unlikely to hold. Alternatively, we could assume that the stochastic process that generates the observed participation sequences is in equilibrium at the beginning of the sample period (see Card and Sullivan, 1988). As pointed out by Chay and Hyslop, 2000, this assumption is unlikely to hold when the observable covariates are timevarying and important determinants of participation. Finally, the random effects assumption could be relaxed in favor of a fixed effects estimator. In this framework, the unobserved individual-specific effects can be absorbed with a conditioning statement which would circumvent the initial conditions problem (see Arellano and Honore, 2000, and Honore and Kyriazidou, 2000). However, in dynamic models with observable characteristics, the necessary conditioning statement is somewhat restrictive as it requires exogenous characteristics to be stationary in the final two periods. This implies, among other things, that time dummies and local labor market conditions are ruled out.

model can be estimated with maximum likelihood techniques.[8] The likelihood contribution for household $h$, given observed characteristics and unobserved heterogeneity, can be written as:

$$L_h(\eta_h) = \prod_{t=1}^{T} Pr\left(y_{h,j,t} = 1|\eta_h\right)$$

However, as $\eta_h$ is not observed, we have to integrate out this term from the above likelihood to obtain the unconditional likelihood function. To do this, we need to specify a distribution for $\eta_h$. We follow Heckman and Singer (1984) and Cameron and Heckman (2001), and assume that the probability distribution of $\eta_h$ can be approximated by a discrete distribution with a finite number $(I)$ of support points. In this case, integration is replaced by a summation over the number of supports for the distribution of $\eta_h$. Associated with each support point is a probability, $\pi_i$, where $\sum_{i=1}^{I} \pi_i = 1$ and $\pi_i \geq 0$. To be specific, we assume that there are $I$ types of households and that each household is endowed with a particular realization of $\eta_h$, $\eta_{h,i}$. This implies that the unconditional contribution to the log-likelihood function for household $h$ is given by:

$$logL_i = log \sum_{i=1}^{I} \pi_i L_i(\eta_{h,i})$$

We experimented with different values for $I$, and found that a model with $I = 2$ fitted the data quite well. This low dimensionality has been found in many studies of mixture models (e.g Ham and Lalonde (1996), Eberwein, Ham and Lalonde (1997), Cameron and Heckman (2001), and Hansen and Lofstrom (2001)). Finally, since SLID is not a representative random sample, the likelihood function is weighted with longitudinal weights provided by Statistics Canada.

[8] See Cameron and Heckman (2001) for identification results of a similar model.

## 6 Empirical Results

In this section, we report results from maximizing the likelihood function above. The magnitudes of the estimated coefficients provide little information about the size of the effects of the observable characteristics, due to the non-linear nature of the model. Therefore, instead of discussing the coefficient estimates, which are reported in Tables A1-A2 in the Appendix, we will focus our presentation on the transition probabilities and source of observed state dependence. The predicted transition probabilities are evaluated for a representative household and are based on the estimates reported in Tables A1-A2.[9]

In Table 6 we present the predicted transition matrices separately for each province. The entries in the table refer to a restricted specification that ignores the issue of unobserved heterogeneity and endogenous initial conditions (the parameter estimates for this model are presented in Table A1). In Table 7, we present results based on estimates from a general model that attempts to control for these matters (the parameter estimates for this model are provided in Table A2). The entries in Table 6 show large regional variations in entry and exit rates. The state dependence in welfare, for our representative household, is highest in Manitoba (0.925) and in Nova Scotia (0.903) and lowest in Alberta (0.741) and in Saskatchewan (0.763). The entry rates into social assistance are also lowest in Alberta (0.035) and in Saskatchewan (0.049), while they are highest in Nova Scotia (0.149) and Newfoundland and Labrador (0.132). Moreover, for our chosen household type, there is only a minor difference in the exit rate from social assistance between Quebec and Ontario, while the entry rate is higher in Ontario than in Quebec. The difference between the entries in Table 6 and those in Table 3 illustrates the within province heterogeneity in social assistance participation.

As expected, when controls for endogenous initial conditions and un-

[9]The representative household has the following characteristics: single woman, two children, 40 years old, living in an urban area, the local unemployment rate is 10 percent, 12 years of schooling, and not disabled.

observed heterogeneity are incorporated in the model, we find a substantial reduction in the estimated state dependences for all provinces, except Newfoundland and Labrador.[10] The estimated decline in welfare persistence moving from Table 6 to Table 7 is greatest for Prince Edward Island. The probability that a household, residing in Prince Edward Island, with the chosen characteristics will remain in the welfare state in two consecutive years decreased from 0.801 in Table 6 to 0.42 in Table 7, a decline of almost 50 percent. For the other provinces, the decline in the probability of collecting welfare in two consecutive years is smaller, varying between 14 percent (British Columbia) and 43 percent (Manitoba).

