

Applied Economics



ISSN: 0003-6846 (Print) 1466-4283 (Online) Journal homepage: http://www.tandfonline.com/loi/raec20

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To cite this article: Nathan Berg & Todd Gabel (2017) Who was affected by new welfare reform strategies? Microdata estimates from Canada, Applied Economics, 49:14, 1395-1413, DOI: <u>10.1080/00036846.2016.1218428</u>

To link to this article: <u>http://dx.doi.org/10.1080/00036846.2016.1218428</u>

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Published online: 25 Aug 2016.

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Who was affected by new welfare reform strategies? Microdata estimates from Canada

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ABSTRACT

A heterogeneous mix of aggressive welfare reforms took effect in different provinces and years starting in the 1990s. Welfare participation rates subsequently declined. Previous investigations of these declines focused on cuts in benefits and stricter eligibility requirements. This article focuses instead on work requirements, diversion, earning exemptions and time limits – referred to jointly as new welfare reform strategies – while controlling for benefit levels, eligibility requirements, province-specific labour market conditions and GDP growth, as well as individual-level socio-economic information. Province-year-specific variation in new reform strategies produce estimates implying that their presence is associated with a large decline in welfare participation of 1.3 percentage points (14% relative to the unconditional mean participation rate of 9.2%). Our coding scheme generates new measures of policy variation that distinguish reductions in benefit levels and tighter eligibility restrictions from new welfare reform strategies, helping identify how different subpopulations responded to different kinds of welfare reforms. Estimates from 46 subpopulations demonstrate that immigrants, native Canadians, single parents and disabled people were substantially more likely to be affected by aggressive new attempts to limit welfare participation than other Canadians receiving social assistance.

KEYWORDS

Social assistance; SLID; PRWORA; TANF; work requirements; diversion; earnings exemptions; time limits; natural experiments

Routledge

Taylor & Francis Group

JEL CLASSIFICATION H53; I38

I. Introduction

The welfare system in Canada (called Social Assistance) was relatively homogeneous across provinces under the Canadian Assistance Plan (CAP) passed in 1966. Although provinces enjoyed some limited discretion regarding benefit levels and eligibility requirements, the federal government guided most aspects of welfare policy. For example, federal provisions forbade provinces from implementing 'workfare' or time limits.¹ By the mid-1990s, however, the percentage of working-age Canadians

receiving welfare (i.e. welfare participation²) climbed to 12.5% in 1994. Following the passage of the Canadian Health and Social Transfer (CHST) in 1996, which transferred almost all control over welfare policy to the provinces, budget-strapped provinces began experimenting with different degrees of policy reform to reduce welfare participation.³ This decentralization produced a heterogeneous policy environment in both the timing and substance of provincial-level changes in welfare policy. Berg and Gabel (2015) referred to new policy reforms during this period as *new reform strategies* of four distinct

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¹Workfare requires that welfare participants work in exchange for welfare benefits, which is different from *work requirements* that require job search or school attendance under the heading of 'work related activities.' Ontario is the only province that implemented workfare to a significant degree.

²In this article, the welfare participation rate refers to the fraction of the non-elderly adult population (ages 18–64) receiving welfare benefits. Welfare participation is coded as a binary indicator and the empirical models presented subsequently undertake to explain the probability that a non-elderly adult is a welfare participant as a function of both individual-level characteristics and policy variables in place during a given province-year.

³The CHST shifted funding from a 50/50 cost-sharing agreement between the provinces and the federal government to a simple block grant. Block-grant funding gave provincial governments much greater discretion over the mix of policy tools used in provincial welfare systems, as well as stronger incentive to moderate or reduce benefit levels (Gundersen, LeBlanc and Kuhn 1999; Banting and Boadway 2004). The CHST eliminated nearly all federal restrictions on eligibility requirements, allowing provincial governments to experiment with new policy tools to control welfare participation. The only federal rule that remained under CHST was a provision forbidding provinces from imposing provincial residency requirements on eligibility.

Supplemental data for this article can be accessed here.

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types: work requirements, diversion, time limits and earning exemptions. In this taxonomy of policy types, the four new reform strategies are separate and distinct from the more frequently studied *standard reform tools*, which are eligibility requirements and welfare benefit levels. We adopt this classification scheme, which aims to more finely code and measure the effects of distinct policy types on welfare participation, and apply it for the first time to microdata. The microdata analysis reveals new information about the effects that new welfare reforms had on subpopulations such as Native Canadians and single parents.

One important stylized fact motivating this study is the large decline in Canada's welfare participation rate that roughly coincides with the time frame in which new welfare reforms were enacted by provincial governments. In 2005 - just 9 years after passage of CHST - Canada's welfare participation rate fell to 6.1% from 12.5% a decade before.⁴ This observed decline in welfare participation raises the question of how much can be attributed to new reform strategies, to other policy changes and to exogenous macroeconomic shocks. Canada's real GDP grew at an average annual rate of 3.4% from 1994 to 2005, and the national unemployment rate fell from 10.4 to 6.8% over the same period. Negative correlations between macroeconomic growth and welfare participation with clear causal interpretations are well established (Christofides, Stengos, and Swidinsky 1997; CEA, 1999; Grogger and Karoly 2005; Finnie and Irvine 2008). The measurement questions about the effects of distinct policy mechanisms that this article addresses are intended to complement previous studies by including more disaggregated information coding variation in welfare policy in our econometric models of welfare participation.⁵

As mentioned already, the standard reform tools of benefit levels and eligibility requirements would appear to be the most frequently studied policy variables thought to influence welfare participation. While changing benefit levels and eligibility requirements, some provinces went much further in attempting to control welfare participation with aggressive new reform strategies.⁶ The policy heterogeneity arising from Canada's relatively decentralized, provincially administered welfare systems provides statistical variation (across- and within-province) in the mix of welfare policies present in each province-year. This variation, in turn, enables estimation of their joint effect while controlling for individual-level characteristics in the Survey of Labour Income Dynamics (SLID) microdata (as well as variation in benefit levels and eligibility requirements that occurred over the same period). Province- and year-fixed effects are included in our empirical models to remove time-invariant province idiosyncrasies and an arbitrary time-series of annual shocks affecting all provinces each year. Inclusion of controls for benefit levels, eligibility requirements, province-specific GDP growth, unemployment and a rich set of individual-level demographic information, results in what we think are conservatively estimated effect sizes, which can be interpreted as lower bounds on the (magnitudes of the) effects that new welfare strategies actually had on welfare participation.

The policy tools coded as new reform strategies (i.e. stringent work requirements, diversion, earnings exemptions and time limits) differ from standard reform tools in two main respects. First, they require

⁴This information on welfare participation rates comes from the National Council of Welfare (NCW, 2008), which was closed by the federal government in 2012.

⁵Those who supported new welfare strategies in Canada (the coding and effects of which are the focus of this article) argued explicitly that these policy changes would reduce welfare participation. The argument was simple benefit-cost calculus: by offering new incentives to exit welfare and raising the time and hassle costs of entry, participation would decline. This mechanism is, of course, not mutually exclusive of other mechanisms that could potentially explain (at least some of) the decline in Canada's participation rate (e.g. macroeconomic expansion of labour market opportunities might have induced welfare participants to exit welfare and supply more labour irrespective of shifts in provincial-level welfare policy). Insofar as the data support the claim that a portion of the decline in participation resulted from changes in welfare policy variables, the empirical question of effect sizes associated with different policy variables remains. We argue that our algorithmic coding scheme helps meaningfully disentangle statistical associations between multiple policy tools (which fluctuated dramatically over the previous two decades) and welfare participation.

⁶*New reform strategies* implemented at the provincial level in Canada were, in many ways, comparable to welfare reforms adopted at the federal level in the U.S. in 1996 when Congress passed the Personal Responsibility and Work Opportunity Reconciliation Act (PWRORA). Welfare-to-work programmes and other novel policies aimed at incentivizing labour supply among very low-income workers have been studied in detail based on various data sources, mostly from the U.S.: Greenberg and Robins (2011); Robins, Michalopoulos and Foley (2008); Greenberg et al. (2005); Lubotsky (2004); Cleveland and Hyatt (2003) and Gittleman (2001). Complementing the present study's focus on the likelihood of participation, another strand of the empirical literature on the behavior of welfare participants investigates entry and exit rates: Stellmack, Wanberg and Kammeyer-Mueller (2003) and Ratcliffe (2002). Although earnings exemptions have been a part of Canada's welfare system for quite some time (i.e. they were not 'new' in the mid 1990s), U.S. welfare participants faced high marginal tax rates until PRWORA in 1996. Ziliak (2007) and Moffitt (1999) show that earnings exemptions (referred to as 'earned income disregards' in the U.S.) played an important role in welfare reform initiatives.

specific new actions on the part of potential recipients in order to receive benefits. And second, they explicitly encourage employment as an alternative to welfare.⁷ This classification of policy reforms is similar in spirit to studies using U.S. data, such as Ziliak, Figlio, Davis, and Connoly (2000), Blank (2001), Grogger (2003) and Danielson and Klerman (2008). Using Canadian data, Finnie and Irvine (2008), Kneebone and White (2009) and Shannon (2009) develop techniques for coding policy change using year- or province-level indicator variables, which begin to disaggregate different policy tools, but without identifying effects of specific policies separately from particular combinations of provinceand year-fixed effects.