The transition probabilities reported in Tables 6 and 7 can be used to decompose the estimated state dependence into structural and spurious state dependence. The results from this decomposition are presented in Table 8. For Nova Scotia, Ontario, Saskatchewan and British Columbia, we find that 80-85 percent of the observed welfare persistence is "structural" and hence 15-20 percent is "spurious" and due to unobserved heterogeneity. A lower estimate of "structural" state dependence is obtained for Prince Edward Island, New Brunswick, Quebec, Manitoba and Alberta, where 52-70 percent of the observed welfare persistence is labeled "structural".[11] These results suggest that the majority of the observed serial persistence in all provinces is due to "structural" reasons and a minority is due to time invariant heterogeneity. These results are essential in analyzing the issue of a "welfare trap" in Canada. Our findings indicate that such a trap does exist and that it is largest in Newfoundland and Labrador, Nova Scotia, Ontario, Saskatchewan and British Columbia.

The finding that the source of welfare dependency differs across provinces is of importance. While it is unlikely that human capital depreciation varies across provinces, there may be provincial variations in the signaling effect of receiving welfare. For instance, in provinces with relatively high par-

[10] A similar reduction in serial persistence when unobserved heterogeneity is incorporated is reported in Chay and Hyslop (1998).

[11] For Newfoundland and Labrador, we find that the portion of the observed persistence that can be attributed to structural reasons is greater than 100 percent.

ticipation rates, the negative signal attached to being a social assistance recipient may be smaller than in provinces where participation rates are relatively low. Thus, in this case, we would expect the degree of structural state dependence to be higher in provinces with high participation rates. On the other hand, it may be the case that so called stigma effects of receiving social assistance are lower in communities where participation rates are high. This would suggest that the degree of structural state dependence is lower in provinces with high participation rates. If we rank provinces according to welfare participation rates for the period 1993-2000 based on the entries in Table 1, we find that Newfoundland and Labrador, for which the highest degree of structural state dependence was found, is ranked at the top (participation rate of 18.1 percent) and that Prince Edward Island, for which the lowest degree of structural state dependence was found, is ranked at the bottom (participation rate of 8.7 percent). However, while this suggests that there may be regional differences in the signaling effects of welfare participation, the pattern is not strong enough for a general conclusion.

An alternative explanation for the observed provincial variations in structural and spurious state dependence is regional differences in welfare generosity. For instance, it may be the case that high replacement rates generate "addictions" to welfare use and consequently previous participation will have a direct impact on current participation. In Table 9, we provide a description of welfare generosity across provinces between 1993 and 2000. The entries in the table show total welfare income as percentage of the provincial poverty line for a household consisting of a single parent with one child. In parenthesis, we provide generosity rankings for each year where (1) indicates the most generous province and (10) the least generous. For the whole period 1993-2000, the most generous province is Newfoundland and Labrador, followed by Nova Scotia, Ontario and Prince Edward Island. The least generous provinces are Alberta, Manitoba, Quebec and New Brunswick. When comparing these welfare generosity rankings with the degree of structural state dependence, the picture is quite clear. There is a negative relationship between welfare generosity rankings and the de-

gree of structural state dependence with a correlation coefficient of -0.62. This suggests that the existence of structural state dependence, or a "welfare trap", is more likely to appear in provinces with relatively high benefit levels. One implication of this result is that a change in the welfare benefit structure is not likely to lower participation as significantly among less generous provinces as more generous ones. One empirical validation of this result is the significant decline in welfare participation in Ontario between 1995 and 2000, when participation rates dropped from 11.8 percent to 7.3 percent. At the same time, welfare generosity was reduced from 75 percent of the poverty line in 1995 to 60 percent in 2000. Clearly, not all of the reduction in welfare use during this time period can be attributed to the reduction in benefit levels. Improvement in the labor market is another important factor behind the decline. However, the decline in participation rates was stronger in Ontario compared with, for example, Alberta, despite the fact that unemployment was reduced to a greater extent in Alberta between 1993 and 2000.