Some provinces shifted benefit levels and eligibility requirements both before and after passage of CHST in 1996, reducing benefit levels and tightening eligibility requirements aggressively during the period from 1994 in which welfare participation declined. According to the National Council of Welfare (NCW), benefit levels for single individuals with no children fell on average 23% between 1994 and 2005, while benefits for single parents with one child fell on average of 18% (NCW 1995; 2006). A substantial literature links reductions in welfare benefits to declines in welfare participation (Card and Robins 2005; Hansen 2007; Lemieux and Milligan 2008). The relationship between changes in eligibility requirements such as age restrictions, residency requirements, asset exemptions and cohabitation rules (used with the intent of limiting welfare participation) is less well understood. Allen (1993) and Green and Warburton (2004), however, provide interesting evidence regarding the effectiveness of these policy tools in particular provinces.

The article is organized as follows. Section II presents a table summarizing administrative publications that provided the raw information used to code disaggregated welfare policy variables indicating the presence and stringency of new reform strategies across province-years. Section III describes the SLID data, definitions of variables and summary statistics. Section IV presents empirical models of welfare participation that replicate the effects of new reform strategies previously reported using aggregated provinceyear data using our microdata. Section V presents 46 subpopulation-specific effects on welfare participation, demonstrating for the first time which subpopulations responded the most to new reform strategies designed to reduce participation. Section VI concludes with a discussion and interpretation of the empirical findings.

II. Description of new reform strategies

Table 1 summarizes the substance and timing of new reform strategies by province, distilled from information in numerous provincial government publications. The provinces' heterogeneous combinations of welfare policies generate what is effectively 10 natural experiments that the coding scheme introduced in this article attempts to utilize to reveal new information about more finely disaggregated policy effects. This article focuses on estimating the probability of an individual being on social assistance as a function of different policy parameters, and the descriptive task of estimating this probability separately for more than 40 subpopulations of interest.⁸

The four broad categories of new reform strategies in Table 1 are work requirements with sanctions, diversion, earnings exemptions and time limits. Table 1 further distinguishes province-years whose work requirements with sanctions and diversion were implemented with weak versus strong degrees of stringency of enforcement.⁹ The classification scheme in Table 1 is

⁷Work requirements require welfare participants to perform work-related activity (such as volunteering, job search or paid work) or else lose some or all welfare benefits. Diversion is a strategy that attempts to guide potential welfare applicants towards alternatives to welfare, even if that means higher short-term costs for the province's welfare programme. In some provinces, applicants were given one-time payments as a substitute for welfare enrollment so that short-term needs could be met while reducing the probability of future welfare participation. Earning exemptions allow recipients to simultaneously collect welfare benefits and earn a limited amount of labour income to encourage employment. Although earnings exemptions do not require a specific new action from welfare participants, they were used to incentivize work in the U.S.'s welfare reforms and are included here to facilitate comparison. Time limits restrict the duration of welfare eligibility, potentially inducing would-be participants to ration their use of welfare and try harder to obtain labour income. In the case of British Columbia, for example, non-exempt individuals were eligible for welfare for only 2 years out of every 5-year period. For analysis of time limits and U.S. welfare participation, see Swann (2005) and Ribar, Edelhoch, and Liu (2008).

⁸A *coding scheme* refers to a mapping of the information in Table 1 into one or more variables to be included in an econometric model (in this study, an econometric model of the probability that an individual is observed to be a welfare participant in a given province-year). A companion paper utilizes the longitudinal component of SLID to investigate entry, exit and duration of spells on social assistance.

⁹Work requirements are considered 'weak' or 'strong' according to whether sanctions for non-compliance could result in either complete elimination of welfare benefits or just a fraction (or none at all). This follows the methodology often found in studies using U.S. data (CEA 1999; Rector and Yousseff, 1999; Danielson and Klerman 2008). Diversion is considered 'weak' if the primary focus of the policy is to inform welfare applicants of other means of assistance or employment opportunities; 'strong' diversion involved direct (and often, innovative) strategies to reduce welfare participation. These labels code what provincial and third-party sources document regarding important provincial differences in stringency of enforcement and the aggressiveness of welfare reforms in attempting to reduce participation.

Table	 New 	welfare	reform	strategies	by	province	(1986-	·2007))*
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	Workr with sance	tions**	Diversion*	***		Time	
Province	Weak	Strong	Weak	Strong	Earning exemptions****	limits****	
Alberta	¹ January 1991–February 1993	⁸ March 1993 -		¹⁶ March 1993 -	Jan 1986 -		
British Columbia	² January 1996–December 2001	⁹ January 2002 -	¹² January 1996– December 2001	¹⁷ January 2002 -	¹⁹ January 1986–December 1995	²⁰ April 2002 -	
Manitoba	³ May 1996 -				January 1999 -		
New Brunswick	⁴ May 1995 -				January 1996–Dec 2004		
Newfoundland							
Nova Scotia		¹⁰ August 2001 -	¹³ August 2001 -	10			
Ontario		¹¹ September		¹⁸ Jun 1996 -	January 1986 -		
	-	1996 -					
Prince Edward Island	⁵ June 1995 -		¹⁴ April 1995 -		January 1990 -		
Quebec	⁶ January 1990–September				January 1986–December		
	1994				1988		
Saskatchewan	⁷ June 1997 -		¹⁵ May 2001 -		January 1989 -		

*The table draws heavily on Table 1 in Berg and Gabel (2015) describing how new reform variables are coded based on administrative publications by provincial governments and other source documents. See Supplemental data Appendix A in Berg and Gabel (2015) for a complete listing of source documents.

**Work requirements require welfare participants to perform some form of work-related activity (such as volunteering or job search) or otherwise lose some or all welfare benefits. Work requirements are considered 'weak' or 'strong' according to whether sanctions for non-compliance could result in either complete elimination of welfare benefits or just a fraction (or none at all).

***Diversion helps welfare applicants find alternatives to welfare, even if that means higher short-term costs for the province's welfare programme. In some provinces, applicants were given one-time payments as a substitute for welfare enrolment so that short-term needs could be met while reducing the probability of future welfare participation. Diversion is considered 'weak' if the primary focus of the policy is to inform welfare applicants of other means of assistance or employment opportunities; 'strong' diversion involved direct (and often, innovative) strategies to reduce welfare participation.

****Earning exemptions allow recipients to simultaneously collect welfare benefits and earn a limited amount of labour income to encourage employment. ****Time limits restrict the duration of welfare eligibility, potentially inducing would-be participants to ration their use of welfare for the direst circumstances and more aggressively pursue labour income. In the case of British Columbia, for example, non-exempt individuals are eligible for welfare only 2 years out of every 5-year period.

¹The Supports for Independence programme required welfare participants to look for work or obtain training, and failure to do so resulted in sanctions. However, these work requirements had little practical effect because participants could easily appeal the decision and retain benefits at least on an interim basis while waiting for their appeals to be heard. Therefore, these work requirements are coded as *weak*.

 2 Under the BC Benefits Act, welfare participants were required to participate in work-related activity or have their benefits reduced.

³Through the Employment and Income Assistance programme, welfare participants are required to complete an Action Plan that laid out their work-related responsibilities. Failure to fulfil one's Action Plan resulted in a \$50 sanction, which could rise to \$100 after 6 months. Since benefits cannot be fully eliminated, these work requirements are coded as weak.

⁴Under the Family Income Security Act, welfare participants are required to take job training classes, perform a job search or work. Otherwise, they will face a reduction in benefits. Since benefits cannot be fully eliminated, these work requirements are coded as *weak*.

⁵Under the Social Assistance Act welfare participants are required to look for work, attend school, or take part in job training classes. Penalties for noncompliance were reportedly infrequent. Therefore, these reforms are coded as *weak*.

⁶The Act Respecting Income Security provided welfare participants who engaged in work-related activity a bonus of roughly \$100 in additional welfare benefits. Since benefits cannot be fully eliminated for non-participation in work-related activities, these 'sanctions' are coded as weak.

⁷Under the Saskatchewan Assistance Plan welfare participants are required to set forth a personal transition plan outlining goals and responsibilities that would lead to self-sufficiency. Penalties for noncompliance were reportedly infrequent. Therefore, these work requirements are coded as *weak*.

⁸The Supports for Independence Programme was slowly phased out in favour of the Alberta Works programme. Under Alberta Works welfare participants are required to participate in work -related activity or face sanctions that either reduced or eliminated benefits.

⁹The Employment and Assistance Act, which replaces BC Benefits, requires welfare participants to participate in work-related activity or have their benefits reduced by \$100 for two months (if a family with dependent children), or eliminated entirely (if a single adult).

¹⁰The Employment Support and Income Assistance Act requires welfare participants to enter an Employment Action Plan. The first instance of noncompliance could be sanctioned with a loss of benefits for 6 weeks; repeated non-compliance could result in loss of eligibility to welfare.

¹¹Under the Ontario Works programme, welfare participants who do not participate in mandatory work requirements will have their benefits reduced, or cancelled, for 3 months at the first instance of non-compliance. This sanction increases to 6 months for subsequent offenses.

¹²The BC Benefits Act expected welfare applicants to have pursued all alternate sources of support before gaining access to welfare. The province was also temporarily successful in requiring new residents to wait 3 months before becoming eligible for assistance. Finally, a short-lived pilot programme required some districts to subject welfare applicants to added screening procedures. Despite these and other measures, however, the province demonstrated a guestionable ability to enforce eligibility requirements, and is thus coded as *weak*.

¹³Under the Employment Support and Income Assistance Act, welfare applicants are expected to pursue all other 'feasible' forms of assistance, such as other government support programmes like unemployment insurance benefits, child tax credits and the like. If, after evidence provided to case workers suggest the applicant is employable, the applicant must show some evidence of job search activity within the past 30 days. If the caseworker is satisfied that sufficient job search has been undertaken, then the applicant can be admitted onto welfare.

¹⁴The Social Assistance Act requires that welfare applicants be informed of, and be strongly encouraged to pursue, other forms of assistance, such as Employment Insurance and Worker's Compensation benefits, prior to joining welfare.

¹⁵Under the Building Independence umbrella programme welfare applicants are now processed through call centres. Rather than enrol applicants into welfare immediately, callers are alerted to other means of support and, as necessary, diverted to the Jobs First programme. The Job First programme provides job training services to applicants and informs them of local job opportunities.

¹⁶Under the Supports for Independence programme employable welfare applicants are now required to wait before gaining welfare eligibility. The duration is unspecified but applicants may be required to first attend an orientation session before attaining eligibility to welfare. In addition, case workers have the discretion to deny eligibility for employable, single applicants. Also, applicants are required to pursue all other forms of assistance, including liquidating their assets. Furthermore, case workers have the discretion to use funds to meet emergency needs other than through enrolment into welfare, such as providing the cost of transportation for applicants who agreed to move to a neighbouring province.

- ¹⁷The Employment and Assistance Act requires welfare applicants to wait 3 weeks, during which they were required to attend an orientation session and perform job search before gaining eligibility for welfare. Also, applicants are not eligible for welfare unless they can show they have worked for 2 years in succession.
- ¹⁸Ontario Works mandates that all welfare applicants pursue all other sources of income before eligibility to welfare can be obtained. These sources include food banks, untapped spousal support and the liquidation of assets. Welfare applicants are processed through call centres that put applicants through a screening process. Documentation requirements are extensive.
- ¹⁹In addition to 1986–1995, British Columbia again put earnings exemptions in place (temporarily) between 2001 and 2002. In 2003, however, the province eliminated all earning exemptions. Since then, welfare participants pay 100% tax on all labour market earnings.
- ²⁰In 2002, British Columbia implemented a time limit stipulating that applicants could receive benefits for a maximum of 2 years out of every 5-year period. Since that time, however, 25 classes of individuals have been exempted from such restrictions, including single parents with a child younger than 3 years of age.
- Through the Employment and Income Assistance programme welfare participants are required to complete an Action Plan that laid out their work-related responsibilities. Failure to fulfil one's Action Plan resulted in a \$50 sanction, which could rise to \$100 after 6 months. Since benefits cannot be fully eliminated, these work requirements are coded as weak.
- 3 Through the Employment and Income Assistance programme welfare participants are required to complete an Action Plan that laid out their work-related responsibilities. Failure to fulfil one's Action Plan resulted in a \$50 sanction, which could rise to \$100 after 6 months. Since benefits cannot be fully eliminated, these work requirements are coded as weak.

used to code province-years as having new reform strategies in effect whenever three or more non-weak new reforms are present. There are three primary reasons for this coding scheme.

First, our coding scheme facilitates comparison with the literature on U.S. welfare reform. Passage of PRWORA in 1996 required U.S. states to adopt 5year time limits and work requirements with sanctions for non-compliance and (in some states) earnings exemptions to encourage work. Some states enacted stricter policies than these minimums: for example, diversion policies requiring welfare applicants to first seek other sources of financial support (e.g. living together with relatives, or one-off job access loans). Studies using U.S. data have coded the reforms under PRWORA as a policy bundle that came into effect in 1996. Thus, from 1996 onwards, all 50 states have had three or four new reform strategies in effect.

Second, the province-years identified as reform provinces by this scheme (which include Alberta, Ontario and British Columbia in particular years) are consistent with previous studies' classification of reform provinces. Kneebone and White (2009), Shannon (2009) and Finnie and Irvine (2008) similarly classify those three provinces (in particular years) as having substantively more aggressive reforms. Our classification algorithm provides an objective framework with explicitly stated criteria for classifying the presence and stringency of the policy variables associated with welfare reform.

Third, albeit ex post facto, the 'three or more nonweak new reforms' coding rule appears to meaningfully extract additional information about observed policy variation that goes beyond the simpler (overly simplistic, in our view) inclusive coding scheme that views welfare reform merely as a pre- versus post-CHST difference (measured by a post-1996 dummy variable applying equally to all provinces). As described in greater detail in the results section, we undertook numerous robustness checks by estimating the effects of policy measures generated by alternative coding schemes in a hierarchical ordering by inclusivity (i.e. how easy it was for a province-year to be classified as having new reform strategies in effect). We argue that the coding scheme adopted here most effectively captures provincial and temporal policy variation.

New reforms are, by definition, distinct from changes in benefit levels and eligibility requirements as well as other labour market policy tools (e.g. province-year-specific minimum wages and unemployment insurance benefits). The empirical models reported below, group variables under headings of policy tools, province- and year-specific macroeconomic conditions and various sets of information recording demographic differences. As mentioned above, some observers model welfare reform in Canada after empirical approaches used to study federally enacted U.S. welfare reforms passed in 1996. Although there was some heterogeneity among U.S. states' implementation of federal rules, most studies of the U. S. code those reforms to have taken place at or nearly at the same point in time. In contrast, Canada's welfare reforms were substantially more heterogeneous and therefore, we argue, imply the need to include information describing this heterogeneity in empirical models of welfare participation.

According to Table 1, Alberta, British Columbia and Ontario pursued three or more non-weak reforms and would therefore be coded (in different years) as having new reform strategies in place.¹⁰ By contrast, the provinces of Newfoundland and Quebec pursued few, if any, new reform strategies. The remaining provinces' degrees of implementation of new reform strategies fall somewhere in between.

The first goal of this article is to investigate the extent to which the provincial-level analyses of Kneebone and White (2009) and Berg and Gabel (2015) can be replicated using individual-level microdata. The second goal is to exploit the demographic information in the microdata to describe which subpopulations were most and least sensitive to those new reform strategies for which their effects on participation have yet to be documented in much detail. This addresses the question of which Canadians actually responded to new welfare reforms and which subpopulations' responses to those policy changes can be most strongly associated with the precipitous drop observed in welfare participation.

III. Data and descriptive statistics

This study uses the Survey of Labour Income Dynamics (SLID) with observations spanning years from 1993 to 2007. SLID provides detailed microdata with information about individual demographic profiles, financial situations, education, employment status, receipt of unemployment benefits and receipt of welfare. SLID has both cross-sectional and longitudinal components.¹¹ The welfare participation model presented in this article uses yearly crosssectional data, sometimes referred to as 'pooled' panel data. The mean respondent in SLID appears in 2.1 annual cross sections, which unfortunately introduces same-respondent correlation among error terms that we attempt to address by using robust standard error estimates.¹² We also ran versions of the model using those respondents who were observed only once, and another run of the model using only those who were observed in multiple years with individual fixed effects, to check the qualitative robustness of the reported findings.

SLID employs a sample design stratified by province and subregions within provinces. SLID provides sample weights for individual survey response data designed to achieve a nationally representative sample. SLID actually provides two sets of sample weights, one for the population distribution in the first year of each longitudinal wave (referred to as longitudinal weights), and another representing Canada's current population (cross-sectional weight) (Statistics Canada 2010a). These weights are adjusted to account for non-response, drawing on information in administrative databases attempting to improve the representativeness of the SLID data. There is some debate about the desirability of sample weights in applied econometric studies. Bloom and Idson (1991) conclude that sample weights have little impact on the size, sign or significance of estimates in most labour models, while Khan et al. (2007) raise the possibility that sample weights may lead to misleading results. By contrast, Magee, Robb, and Burbidge (1998) argue that weighting is important to generate the most accurate estimates when using data from the Canadian Survey of Consumer Finances (SCF) in particular. Moreover, numerous applied econometric studies apply sample weights (e.g. Cappelli 2004). Using sample weights leads to larger estimated effect sizes for the new reform strategies variable in our coding scheme. In the interest of reporting conservative effect sizes that can be interpreted as lower bounds on true effect size, unweighted estimators are presented throughout.¹³

¹⁰Kneebone and White (2009), Shannon (2009) and Finnie and Irvine (2008) have also identified these three provinces as adopting the most significant reform, relative to the rest of Canada, although their timing is not exactly the same as in Table 1.

¹¹The cross-sectional component was designed so that it could be combined with the Survey of Consumer Finances (SCF), 1976–1997. The years in which both SLID and SCF data were gathered (i.e. 1993 through 1997) provide a combined sample, which skews the number of observations towards this earlier period: There are about twice as many observations in the pooled panel from 1993–1997 as in later years).

¹²Standard errors produced by STATA's 'robust' option are conservative in the sense of allowing for mis-specification of the error term and some amount of correlation, typically shrinking *t*-statistics towards zero and making it harder for the data to indicate a statistically significant effect.