## 7 Summary and Conclusions

This paper analyzes transitions into and out of social assistance in Canada. We use data from the Survey of Labour and Income Dynamics (SLID) for the years 1993 to 2000, to investigate if there are differences in transition probabilities across provinces. The data indicates that there are substantial differences in welfare participation rates across provinces. Participation rates are higher in Newfoundland and Labrador and in Quebec than elsewhere in Canada. Furthermore, there have been substantial changes in welfare use over time, and these changes are similar for all provinces. However, some provinces have been more successful in reducing welfare use than others. For instance, between 1996 and 2000, welfare participation rates were reduced by 45 percent in Ontario but by only 19 percent in Quebec. The data also indicate that the composition of welfare users is quite different across provinces. The exit rates out of social assistance are lowest in Newfoundland and Labrador and in Quebec, while the entry

rates into welfare are lowest in Manitoba. The difference in entry and exit rates illustrates the anatomy of provincial welfare participation rates. For example, it was shown that the social assistance participation rate is higher in Quebec than in Ontario because the probability of remaining in welfare in the next period is about 10 percent higher in Quebec than in Ontario. At the same time, the probability of entering welfare is about the same in both provinces. Thus, social assistance appears to be more of a temporary income support for households in Ontario than in Quebec.

Central to the welfare debate is the issue of an existence of a "welfare trap". If welfare utilization has a so called addictive effect, and current program participation directly impacts future probability of program utilization, high participation rates may be, at least partially, remedied by changes in welfare program parameters, including benefit levels. The success of welfare reform is more questionable if instead observed serial persistence is due to "spurious" state dependence. In this case, permanent unobserved heterogeneity across individuals is the source of the state dependence. To separate between these sources of state dependence we estimate dynamic Probit models, including a model that controls for both endogenous initial condition and unobserved heterogeneity. This model allows us to investigate differences in the source of state dependence across provinces.

The empirical results suggest that a large fraction of the observed state dependence can be attributed to structural reasons in Newfoundland and Labrador, Nova Scotia, Ontario, Saskatchewan and British Columbia. Lower estimates of "structural" state dependence are obtained for Prince Edward Island, New Brunswick, Quebec, Manitoba and Alberta. The results indicate that a "welfare trap" does exist in Canada, but the extent of it varies across provinces. The results also suggest that there is a link between provincial variations in structural and spurious state dependence and regional differences in welfare generosity. In particular, the existence of structural state dependence, or a "welfare trap", appears to be more likely in provinces with relatively high benefit levels. One implication of this result is that a change in the welfare benefit structure is not likely to lower participation as significantly among less generous provinces as more generous

ones.

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**Table 1. Participation in Social Assistance in Canada 1993-2000, by Year and Province.**

| Province: | Period 1993-2000 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| All Provinces | 0.110 | 0.111 | 0.098 | 0.113 | 0.129 | 0.119 | 0.109 | 0.098 | 0.085 |
| Newfoundland and Labrador | 0.181 | 0.140 | 0.134 | 0.179 | 0.219 | 0.219 | 0.171 | 0.170 | 0.143 |
| Prince Edward Island | 0.087 | 0.069 | 0.086 | 0.097 | 0.094 | 0.085 | 0.080 | 0.092 | 0.069 |
| Nova Scotia | 0.106 | 0.102 | 0.089 | 0.105 | 0.115 | 0.109 | 0.098 | 0.084 | 0.083 |
| New Brunswick | 0.121 | 0.132 | 0.089 | 0.122 | 0.125 | 0.106 | 0.138 | 0.107 | 0.079 |
| Quebec | 0.132 | 0.111 | 0.111 | 0.128 | 0.142 | 0.134 | 0.124 | 0.129 | 0.115 |
| Ontario | 0.115 | 0.121 | 0.104 | 0.118 | 0.134 | 0.128 | 0.109 | 0.091 | 0.073 |
| Manitoba | 0.079 | 0.092 | 0.075 | 0.068 | 0.093 | 0.079 | 0.063 | 0.053 | 0.054 |
| Saskatchewan | 0.095 | 0.082 | 0.079 | 0.086 | 0.114 | 0.102 | 0.104 | 0.112 | 0.060 |
| Alberta | 0.084 | 0.094 | 0.073 | 0.097 | 0.095 | 0.082 | 0.074 | 0.062 | 0.065 |
| British Columbia | 0.099 | 0.105 | 0.087 | 0.085 | 0.119 | 0.097 | 0.110 | 0.081 | 0.067 |