¹³Supplemental data Appendix W presents weighted and un-weighted sample means, side by side, to directly see the extent of over- and underrepresentation in the raw data. The two samples are broadly similar and under-counting generally does not appear to be severe, aside from singles, minority mothers and minority fathers, and likely college graduates as well. This is not an issue however in the subpopulation analyses estimated using only singles, minority mothers and fathers, respectively. Supplemental data Appendix W also shows that the raw sample under-counts people living in province-years with new reform strategies, the result of having twice as many observations from earlier years when relatively few new reform strategies had been adopted. A recent report on educational attainment by (HRSDC) (2010) indicates that about 11% of Canadian adults had earned a college degree or better in 1990, and 19% in 2007. Yet according to Table 3, only about 9.3% of respondents in Table 3 report having earned a college degree or better. It should be noted that the combination of SLID and SCF between 1993 and 1997 gives roughly twice as many observations during these years, which distorts rates of educational attainment downward insofar as education rates are rising over time while the sample in Table 3 over-weights earlier years. Over-weighting earlier years with fewer new reforms would, once again, suggest a usefully conservative interpretation of the estimated effects in later sections, which should provide lower bounds on true effect sizes as a result of under-representation of people in province-years with new reform strategies in place.

Although SLID is rich with individual-level data, a number of studies have noted problems using survey data and relying on respondents' self reports (Riddell and Riddell 2006; Klerman, Ringel, and Roth 2005; Warburton and Warburton 2004; Kapsalis 2001; Berg and Lien 2006; and Berg 2005). Warburton and Warburton (2004) find that the incidence of self-reported welfare receipt among SLID respondents appears significantly under-reported when compared to administrative data, with, for example, self-reported welfare benefits in SLID amounting to only 65% of the levels paid out according to administrative data. Self-reported educational attainment likewise has been mentioned as inflated relative to population distributions of educational attainment based on administrative records. In the U.S., the magnitude of under-reporting of welfare receipts in the 2001 American Community Sample Survey may be as much as 50% (Lynch et al. 2008).

In addition to individual-level data from the SLID, we also use province-level data on unemployment rates, real GDP growth, lags of these macroeconomic variables and unemployment insurance benefits obtained from Statistics Canada.¹⁴ We also use provincial minimum wage rates provided by the Minimum Wage Database at (HRSDC 2009). Other provincial policy variables include asset exemption limits and welfare benefit levels obtained through the National Council of Welfare and their annual series on *Welfare Incomes* (1994). Unless otherwise stated, all dollar units are adjusted for inflation and expressed in C\$2007.

Table 2 describes the variables used in this article. The dependent variable, WELFARE _RECEIPT, takes the value of 1 if the respondent reported having received welfare benefits of C\$101 or more in a given year, and 0 otherwise.¹⁵ The variable logBENEFITS provides normalized information about varying real annual levels of welfare benefits for single parents with one child.¹⁶ Demographic, education, family type and labour variables were generated from the SLID database. Education nonresponse and family type non-response indicator variables (EDUC NONRESP and FAMILY NONRESP) were included to deal with the high rates of nonresponse to education and family -type survey items while introducing as little non-response bias as possible.¹⁷ Non-responders to the disability questionnaire item were coded as non-disabled, and nonresponders to the minority item were coded as nonminority. Native Canadian refers to those whose ancestry predates the arrival of Europeans in North America, also referred to sometimes as aboriginals. We used response data only from respondents aged 18- 64, as those outside this range are either too young or too old to apply for welfare in Canada. Aside from exceptions explicitly mentioned, the demographic indicators (and all other variables in the regressions) have pairwise correlations less than 0.350 in magnitude.

Table 3 presents summary statistics for the variables used in the most encompassing of the empirical models reported in the following section.¹⁸ The number of observations is 921,449, which comes from pooling 15 annual cross sections from 1993 through 2007. These observations are taken from 445,486 unique individuals whose mean number of observations over the 15 years is 2.1. Approximately, one-third of respondents in our sample (310,554) had only one observation. According to Table 3, the unconditional mean of the dependent variable, WELFARE RECEIPT, is 9.2%. Although Kapsalis (2001) and Warburton and Warburton (2004) suggest that this number based on SLID data is significantly lower than that calculated from administrative data sources (e.g. provincial welfare agency records), this mean based on SLID tracks

¹⁴Statistics Canada data files used in this study are Provincial Economic Accounts, Income Trends in Canada 1976–2007, as well as the CANSIM Database Tables 282–0086 and 384–0009 (2007, 2009, 2010a, 2010b, 2010c).

¹⁵Following Finnie, Irvine, Sceviour (2004) the \$101 cutoff reduces the likelihood of possible coding errors, as well as ignores insignificant degrees of welfare receipt. Other measures to proxy for being on welfare were used in unreported runs of the main regressions, for example, using total welfare benefits received in a given year as the dependent variable. The qualitative findings regarding effects of the main policy variables were not substantively different. In addition, the binary dependent variable in a linear probability model specification provides easy-to-interpret coefficients, translating a one-unit change in each regressor into an expected change in the probability of welfare participation. Supplemental data Appendix L provides logit results based on identical sets of right-hand-side variables as reported in the linear probability model reported in the next section.

¹⁶Benefits levels depend on province-specific schedules for different family types. Variation in benefit levels for different family types are correlated although not perfectly. Instead of including five or more highly correlated benefit level variables for each family type in the empirical models, we include only this one as a proxy.

¹⁷The variables EDUC_NONRESP and FAMILY_NONRESP were highly correlated with one another (pairwise correlation of 0.895), indicating that those who did not respond to questions about education levels also did not provide family type information either.

¹⁸Access to the SLID database is contingent on respecting privacy rules established by the Canadian government. As a result, certain descriptive statistics such as median, minimum and maximum values are not permitted to be released as they may risk revealing private information.

Table 2. Description of va	ariables.		
Variables	Description	Variables	Description
Dependent variable WELFARE_RECEIPT	Binary indicator for having received welfare in excess of 100 dollars	Education level EDUC_HSDROP EDUC_HS	Highest education level is below a high school diploma Hichest education level is a high school diploma
Policy* NEWREFORM	Welfare reform variables**	EDUC_SOME COLL	Highest education level is a major approximately the providence of
logBENEFITS	Log of real welfare benefit level for single parents with one child	EDUC_COLL	Highest education level is a university degree
logASSET_THRESH	Log of real asset exemption threshold	EDUC_MASTER	Highest education level is a (non-professional) master's degree
	Log of real minimum wage Log of real total employment insurance benefits per non-elderly person	EDUC_PHD	Highest education level is a professional degree Highest education is a doctoral degree
		EDUC_NONRESP	Did not indicate education level
Province-level macro* LINEMPLOVMENT	I nemnlovment rate	Eamily type	
UNEMPLOYMENT {t-1}	Unemployment rate, lagged one period	SINGLE	Not married or common-law
UNEMPLOYMENT _{t-2}	Unemployment rate, lagged two periods	ONE_KID_SINGLE	Single with one child at home
REALGDPGROWTH	Real GDP growth rate	TWO_KIDS_SINGLE	Single with two children at home
REALGDPGROWTH _{{t-1}}	Real GDP growth rate, lagged one period	THREEPLUS_KIDS_SINGLE	Single with three or more children at home
REALGDPGROWTH _{{t-2}	Real GDP growth rate, lagged two periods		Married or common-law
Demoaranhic			coupled with one child at home
AGE	Age of respondent is between:	TWO_KIDS_COUPLED	Coupled with two children at home
18–22	18 and 22	THREEPLUS_KIDS_COUPLED	Coupled with three or more children at home
23–30	23 and 30	FAMILY_NONRESP	If respondent did not indicate family type
31–40	31 and 40	SINGLE_PARENT	Single and a parent
41–50	41 and 50	PARENT	Parent with children at home
51-60	51 and 60	MOTHER	Female and a parent
61–64	61 and 64	FATHER	Male and a parent
MALE	Male	MINORITY_MOTHER	Female and a minority
MOVER*** NON-LIRRAN***	Respondent changed province of residence Recondent lives in urban area	MINORITY_FATHER	Male and a minority
DISABILITY***	Disabled	Labour	
IN_SCHOOL***	Respondent attends school	UL_RECEIPT	Received unemployment insurance in excess of 100 dollars
MINORITY***	Respondent self-identified as ethnic minority	WKC_RECEIPT	Received workers compensation in excess of 100 dollars
NATIVE***	Native or Aboriginal Canadian	COMMISSION****	Earned commissions through employment
NON-ENGLISH***	Mother tongue non-English	MANAGER****	Employed in a managerial position
IMMIGRANT***	Respondent is an immigrant	EMPLOYED****	Paid worker
YRS_IMM	Years since immigrated to Canada		
*These are province-level varia	bles		
**The main explanatory variab	le is NEWREFORM, an indicator for province-years in which three or more non-w	eak new reform strategies (as classif	ed in Table 1) are in effect.
***Non-responses to these sun	vey items were set to the following default values: not to have changed provinces	s, not to be living in an urban area, n	ot disabled, did not attend school in reference year, not a minority,

not a Native Canadian, having English as their mother tongue and not an immigrant. ****Non-respondents to survey were considered not on commission, not employed in managerial-type positions and not employed during the reference year, respectively.

Table 3. Summary statistics*, SLID cross-sectional.

Dependent variable Education level WELFARE_RECEIPT 0.092 0.29 0.00 1.00 EDUC_HSDROP 0.125 0.33 0.00 1.00 Policy EDUC_HS 0.107 0.31 0.00 1.00 NEWREFORM 0.307 0.45 0.00 1.00 EDUC_CERT 0.217 0.41 0.00 1.00 logBENEFITS 9.670 0.12 9.46 9.99 EDUC_COLL 0.073 0.26 0.00 1.00
WELFARE_RECEIPT 0.092 0.29 0.00 1.00 EDUC_HSDROP 0.125 0.33 0.00 1.00 Policy EDUC_HS 0.107 0.31 0.00 1.00 NEWREFORM 0.307 0.45 0.00 1.00 EDUC_CERT 0.217 0.41 0.00 1.00 logBENEFITS 9.670 0.12 9.46 9.99 EDUC_COLL 0.073 0.26 0.00 1.00
Policy EDUC_HS 0.107 0.31 0.00 1.00 NEWREFORM 0.307 0.45 0.00 1.00 EDUC_SOME COLL 0.100 0.30 0.00 1.00 logBENEFITS 9.670 0.12 9.46 9.99 EDUC_COLL 0.073 0.26 0.00 1.00
Policy EDUC_SOME COLL 0.100 0.30 0.00 1.00 NEWREFORM 0.307 0.45 0.00 1.00 EDUC_CERT 0.217 0.41 0.00 1.00 logBENEFITS 9.670 0.12 9.46 9.99 EDUC_COLL 0.073 0.26 0.00 1.00
NEWREFORM 0.307 0.45 0.00 1.00 EDUC_CERT 0.217 0.41 0.00 1.00 logBENEFITS 9.670 0.12 9.46 9.99 EDUC_COLL 0.073 0.26 0.00 1.00
logBENEFITS 9.670 0.12 9.46 9.99 EDUC_COLL 0.073 0.26 0.00 1.00
logASSE1_THRESH 8.167 0.51 6.91 9.10 EDUC_MASTER 0.014 0.12 0.00 1.00
logMINWAGE 2.015 0.10 1.78 2.17 EDUC_PROF 0.003 0.05 0.00 1.00
logUNEMP_INS 6.385 0.51 5.62 7.81 EDUC_PHD 0.003 0.06 0.00 1.00
EDUC_NONRESP 0.357 0.48 0.00 1.00
Province-level macro
UNEMPLOYMENT*** 9.005 3.15 3.40 20.10 Family type
REALGDPGROWTH*** 3.004 2.00 -4.65 15.60 SINGLE**** 0.250 0.43 0.00 1.00
ONE_KID_SINGLE 0.025 0.16 0.00 1.00
Demographic TWO_KIDS_SINGLE 0.014 0.12 0.00 1.00
AGE 39.624 12.70 18.00 64.00 THREPLUS_KIDS_SINGLE 0.005 0.07 0.00 1.00
18-22 0.110 0.31 0.00 1.00 COUPLED**** 0.442 0.50 0.00 1.00
23-30 0.169 0.37 0.00 1.00 NO_KIDS_COUPLED 0.157 0.36 0.00 1.00
31-40 0.248 0.43 0.00 1.00 ONE_KID_COUPLED 0.102 0.30 0.00 1.00
41–50 0.243 0.43 0.00 1.00 TWO_KIDS_COUPLED 0.124 0.33 0.00 1.00
51–60 0.175 0.38 0.00 1.00 THREEPLUS_KIDS_COUPLED 0.060 0.24 0.00 1.00
61–64 0.055 0.23 0.00 1.00 FAMILY_NONRESP 0.308 0.46 0.00 1.00
MALE 0.491 0.50 0.00 1.00 PARENT**** 0.330 0.47 0.00 1.00
MOVER 0.008 0.09 0.00 1.00 SINGLE_PARENT**** 0.044 0.21 0.00 1.00
NON-URBAN 0.186 0.39 0.00 1.00 MOTHER**** 0.179 0.38 0.00 1.00
DISABILITY 0.117 0.32 0.00 1.00 SINGLE_MOTHER**** 0.034 0.18 0.00 1.00
IN_SCHOOL 0.075 0.26 0.00 1.00 MINORITY_MOTHER**** 0.011 0.10 0.00 1.00
MINORITY 0.037 0.19 0.00 1.00 FATHER**** 0.152 0.36 0.00 1.00
NATIVE 0.023 0.15 0.00 1.00 SINGLE_FATHER**** 0.010 0.10 0.00 1.00
NON-ENGLISH 0.322 0.47 0.00 1.00 MINORITY_FATHER**** 0.009 0.09 0.00 1.00
IMMIGRANT 0.107 0.31 0.00 1.00
YRS_IMM 1.586 6.89 0.00 . Labour
UI_RECEIPT 0.256 0.44 0.00 1.00
Years 1993–2007 WKC_RECEIPT 0.056 0.23 0.00 1.00
N 9,21,449 COMMISSION**** 0.049 0.22 0.00 1.00
MANAGER**** 0.080 0.27 0.00 1.00
EMPLOYED**** 0.456 0.50 0.00 1.00

*The statistics here use non-weighted data. Summary statistics using survey weights are presented in Supplemental data Appendix W.

**Summary statistics for province- and year-fixed effects are not presented here although they are included in the empirical models.

***Lagged versions of the macroeconomic variables, UNEMPLOYMENT and REALGDPGROWTH, are included in the empirical models. Summary statistics for these lagged variables are not presented in this table, because lagged and unlagged variables have (nearly) identical univariate distributions and summary statistics.

****These variables do not appear as regressors in the main model. These variables are instead used to isolate the effects of our main independent variable (NEWREFORM) on certain subpopulations. Also note that SINGLE and COUPLED do not sum to 1 because a large portion of survey respondents nonresponded (i.e. FAMILY_NONRESP = 0.308).

rather closely with the unconditional mean welfare participation rate of 9.0 from 1986 through 2005 reported in Berg and Gabel (2015).

The policy variable NEWREFORM takes a value of 1 in province-years in which the province adopts three or more non-weak new reforms as summarized in Table 1, and 0 otherwise. The province-years indicated by NEWREFORM = 1 are Alberta (1993-present), British Columbia (2002-present) and Ontario (1996-present).¹⁹ The unconditional mean of NEWREFORM in Table 3 indicates that 31% of

observations in the sample are from province-years that have adopted new reform strategies. While this number appears large, it should be noted that Alberta, British Columbia and Ontario account for about 60% of the Canadian population, reflecting the under-counting issue mentioned earlier (i.e. recalling that, in the weighted sample shown in Supplemental data Appendix W, the mean of NEWREFORM rises to 45%).

Overall, province-level macroeconomic variables UNEMPLOYMENT and REALGDPGROWTH have

¹⁹Kneebone and White (2009) suggest that British Columbia's reforms were comparable to those of Alberta and Ontario since 1996. Our stringent coding scheme as summarized in Table 1 offers a different view. According to provincial and other administrative publications (i.e. the source data for Table 1) as well as news accounts, the BC reforms were more comparable to those of Saskatchewan and Prince Edward Island prior to CHST (i.e. more lenient than Alberta and Ontario). Following CHST, only Alberta, British Columbia and Ontario undertook reform efforts comparable to those adopted under PRWORA. This interpretation contrasts with that of Finnie and Irvine (2008), who state that 'the more draconian elements' of U.S. welfare reform legislation were 'avoided' in Canada.

large degrees of variation. For example, the largest level of unemployment (20.1%) and lowest level of real GDP growth (-4.6%) occurred in Newfoundland in 1993 and 1996, respectively. Interestingly, Newfoundland also experienced the highest real GDP growth rate (15.6% in 2002). Provincial unemployment rates reached their lowest level of 3.4% in Alberta in 2006. The Maritime Provinces (New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland) have had higher rates of unemployment and slower rates of economic growth.

Another statistic of interest is the rate of receipt of unemployment benefits, which is about a quarter of the sample (or 21.1% in the weighted sample). The variable UI_RECEIPT is an indicator = 1 if an individual reports receiving any unemployment benefits during the year. This large rate of receipt of unemployment benefits seems large. The mean amount of unemployment insurance benefits was C\$1536, which is an economically significant annual sum for many. This control is critical because one would, all else equal, expect greater reliance on unemployment benefits to be among the important consequences of welfare reforms that restricted access to welfare and encouraged applicants to look for alternative sources of income and income support, including unemployment insurance.

Likewise, EMPLOYED appears to be relatively low, with just 45.6% of respondents reporting that they were a paid worker in a given year. According to HRSDC (2010), employment as a percentage of working-age Canadians has ranged from about 58 to 63% over the sample period. One possible cause for this discrepancy is the large number – about onethird of the entire sample – of non-respondents who were classified as *not* having been in paid work by the default rule in our coding scheme. Again, using sample weights mitigates this issue to a modest extent although not nearly enough to get it in the expected range based on HRSDC reports, with the weighted mean employment rate rising to 48.8%.

IV. Empirical welfare participation models

Pooled cross-sectional data are used to estimate discrete-dependent variables models where each individual is assumed to be observed only once. The primary dependent variable is the binary indicator Y_{ipt} representing whether individual *i* was in receipt of C\$101 or more in welfare benefits when residing in province *p* and observed in year *t*. Linear probability model (LPM) specifications are reported below for ease of interpreting constant marginal effects (i.e. not dependent on right-hand-side information as marginal effects in nonlinear probability models are), although the more general probability model is stated here:

$$\operatorname{Prob}(\mathbf{Y}_{ipt} = 1 | \mathbf{X}_{ipt}) = \mathbf{F}(\mathbf{X}_{ipt} \ \beta),$$

where X_{ipt} is a k × 1 vector of variables thought to influence Y_{ipt} and β is a vector of parameters describing the cumulative distribution function F.