*Note*: Source: Survey of Labour and Income Dynamics (SLID), 1993-2000. Based on a sample of men and women. Students and retirees are excluded. The numbers are weighted using cross-sectional weights provided by Statistics Canada

**Table 2. Participation in Social Assistance in Canada. SLID and official statistics, 1993-2000, by Year.**

| Province: | Period 1993-2000 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| SLID | 0.110 | 0.111 | 0.098 | 0.113 | 0.129 | 0.119 | 0.109 | 0.098 | 0.085 |
| Participation according to National Council of Welfare | 0.092 | 0.104 | 0.107 | 0.105 | 0.099 | 0.093 | 0.085 | 0.075 | 0.068 |

*Note*: Sources: Survey of Labour and Income Dynamics (SLID) and the National Council of Welfare. The figures from SLID were obtained using a sample of men and women. Students and retirees are excluded. The figures are weighted using cross-sectional weights provided by Statistics Canada.

**Table 3. Transition Matrices, 1993-2000, by Province.**

| State at Time *t*: | State at Time *t+1*: Newfoundland and Labrador | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.820 | 0.180 |
| No Welfare | 0.035 | 0.965 |

| State at Time t: | State at Time *t+1*: Prince Edward Island | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.696 | 0.304 |
| No Welfare | 0.028 | 0.972 |

| State at Time t: | State at Time *t+1*: Nova Scotia | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.793 | 0.207 |
| No Welfare | 0.022 | 0.978 |

| State at Time t: | State at Time *t+1*: New Brunswick | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.742 | 0.258 |
| No Welfare | 0.031 | 0.969 |

| State at Time *t*: | State at Time *t+1*: Quebec | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.827 | 0.173 |
| No Welfare | 0.021 | 0.979 |

| State at Time t: | State at Time *t+1*: Ontario | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.750 | 0.250 |
| No Welfare | 0.020 | 0.980 |

| State at Time t: | State at Time *t+1*: Manitoba | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.723 | 0.277 |
| No Welfare | 0.016 | 0.984 |

| State at Time t: | State at Time *t+1*: Saskatchewan | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.750 | 0.250 |
| No Welfare | 0.021 | 0.979 |

| State at Time *t*: | State at Time *t+1*: Alberta | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.727 | 0.273 |
| No Welfare | 0.020 | 0.980 |

| State at Time t: | State at Time *t+1*: British Columbia | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.718 | 0.282 |
| No Welfare | 0.021 | 0.979 |

*Note*: Source: Survey of Labour and Income Dynamics (SLID), 1993-2000. Based on a sample of men and women.

Students and retirees are excluded. The figures are weighted using longitudinal weights provided by Statistics Canada.

**Table 4. Number of Years receiving Social Assistance, by province, 1993-1998.**

| Years receiving Social Assistance: | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Newfoundland and Labrador | 0.758 | 0.050 | 0.039 | 0.048 | 0.018 | 0.024 | 0.062 |
| Prince Edward Island | 0.859 | 0.037 | 0.050 | 0.018 | 0.000 | 0.024 | 0.013 |
| Nova Scotia | 0.862 | 0.053 | 0.015 | 0.009 | 0.024 | 0.014 | 0.024 |
| New Brunswick | 0.742 | 0.089 | 0.052 | 0.031 | 0.022 | 0.028 | 0.037 |
| Quebec | 0.846 | 0.028 | 0.019 | 0.014 | 0.016 | 0.012 | 0.067 |
| Ontario | 0.838 | 0.071 | 0.019 | 0.026 | 0.012 | 0.008 | 0.027 |
| Manitoba | 0.852 | 0.048 | 0.060 | 0.008 | 0.009 | 0.003 | 0.019 |
| Saskatchewan | 0.877 | 0.045 | 0.021 | 0.013 | 0.011 | 0.003 | 0.029 |
| Alberta | 0.877 | 0.035 | 0.020 | 0.023 | 0.019 | 0.005 | 0.022 |
| British Columbia | 0.876 | 0.053 | 0.013 | 0.023 | 0.011 | 0.013 | 0.012 |

*Note*: Source: Survey of Labour and Income Dynamics (SLID), 1993-2000. Based on a balanced sample of men and women drawn from the first SLID panel covering the years 1993-1998. Students and retirees are excluded. The figures are weighted using longitudinal weights provided by Statistics Canada.

**Table 5. Mean Characteristics by Previous Year's Welfare State, 1993-2000.**

| | **State at t:** | **Welfare** | | **No welfare** | | Whole |
|---|---|---|---|---|---|---|
| | **State at t+1:** | Welfare | No welfare | Welfare | No welfare | Sample |
| Married | | 0.42 | 0.60 | 0.59 | 0.77 | 0.73 |
| Age | | 40.49 | 37.80 | 38.96 | 41.16 | 40.97 |
| Urban area | | 0.83 | 0.80 | 0.78 | 0.80 | 0.80 |
| Number of Children | | 1.95 | 1.89 | 1.85 | 1.91 | 1.91 |
| Years of Education | | 11.17 | 12.06 | 11.83 | 13.31 | 13.06 |
| Regional Unemployment Rate (%) | | 9.86 | 9.38 | 9.84 | 9.13 | 9.21 |
| Disabled | | 0.33 | 0.13 | 0.18 | 0.08 | 0.10 |
| Male | | 0.41 | 0.49 | 0.51 | 0.51 | 0.50 |
| Province | | | | | | |
| Newfoundland and Labrador | | 0.038 | 0.028 | 0.032 | 0.019 | 0.021 |
| Prince Edward Island | | 0.003 | 0.005 | 0.007 | 0.005 | 0.005 |
| Nova Scotia | | 0.030 | 0.026 | 0.035 | 0.032 | 0.032 |
| New Brunswick | | 0.028 | 0.033 | 0.041 | 0.027 | 0.028 |
| Quebec | | 0.315 | 0.220 | 0.254 | 0.258 | 0.262 |
| Ontario | | 0.357 | 0.398 | 0.346 | 0.357 | 0.358 |
| Manitoba | | 0.023 | 0.029 | 0.030 | 0.038 | 0.037 |
| Saskatchewan | | 0.027 | 0.029 | 0.034 | 0.034 | 0.033 |
| Alberta | | 0.067 | 0.085 | 0.091 | 0.098 | 0.095 |
| British Columbia | | 0.112 | 0.147 | 0.131 | 0.131 | 0.130 |
| Number of Observations | | 8,838 | 2,811 | 2,222 | 95,703 | 109,574 |

Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2000. Based on a sample of men and women. Students and retirees are excluded. The figures are weighted using longitudinal weights provided by Statistics Canada.

## Table 6. Estimated Transition Matrices, 1993-2000.

No Control for Initial Condition and Unobserved Heterogeneity

| State at Time *t*: | State at Time *t+1*: Newfoundland and Labrador | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.897 | 0.103 |
| No Welfare | 0.132 | 0.868 |

| State at Time t: | State at Time *t+1*: Prince Edward Island | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.801 | 0.199 |
| No Welfare | 0.077 | 0.923 |

| State at Time t: | State at Time *t+1*: Nova Scotia | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.903 | 0.097 |
| No Welfare | 0.149 | 0.851 |

| State at Time t: | State at Time *t+1*: New Brunswick | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.887 | 0.113 |
| No Welfare | 0.118 | 0.883 |

| State at Time *t*: | State at Time *t+1*: Quebec | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.859 | 0.141 |
| No Welfare | 0.050 | 0.950 |

| State at Time t: | State at Time *t+1*: Ontario | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.855 | 0.145 |
| No Welfare | 0.086 | 0.914 |

| State at Time t: | State at Time *t+1*: Manitoba | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.925 | 0.075 |
| No Welfare | 0.123 | 0.877 |

| State at Time t: | State at Time *t+1*: Saskatchewan | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.763 | 0.237 |
| No Welfare | 0.049 | 0.951 |

| State at Time *t*: | State at Time *t+1*: Alberta | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.741 | 0.259 |
| No Welfare | 0.035 | 0.965 |

| State at Time t: | State at Time *t+1*: British Columbia | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.772 | 0.228 |
| No Welfare | 0.064 | 0.936 |

**Table 7. Estimated Transition Matrices, 1993-2000.**

With Control for Initial Condition and Unobserved Heterogeneity

| State at Time *t*: | State at Time *t+1*: Newfoundland and Labrador | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.947 | 0.053 |
| No Welfare | 0.549 | 0.451 |

| State at Time t: | State at Time *t+1*: Prince Edward Island | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.420 | 0.580 |
| No Welfare | 0.247 | 0.753 |

| State at Time t: | State at Time *t+1*: Nova Scotia | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.734 | 0.266 |
| No Welfare | 0.136 | 0.864 |

| State at Time t: | State at Time *t+1*: New Brunswick | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.547 | 0.453 |
| No Welfare | 0.100 | 0.900 |