The first of five specifications, Model A, regresses individual-level welfare participation on 11 province-level policy variables stacked in the vector P_{pt} (P for policy variables that vary only by p and t but not over *i* with a particular province-year) in addition to province- and year-fixed effects. The main explanatory variable, NEWREFORM_{pt}, captures between province and intertemporal variation in provinces' new reform strategies. Four other province-level variables account for variation in standard welfare reform tools (i.e. benefits levels and eligibility requirements) and labour market policy parameters: logASSET_THRESH_{pt}, logBENEFITS, logMINWAGE_{nt} and logUNEMP_INS_{nt}.²⁰ Provincespecific macroeconomic variables consisting of unemployment rates (UNEMPLOYMENT_{pt}), real GDP growth rates (REALGDPGROWTH_{pt}) and their respective lags over two-periods complete the list of variables included in P_i. Model A can now be expressed compactly as:

Model A:
$$\rightarrow$$
 Y_{*i*pt} = α + P_{*p*t}['] μ + ξ _{*p*t} + ε _{*i*pt},

where μ represents the main policy and macro marginal effects of province-level policy variables on individuals; ξ_{pt} is the unobserved heterogeneity that varies at the province level over time, which can be controlled for using province- and year-fixed effects, or with a random effects model; ε_{ipt} represents unobserved individual-level heterogeneity; and α is a constant. The error term ε_{ipt} is assumed to have zero mean and, when stacked into vector form, either a diagonal or block diagonal covariance matrix to allow

²⁰For a discussion on the importance of asset thresholds affecting the behavior of would-be welfare participants, see Bansak, Mattson, and Rice (2010); Hurst and Ziliak (2006); and Sullivan (2006).

for systematic differences in the magnitude of unobserved heterogeneity (e.g. clustering by province) and one-period autocorrelation. The first element of μ corresponds to NEWREFORM_{pt} which is the primary policy effect of interest, representing the change in probability of being a welfare participant when moving a person with the same characteristics and other policy parameters from a province-year without new reforms to a province-year with new reforms.

Model B adds to Model A (after omitting the 60– 64 age bracket as the reference class) 15 individuallevel demographic variables as shown in Table 3, stacked in the vector D_{it} (basic demographics excluding education, family type and labour market experience) with corresponding 15 × 1 vector of coefficients ρ .²¹ These variables capture differences in age, ethnicity, gender and nativity:

Model B:
$$\rightarrow$$
 Y_{ipt} = α + P_{pt}' μ + D_{it}' ρ + ξ_{pt} + ε_{ipt} ,

where we note there are abuses of notation reusing Greek symbols that take on distinct values and probability distributions in different models. Although model names are not indicated with subscripts, each appearance of α , μ , ρ , ξ_{pt} and ε_{ipt} should be interpreted as specific to Model A, B, C, D or E. For each one-unit change in the demographic variables stacked in D_{it} , the coefficients in ρ measure the change in the probability of being in receipt of welfare associated with a one-unit change in each demographic factor. Note that, all the variables in D_{ipt} are binary, with the exception of YRS_IMM_{it}.

Model C adds eight dummy variables reflecting the highest levels of education attained by respondents. High school dropouts are the omitted reference class among the nine mutually exclusive and exhaustive education indicators:

Model C:
$$\rightarrow$$
 Y_{*i*pt} = α + P_{*p*t} ^{\prime} μ + D_{*i*t} ^{\prime} ρ + E_{*i*t} ^{\prime} π + ξ _{*p*t} + ε _{*i*pt}

where E_{it} is a 8 × 1 vector of education variables; π is an 8 × 1 vector of coefficients measuring the expected change (relative to high school dropouts) in the probability of receiving welfare for individuals at each level of educational attainment.

Next, Model D adds eight family type indicator variables (including one for family type non-

responders), with single individuals with no children serving as the omitted reference class:

Model D:
$$\rightarrow$$
 Y_{ipt} = $\alpha + P_{pt}'\mu + D_{it}'\rho + E_{it}'\pi + F_{it}'\kappa + \xi_{pt} + \varepsilon_{ipt}$,

where F_{it} is an 8 × 1 vector of family type variables; and κ is an 8 × 1 vector of coefficients that measure the expected change in the probability of receiving welfare for individuals with a particular family type relative to an otherwise similar individual who is single with no children.

Finally, we add two variables representing receipt of unemployment benefits in excess of 100 dollars and receipt of workers compensation in excess of 100, denoted UI_RECEIPT_{*it*} and WKC_RECEIPT_{*it*}, respectively, which might be alternatives (or possibly, gateways) to welfare:

Model E:
$$\rightarrow$$
 Y_{ipt} = α + P_{pt}' μ + D_{it}' ρ + E_{it}' π
+ F_{it}' κ + L_{it}' δ + ξ_{pt} + ε_{ipt} ,

where L_{it} is a 2 × 1 vector stacking the two indicators mentioned above, and δ is a 2 × 1 vector of associated coefficients.

The province-year shock ξ_{pt} can be broken down into three components:

$$\xi_{pt} = \eta_p + \tau_t + v_{pt},$$

where η_p is the province effect, τ_t is the year effect, and v_{pt} is a residual. Including provincial and year dummies (omitting Alberta and 1993 as reference classes) to Models A through E absorbs the first two terms, leaving the individual-heterogeneity term to absorb the residual term from the province-year shock, which we attempt to deal with by computing robust standard errors clustering on provinces.

The first column of Table 4 shows that using only province-level variables, adoption of stringent combinations of new reform strategies is associated with a 1.3 percentage point decline in the probability of receiving welfare. Relative to the unconditional mean rate of receiving welfare which was 9.2%, this policy effect is an economically and statistically significant 14% reduction in the likelihood of receiving welfare. The

²¹Gelbach (2012) provides a useful demonstration of how the order in which regressors are added to a model can influence estimates, showing that sequential inclusion of additional sets of controls does not necessarily imply robustness of the empirical results. We attempted to choose the ordering (presented here) best motivated by theory and relevant policy debates over causes of observed welfare declines.

effect size of NEWREFORM is never smaller than 1.1 percentage points across all models in Table 4.

The variable logBENEFITS has a positive effect across all five models in Table 4, the largest of which is 0.022, implying that a benefits reduction of 50% might not be enough to bring about a decline in

welfare participation as large as a move from a province-year without new reforms to a province-year with. The sign of the effect on real asset limits (logASSET_THRESH), which varies relatively little across provinces and through time, is opposite of what one would expect, although its magnitude is tiny.

Table 4. Five empirical models* with province- and year-fixed effects.

			Estimo	ated coeffici	ents and abso	olute value t-:	statistics for n	nodels:		
Variables	А	t	В	t	С	t	D	t	E	t
Policy										
NEWREFORM	-0.013	6.1	-0.011	5.2	-0.011	5.4	-0.011	5.2	-0.011	5.5
logBENEFITS	0.017	1.8	0.022	2.3	0.014	1.5	0.017	1.8	0.015	1.6
logASSET_THRESH	-0.004	3.0	-0.004	2.9	-0.003	2.2	-0.003	2.7	-0.003	2.6
logMINWAGE	0.013	1.4	0.010	1.1	0.009	1.1	0.007	0.8	0.009	1.1
logUNEMP_INS	0.001	0.1	-0.002	0.5	-0.002	0.4	0.002	0.5	0.002	0.3
Province-level macro										
UNEMPLOYMENT	0.002	2.7	0.002	2.2	0.002	2.3	0.002	2.5	0.002	2.7
UNEMPLOYMENT_{t-1}	0.000	0.0	0.000	0.0	0.000	0.1	0.000	0.3	0.000	0.3
UNEMPLOYMENT_{t-2}	0.002	2.7	0.003	3.1	0.002	2.8	0.002	2.8	0.002	2.8
REALGDPGROWTH	0.000	1.9	0.000	1.4	0.000	1.8	0.000	1.8	0.000	1.9
REALGDPGROWTH_{t-1}	-0.001	3.2	-0.001	2.5	-0.001	3.1	-0.001	3.1	-0.001	3.2
REALGDPGROWTH_{t-2}	0.000	1.5	0.000	1.1	0.000	1.6	0.000	2.0	0.000	2.0
Demographic										
18–22			0.052	32.7	0.051	32.0	0.024	14.9	0.031	19.0
23–30			0.034	23.1	0.052	35.6	0.035	23.5	0.042	28.4
31–40			0.013	9.0	0.032	22.5	0.015	10.4	0.020	14.0
41–50			-0.001	0.8	0.015	10.9	0.000	0.3	0.004	3.0
51–60			-0.002	1.2	0.008	5.7	0.005	3.3	0.008	5.3
MALE			-0.021	35.1	-0.023	39.4	-0.017	28.6	-0.016	26.8
MOVER			0.005	1.4	0.013	3.8	0.010	3.0	0.012	3.6
NON-URBAN			-0.008	9.8	-0.013	16.2	-0.009	11.2	-0.007	8.8
DISABILITY			0.167	176.3	0.159	167.1	0.153	163.0	0.155	164.5
IN_SCHOOL			-0.036	30.4	-0.010	8.1	-0.020	16.2	-0.020	15.8
MINORITY			0.024	13.5	0.028	15.9	0.023	13.3	0.022	12.8
NATIVE			0.119	59.7	0.110	55.4	0.096	48.8	0.097	49.4
NON-ENGLISH			0.007	7.3	0.003	2.9	0.006	7.1	0.008	9.0
IMMIGRANT			0.014	9.8	0.012	8.3	0.013	8.8	0.011	7.9
YRS_IMM			-0.001	20.5	-0.001	15.2	-0.001	15.5	-0.001	15.2
Education level										
EDUC_HS					-0.090	73.4	-0.087	71.2	-0.088	72.5
EDUC_SOME COLL					-0.084	63.5	-0.084	64.4	-0.086	66.2
EDUC_CERT					-0.112	104.6	-0.107	101.4	-0.109	103.1
EDUC_COLL					-0.141	100.1	-0.132	94.4	-0.137	98.1
EDUC_MASTER					-0.135	51.5	-0.124	47.9	-0.131	50.6
EDUC_PROF					-0.134	23.2	-0.121	21.4	-0.130	22.9
EDUC_PHD					-0.134	26.7	-0.122	24.7	-0.130	26.3
EDUC_NONRESP					-0.065	59.0	-0.048	30.2	-0.050	31.4
Family type										
ONE_KID_SINGLE							0.135	68.6	0.137	69.4
TWO_KIDS_SINGLE							0.163	64.5	0.165	65.2
THREEPLUS_KIDS_SINGLE							0.222	54.8	0.223	55.2
NO_KIDS_COUPLED							-0.070	66.6	-0.067	63.4
ONE_KID_COUPLED							-0.051	43.2	-0.044	37.1
TWO_KIDS_COUPLED							-0.049	43.0	-0.044	38.4
THREEPLUS_KIDS_COUPLED							-0.022	15.1	-0.017	12.0
FAMILY_NONRESP							-0.049	28.7	-0.047	27.6
Labour										
UI_RECEIPT									-0.032	45.9
	0.100	1 2	0 1 5 1		0.000		0.007	~ ~	-0.039	31.3
Constant	-0.109	1.2	-0.151	1./	-0.023	0.3	-0.026	0.3	-0.007	0.1
Province-fixed effects	Yes		Yes		Yes		Yes		Yes	
Year-fixed effects	Yes		Yes		Yes		Yes		Yes	
<i>R</i> -squared	0.0092		0.0502		0.0653		0.0890		0.0921	