| State at Time *t*: | State at Time *t+1*: Quebec | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.600 | 0.400 |
| No Welfare | 0.083 | 0.917 |

| State at Time t: | State at Time *t+1*: Ontario | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.694 | 0.306 |
| No Welfare | 0.143 | 0.857 |

| State at Time t: | State at Time *t+1*: Manitoba | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.527 | 0.474 |
| No Welfare | 0.023 | 0.977 |

| State at Time t: | State at Time *t+1*: Saskatchewan | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.637 | 0.363 |
| No Welfare | 0.127 | 0.873 |

| State at Time *t*: | State at Time *t+1*: Alberta | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.447 | 0.553 |
| No Welfare | 0.036 | 0.964 |

| State at Time t: | State at Time *t+1*: British Columbia | |
|---|---|---|
| | Welfare | No Welfare |
| Welfare | 0.665 | 0.335 |
| No Welfare | 0.166 | 0.834 |

**Table 8. Structural vs. Spurious State Dependence in Social Assistance, 1993-2000, by province.**

| | Structural Estimate | Spurious Estimate |
|---|---|---|
| Newfoundland and Labrador | 1.055 | -0.055 |
| Prince Edward Island | 0.524 | 0.476 |
| Nova Scotia | 0.813 | 0.188 |
| New Brunswick | 0.617 | 0.383 |
| Quebec | 0.698 | 0.302 |
| Ontario | 0.812 | 0.189 |
| Manitoba | 0.569 | 0.431 |
| Saskatchewan | 0.835 | 0.165 |
| Alberta | 0.603 | 0.397 |
| British Columbia | 0.861 | 0.139 |
| Average across all provinces | 0.739 | 0.261 |

**Table 9. Total Welfare Income as Percentage of the Poverty Line, 1993-2000, by year and province. The entries are for single parents with one child. Generosity rankings appear in parenthesis.**

| Province: | 1993 | | 1994 | | 1995 | | 1996 | | 1997 | | 1998 | | 1999 | | 2000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Newfoundland and Labrador | 71 | (2) | 70 | (2) | 69 | (2) | 68 | (1) | 67 | (1) | 69 | (1) | 70 | (1) | 72 | (1) |
| Prince Edward Island | 71 | (2) | 70 | (2) | 67 | (3) | 64 | (2) | 62 | (3) | 61 | (3) | 60 | (4) | 63 | (4) |
| Nova Scotia | 66 | (4) | 67 | (4) | 65 | (4) | 64 | (2) | 63 | (2) | 63 | (2) | 63 | (2) | 64 | (2) |
| New Brunswick | 55 | (8) | 57 | (8) | 59 | (8) | 59 | (8) | 59 | (7) | 61 | (3) | 62 | (3) | 64 | (2) |
| Quebec | 60 | (6) | 62 | (7) | 61 | (7) | 60 | (7) | 57 | (8) | 57 | (8) | 57 | (8) | 56 | (8) |
| Ontario | 80 | (1) | 80 | (1) | 75 | (1) | 63 | (4) | 62 | (3) | 61 | (3) | 60 | (4) | 60 | (6) |
| Manitoba | 54 | (9) | 54 | (9) | 53 | (9) | 52 | (9) | 51 | (9) | 51 | (9) | 50 | (9) | 47 | (10) |
| Saskatchewan | 66 | (4) | 66 | (5) | 64 | (5) | 63 | (4) | 62 | (3) | 58 | (7) | 59 | (7) | 61 | (5) |
| Alberta | 54 | (9) | 52 | (10) | 50 | (10) | 50 | (10) | 49 | (10) | 50 | (10) | 50 | (9) | 50 | (9) |
| British Columbia | 64 | (6) | 65 | (6) | 64 | (5) | 63 | (4) | 62 | (3) | 61 | (3) | 60 | (4) | 60 | (6) |

*Note*: Source: National Council of Welfare.

**Table A1. Dynamic Models of Welfare Participation with no control for endogenous initial conditions or unobserved heterogeneity.**

| | Newfoundland and Labrador | Prince Edward Island | Nova Scotia | New Brunswick | Quebec |
|---|---|---|---|---|---|
| **Individual Characteristics:** | | | | | |
| Married | -0.5864 | -0.573 | -0.868 | -0.705 | -0.4085 |
| | 0.137 | 0.180 | 0.129 | 0.127 | 0.0711 |
| Age | -0.0009 | -0.011 | 0.007 | 0.001 | -0.0047 |
| | 0.0055 | 0.008 | 0.005 | 0.005 | 0.0031 |
| Urban | 0.0643 | 0.154 | 0.116 | 0.358 | 0.1221 |
| | 0.1095 | 0.166 | 0.118 | 0.114 | 0.0833 |
| Number of Children | 0.1237 | 0.112 | 0.194 | 0.262 | 0.0647 |
| | 0.0491 | 0.071 | 0.051 | 0.051 | 0.0314 |
| Years of Education | -0.1267 | -0.109 | -0.105 | -0.026 | -0.0789 |
| | 0.023 | 0.032 | 0.021 | 0.020 | 0.0107 |
| Disabled | 0.3506 | 0.494 | 0.210 | 0.792 | 0.6663 |
| | 0.1749 | 0.233 | 0.145 | 0.154 | 0.1015 |
| Male | -0.1594 | 0.013 | -0.179 | -0.206 | -0.0504 |
| | 0.1042 | 0.160 | 0.112 | 0.108 | 0.0632 |
| **State Dependence:** | | | | | |
| Received Welfare Previous Year | 2.3846 | 2.273 | 2.340 | 2.400 | 2.7241 |
| | 0.1102 | 0.177 | 0.119 | 0.122 | 0.0674 |
| **Local Labor Market Variable:** | | | | | |
| Local Unemployment Rate | 0.0094 | -0.012 | 0.016 | 0.035 | 0.0231 |
| | 0.013 | 0.049 | 0.013 | 0.019 | 0.0117 |
| Average Log-likelihood | -0.2083 | -0.1751 | -0.1449 | -0.1578 | -0.1477 |

**Table A1. Dynamic Models of Welfare Participation with no control for endogenous initial conditions or unobserved heterogeneity. Continued.**

| | Ontario | Manitoba | Saskatchewan | Alberta | British Columbia |
|---|---|---|---|---|---|
| **Individual Characteristics:** | | | | | |
| Married | -0.4551 | -0.382 | -0.482 | -0.264 | -0.5431 |
| | 0.0566 | 0.135 | 0.130 | 0.119 | 0.1051 |
| Age | -0.0001 | 0.022 | -0.003 | 0.004 | -0.0067 |
| | 0.0024 | 0.006 | 0.005 | 0.005 | 0.0043 |
| Urban | 0.2254 | 0.147 | 0.204 | 0.006 | -0.023 |
| | 0.0762 | 0.150 | 0.129 | 0.159 | 0.1342 |
| Number of Children | 0.0398 | 0.158 | 0.181 | 0.016 | 0.0718 |
| | 0.0232 | 0.048 | 0.045 | 0.043 | 0.044 |
| Years of Education | -0.0712 | -0.036 | -0.132 | -0.041 | -0.0641 |
| | 0.0088 | 0.021 | 0.024 | 0.020 | 0.0183 |
| Disabled | 0.3622 | 0.200 | 0.504 | 0.180 | 0.5451 |
| | 0.0718 | 0.172 | 0.149 | 0.140 | 0.1364 |
| Male | 0.0151 | 0.088 | -0.010 | 0.001 | 0.0062 |
| | 0.0485 | 0.115 | 0.113 | 0.101 | 0.0923 |
| **State Dependence:** | | | | | |
| Received Welfare Previous Year | 2.4269 | 2.602 | 2.368 | 2.453 | 2.2651 |
| | 0.0518 | 0.133 | 0.122 | 0.108 | 0.0952 |
| **Local Labor Market Variable:** | | | | | |
| Local Unemployment Rate | 0.0348 | 0.140 | -0.013 | 0.045 | 0.0132 |
| | 0.0199 | 0.047 | 0.047 | 0.036 | 0.048 |
| Average Log-likelihood | -0.1805 | -0.1319 | -0.1476 | -0.1346 | -0.1674 |