*For ease of interpreting marginal effects independent of the value of right-hand-side characteristics, this table reports estimates based on the linear probability model specification. Logit models using the same sets of variables were also estimated, which are reported in Supplemental data Appendix L. Probit versions are also available upon request. The results are qualitatively very similar and rarely overturn findings of large versus small magnitudes, signs or statistical significance.

Coefficients on UNEMPLOYMENT suggest that a 1 percentage point increase in the unemployment rate increases the probability of receiving welfare by about 0.2 percentage points, a modest size but nevertheless statistically significant effect. Summing effects on unemployment and its two lags implies that a 1 percentage point increase in the unemployment rate would increase the probability of receiving welfare over the two subsequent years by 0.45 percentage points. Changes in real GDP growth have much smaller effects on the expected rate of welfare participation.

Model B introduces individual-level demographic information from which one observes that being young dramatically increases the likelihood of welfare participation relative to those with similar policy environments and characteristics who are over 40. Comparing age coefficients in other models reveals that differences in education and other sources of variation explain away at most half of the age effect for the youngest working-age Canadians while not at all diminishing the effect sizes in the 23–30 and 31– 40 age categories. These findings are generally consistent with Finnie, Irvine and Sceviour (2004), who find that adults aged 18–24 are more likely to receive welfare, while older age groups have a substantially lower probability of receipt.

The effect size on the variable NATIVE is very large across all models, indicating that native Canadians' probability of being a welfare participant is on the order of 10 percentage points larger than the mean sample respondent net of differences in province, year, policy, macroeconomy, human capital and all other demographics measured in SLID. In percentage terms, this difference is well in excess of a 100% greater risk of being on welfare. (HRSDC 2010) catalogs other social problems among native Canadians and risk factors that likely correlate with welfare participation.

Education attainment controls are included in Model C. Not surprisingly, the estimates suggest that attaining any diploma, certificate or training credential is associated with a strongly negative reduction in the probability of welfare participation relative to those who did not finish high school. Master degrees, professional degrees and doctorates have the largest impacts on welfare receipt although not much larger in absolute terms than a high school diploma. Even those who did not respond to the education items on the survey (EDUC_NONRESP) had 5 percentage points lower risk of being on welfare.

Model D adds information about family structure that yields large effects on the probability of welfare participation. Regressing welfare receipt solely on family type indicators (not reported in tables included here) produces an R-Squared of 3%. Including family type information raises R-Squared substantially from 6.5 in Model C to 8.9% in Model D. It appears that marital status is more important than fertility as a determinant of welfare receipt. Comparing effect sizes for coupled versus uncoupled respondents (holding number of children constant) reveals that welfare participation risks are 19, 21 and 24 percentage points higher for uncoupled individuals, with one, two and three or more kids, respectively (true in both Models D and E in Table 4). Among those without kids, being married decreases the risk of welfare receipt by 7 percentage points. On the other hand, having a child out of wedlock increases one's probability of welfare receipt by more than 13 percentage points.

Model E adds two controls for unemployment insurance receipts and workers compensation benefits. Estimates in the final columns of Table 4 suggest that both UI_RECEIPT and WKC_RECEIPT are negatively associated with welfare receipt, implying that these different social programmes function as imperfect substitutes, but substitutes nonetheless. Those who receive unemployment or workers compensation are 3 percentage points less likely to receive welfare. Welfare administrators in some provinces that adopted policies of deterrence explicitly advised new welfare applicants to seek unemployment insurance instead. And individuals with alternative sources of benefits would, all else equal, have less demand and reduced eligibility for welfare.

Effect sizes and statistical significance of estimated coefficients for NEWREFORM do not change very much at all between Models A through E. It is noteworthy that macroeconomic fluctuations, labour market policy and the standard reform tools of benefits levels and eligibility hardly reduce the marginal effect of new reform strategies on expected rates of welfare participation. In our most comprehensive model, the adoption of new reform strategies reduces the probability of welfare receipt by at least 1.1 percentage points (12% relative to the unconditional mean of 9.2%). Similarly, the coefficients for logBENEFITS appear stable even after including more individual-level controls. Somewhat surprisingly logMINWAGE and logUNEMP_INS, which help proxy for viable alternatives to welfare, have very little influence on the likelihood of an individual receiving welfare.

Regarding the question of replicating with individual-level microdata what Kneebone and White (2009) and Berg and Gabel (2015) reported using data aggregated at the province-year level, the microdata provide confirmatory replication of these previous studies of the effects of new reform strategies on welfare participation. Although the effect sizes are somewhat smaller after adding individual-level controls, the qualitative findings in this microdata study using for NEWREFORM, logBENEFITS and UNEMPLOYMENT appear broadly consistent with effects estimated using data aggregated by province (Kneebone and White 2009). As one might expect, the disaggregated microdata add new empirical detail showing the importance of human capital, family type and nativity status on the risk of welfare participation. Including this individual-level information moderates the large effects of the unemployment rate reported in previous studies. In addition to Kneebone and White (2009) and Berg and Gabel (2015), the study of Finnie, Irvine and Sceviour (2004) uses administrative data over the period 1992-2000 and finds very large effects of provincial unemployment rates on the probability of welfare receipt. While our unemployment rate effects are considerably smaller, Table 4 confirms Finnie, Irvine and Sceviour's (2004) finding that singleparent status is among the greatest risk factors increasing the probability of welfare participation (by 14–22 percentage points in the present study).

In addition, Table 4 shows a large mover effect in the models with the full set of controls: individuals who change provinces in a given year have a higher probability of being in receipt of welfare, increasing on the same order of magnitude as the decrease associated with new reforms being in place. The literature on the relationship between welfare and migration is mixed. Levine and Zimmerman (1995) find that differences in state welfare benefits had no impact on migration decisions. By contrast, Kaestner, Kaushal and Van Ryzin (2003) found that the imposition of time limits in the U.S. reduced

the probability of low-educated single parents migrating to another state while increasing withinstate migration for employment-related reasons. Time limits would likely reduce the gain from migrating to another state, truncating the gains in the future stream of expected benefits. Their findings suggest that welfare recipients generally respond to financial incentives and would relocate to states with higher benefits, ceteris paribus. Finnie (2004) provides evidence using Canadian data showing that the receipt of welfare is positively associated with interprovincial mobility among men (in most age groups) and middle-aged women. The relatively large positive association of mobility with welfare receipt in this article's microdata model contrasts with the previous study (Berg and Gabel 2015) which did not find evidence that provincially aggregated migration rates noticeably influenced welfare participation rates.

There are well-known logical problems (e.g. the possibility of negative or greater than 100% estimated probabilities) and econometric problems (e.g. heteroscedasticity) with the linear probability model, even though Amemiya (1981) and many others showed the similarity of marginal effects computed from LPM, logit and probit estimates. Logit versions of all regressions reported in this article are available upon request, highlights from presented in Supplemental data which are Appendix L. In general, qualitative findings are consistent with LPM results. If anything, we observe greater statistical significance and effect sizes (when converting to marginal effects, which depend on the mean value of all right-hand-side variables) for NEWREFORM in the logit specification. One substantive change is that, in the logit specification, UNEMPLOYMENT loses significance and occasionally switches sign. All lagged versions of UNEMPLOYMENT, however, have the expected signs. Another potentially important difference in LPM versus logit estimates is the unstable sign of provincial unemployment insurance benefit levels (logUNEMP_INS) across different models using the logit specification.