**Table A2. Dynamic Models of Welfare Participation with control for endogenous initial conditions or unobserved heterogeneity.**

| | Newfoundland and Labrador | Prince Edward Island | Nova Scotia | New Brunswick | Quebec |
|---|---|---|---|---|---|
| **Individual Characteristics:** | | | | | |
| Married | -1.471 | -0.928 | -1.092 | -1.424 | -0.578 |
| | 0.366 | 0.272 | 0.344 | 0.310 | 0.141 |
| Age | 0.000 | -0.015 | 0.009 | -0.004 | -0.007 |
| | 0.009 | 0.010 | 0.009 | 0.010 | 0.005 |
| Urban | 0.077 | 0.276 | 0.099 | 0.702 | 0.182 |
| | 0.171 | 0.216 | 0.163 | 0.229 | 0.115 |
| Number of Children | 0.277 | 0.150 | 0.246 | 0.452 | 0.089 |
| | 0.086 | 0.088 | 0.098 | 0.104 | 0.045 |
| Years of Education | -0.309 | -0.164 | -0.137 | -0.144 | -0.118 |
| | 0.060 | 0.048 | 0.062 | 0.051 | 0.030 |
| Disabled | 0.641 | 0.678 | 0.245 | 1.514 | 1.006 |
| | 0.249 | 0.304 | 0.197 | 0.343 | 0.247 |
| Male | -0.496 | -0.045 | -0.249 | -0.510 | -0.079 |
| | 0.200 | 0.199 | 0.186 | 0.233 | 0.086 |
| **State Dependence:** | | | | | |
| Received Welfare Previous Year | 2.247 | 1.611 | 3.490 | 2.829 | 3.989 |
| | 0.277 | 0.312 | 3.200 | 0.310 | 0.815 |
| **Local Labor Market Variable:** | | | | | |
| Local Unemployment Rate | 0.010 | -0.023 | 0.019 | 0.098 | 0.028 |
| | 0.020 | 0.067 | 0.019 | 0.038 | 0.016 |
| **Unobserved Heterogeneity:** | | | | | |
| Factor loading | 0.949 | 1.485 | 0.901 | 0.936 | 1.063 |
| | 0.211 | 0.894 | 1.473 | 0.214 | 0.419 |
| Probability Type I | 0.129 | 0.439 | 0.219 | 0.087 | 0.256 |
| Average Log-likelihood | -0.5749 | -0.4517 | -0.4253 | -0.4543 | -0.4698 |

**Table A2. Dynamic Models of Welfare Participation with control for endogenous initial conditions or unobserved heterogeneity. Continued.**

| | Ontario | Manitoba | Saskatchewan | Alberta | British Columbia |
|---|---|---|---|---|---|
| **Individual Characteristics:** | | | | | |
| Married | -1.109 | -0.288 | -0.680 | -0.296 | -0.947 |
| | 0.155 | 0.146 | 0.220 | 0.136 | 0.296 |
| Age | 0.000 | 0.022 | -0.005 | 0.004 | -0.012 |
| | 0.005 | 0.006 | 0.007 | 0.005 | 0.006 |
| Urban | 0.275 | 0.131 | 0.240 | 0.009 | 0.074 |
| | 0.133 | 0.153 | 0.166 | 0.159 | 0.198 |
| Number of Children | 0.149 | 0.131 | 0.245 | 0.017 | 0.107 |
| | 0.044 | 0.052 | 0.076 | 0.044 | 0.063 |
| Years of Education | -0.158 | -0.025 | -0.189 | -0.044 | -0.122 |
| | 0.025 | 0.022 | 0.054 | 0.021 | 0.042 |
| Disabled | 0.787 | 0.128 | 0.686 | 0.206 | 0.856 |
| | 0.156 | 0.182 | 0.239 | 0.149 | 0.244 |
| Male | -0.083 | 0.128 | -0.030 | -0.006 | -0.093 |
| | 0.091 | 0.120 | 0.147 | 0.102 | 0.135 |
| **State Dependence:** | | | | | |
| Received Welfare Previous Year | 3.094 | 2.927 | 2.571 | 2.361 | 2.193 |
| | 0.923 | 0.243 | 0.052 | 0.210 | 0.174 |
| **Local Labor Market Variable:** | | | | | |
| Local Unemployment Rate | 0.065 | 0.133 | -0.017 | 0.048 | 0.038 |
| | 0.034 | 0.048 | 0.060 | 0.037 | 0.063 |
| **Unobserved Heterogeneity:** | | | | | |
| Factor loading | 0.982 | -0.143 | 0.617 | -0.045 | 0.589 |
| | 0.325 | 0.083 | 0.072 | 0.095 | 0.189 |
| Probability Type I | 0.128 | 0.030 | 0.184 | 0.972 | 0.062 |
| Log-likelihood | -0.5236 | -0.3824 | -0.4200 | -0.4096 | -0.4748 |

**Figure 1. Welfare Participation Rates in Canada and the US**


Note: Sources: National Council of Welfare for Canada and The Administration for Children and Families (ACF) for the U.S.