As a last robustness check, Supplemental data Appendix R presents additional estimates across a number of different specifications. The first alternative error specification, listed in column 1, uses STATA's 'robust' option to allow for heteroscedastic disturbances, which shows that the primary policy effect on NEWREFORM retains its strong statistical significance. The second column adopts Arellano's (1987) clustering technique which allows for autocorrelation in error terms, which shrinks the *t*-statistic on NEWREFORM by half which leaves it at a highly statistically significant 2.4. Other estimates of interest, such as those for the demographic, education and family type regressors, also retain patterns of statistical significance reported in Table 4 under these more cautious error-term specifications.

Column 3 in Supplemental data Appendix R shows that estimates resulting from estimating Model E using weighted cross-sectional data only increase the magnitude of the effect size of NEWREFORM from -0.011 to -0.015 (a 36% increase). The signs and effect sizes of the other coefficients are roughly comparable to earlier estimates. In column 4 of Supplemental data Appendix R, the province-fixed effects Model E was estimated using a subsample that included only those respondents who were observed just once. These respondents quickly attritted from the SLID. The corresponding effect size of NEWREFORM (-0.005) was much smaller than in any other model and is not statistically significant. Data with only one observation come largely from the SCF between the years 1993 and 1997. Finally, we augment the province-fixed effects model by including individual fixed effects using a subset of individuals observed more than once, treating the cross-sectional data as an unbalanced panel (presented in column 5). On average there were 4.5 observations per group (individual). This model is, no doubt, over-parameterized with more than 140,000 fixed effects in a sample of size of 610,895. All time-invariant individual-level demographic variables are dropped from this model specification because of the inclusion of individual fixed effects. We find that the effect size of NEWREFORM decreases slightly in absolute terms, from - 0.011 to - 0.009, but retains its strong statistical significance.²² Lastly, Column 6 estimates Model E only among the non-disabled population. The effect size of NEWREFORM falls by about 18% as compared with the estimate for the full sample, suggesting that new reform strategies had a slightly larger impact on those classified as disabled.

V. Subpopulation analysis of welfare participation

This section describes how particular subpopulations of Canadians (as represented, albeit imperfectly, in the SLID) were affected by new reform strategies. We estimate Model E separately on 46 different subpopulations in the presence of all other non-constant controls in that model (equivalent to a fully interacted model in which all coefficients depend on subpopulation membership). Table 5 reports only coefficients on NEWREFORM in a subpopulation-specific estimation of Model E across 46 subsamples.

According to Table 5, the effect of NEWREFORM on young adults aged 18–22 is more than twice that of the population as a whole (-0.025 versus -0.011). The subpopulation aged 23–30 is 50% more affected by the presence of new reform strategies than the mean person in the sample (-0.016 versus -0.011). Those nearing retirement age are also significantly more affected by new reform strategies. The positive mover effect in the full-sample model is larger when estimated only among movers, but is estimated very imprecisely and fails by a considerable margin to reach statistical significance.²³

Based on Table 5, it appears that new reform strategies reduced welfare participation relatively more among those with disabilities, minorities, natives and immigrants. New reform strategies were disproportionately effective in reducing welfare among those with relatively low levels of education, too. For example, in the presence of new reform strategies, respondents whose highest educational credential is a high school degree are 2.2 percentage points less likely to be in receipt of welfare – almost double the effect size as for the population in general. Those with a college degree or better appear to be relatively unaffected by new reform strategies. There is a puzzling positive

²²For comparison, the effect size of NEWREFORM is – 0.015 in the subsample of respondents who were observed more than once (without the inclusion of individual fixed effects).

²³This effect can nevertheless be interpreted in light of anecdotes that welfare administrators in Alberta offered welfare applicants a lump-sum payment to travel to neighboring provinces (possibly applying for welfare in the destination province) to prevent adding new welfare participants in Alberta (Smyth 1993; Yaffe 1994).

Table 5. The effect of new reform strategies in 46 subpopulations

	Estimated coefficients for NEWREFORM and absolute value t-statistics, for Model E:			Estimated coefficients for NEWREFORM and absolute value t-statistics, for Model E:					
Estimated among subsample:	LPM	t	LOGIT	z	Estimated among subsample:	LPM	t	LOGIT	z
All population	-0.011	5.5	-0.168	5.8	Family type				
					SINGLE	-0.031	6.3	-0.287	5.92
Demographic					ONE_KID_SINGLE	-0.062	3.1	-0.341	2.7
18–22	-0.025	3.6	-0.259	3.3	TWO_KIDS_SINGLE	0.013	0.5	0.070	0.4
23–30	-0.016	3.0	-0.189	2.8	THREEPLUS_KIDS_SINGLE	-0.122	2.8	-0.776	3.1
31–40	-0.004	1.1	-0.049	0.8	COUPLED	-0.009	3.7	-0.214	3.9
41–50	-0.009	2.2	-0.124	2.0	NO_KIDS_COUPLED	0.002	0.5	-0.074	0.71
51–60	-0.006	1.2	-0.165	2.3	ONE_KID_COUPLED	-0.020	3.7	-0.392	3.6
61–64	-0.019	2.1	-0.209	1.8	TWO_KIDS_COUPLED	-0.015	3.3	-0.286	2.6
MALE	-0.010	3.6	-0.164	3.8	THREEPLUS_KIDS_COUPLED	-0.002	0.2	-0.044	0.4
FEMALE	-0.013	4.2	-0.178	4.6	PARENT	-0.019	5.4	-0.248	4.8
MOVER	0.021	1.0	0.253	0.7	SINGLE_PARENT	-0.051	3.5	-0.290	3.2
NON-URBAN	-0.025	4.9	-0.439	5.3	MOTHER	-0.020	4.0	-0.243	3.7
DISABILITY	-0.025	3.0	-0.188	3.0	SINGLE_MOTHER	-0.055	3.2	-0.280	2.8
IN_SCHOOL	-0.025	4.0	-0.354	3.0	MINORITY MOTHER	0.001	0.0	-0.111	0.4
MINORITY	-0.014	1.3	-0.215	1.5	FATHER	-0.017	3.6	-0.272	3.18
NATIVE	-0.027	1.4	-0.045	0.3	SINGLE_FATHER	-0.041	1.5	-0.346	1.5
NON-ENGLISH	-0.001	0.3	-0.093	1.5	MINORITY FATHER	-0.013	0.7	-0.030	0.1
IMMIGRANT	-0.021	3.4	-0.324	3.6	FAMILY_NONRESP	0.002	0.4	0.025	0.36
Education					Labour				
EDUC_HSDROP	-0.027	3.3	-0.253	3.8	COMMISSION	-0.020	2.8	-0.414	2.5
EDUC_HS	-0.022	3.7	-0.289	3.1	MANAGER	-0.006	1.6	-0.267	1.3
EDUC_SOME COLL	-0.019	3.0	-0.214	2.4	EMPLOYED	-0.015	6.4	-0.292	5.2
EDUC_CERT	-0.017	4.5	-0.274	3.7					
EDUC_COLL	-0.003	0.7	-0.145	0.7					
EDUC_MASTER	0.023	2.8	1.073	2.1					
EDUC_PROF	-0.004	0.2	1.200	0.7					
EDUC_PHD	0.000	0.0	3.850	1.2					
EDUC_NONRESP	-0.013	3.0	-0.169	3.3					

*Subpopulations are overlapping but reported separately in an attempt to describe, using standard demographic measures, the subpopulations that were most and least affected by welfare reform in Canada. Table 5 presents only the coefficients on NEWREFORM from Model E with province- and year-fixed effects, estimated 46 times using different subsamples. Coefficients and the empirical distribution of the error term are theoretically and empirically distinct for each subpopulation and represent different models. Nevertheless, all models use nearly identical lists of variables, dropping only those regressors that have no variation within a particular subpopulation (i.e. FEMALE is dropped from the regression using the subsample of MOTHERS). The right-hand-side variable used to identify the subsample was in each case dropped as well. Logit estimates reported here are raw logit coefficients rather than marginal effects.

coefficient among the subsample of master's degree holders for which we find no easy explanation.

Subpopulation definitions based on family type reveal considerably larger effects of new reforms on individuals in those family types than in the general population. Parents' expected decline in welfare participation was -0.019, which is more than 50% larger -0.011 in the population as a whole. Single parents' expected decline in welfare participation was -0.051, which is four to five times larger than for the entire population. Unmarried parents appear to have adjusted in response to new welfare reforms to a much greater extent than the average person in the sample. There is some inconsistency that we cannot explain among estimated policy effects: for example, the effect of new welfare reforms on risk of welfare participation is -0.062 among single parents with one child, -0.122 among single parents with three or more children, but statistically insignificant (and positive) for single parents with two children.

Among coupled parents, those with one child were more affected by new reforms than couples with two children. Couples with two children were more affected than couples with three children. This may be because larger families with more children faced higher costs of job search or higher direct and indirect costs of moving to a new location with jobs. For example, greater time allocations to childcare leave less time for job search; more children imply greater housing costs and proportionately greater costs of finding new housing; greater frictional costs of finding new schools and day care for children could link number of children and attachment to welfare participation; and greater reliance on friends and relatives for childcare consequently increases the difficulty of moving.²⁴ This raises a puzzle, however, because all these factors

²⁴Bitler, Gelbach, and Hoynes (2006) examine the challenges that families with children face attempting to comply with the requirements of stringent new welfare reforms. They find, for instance, that children are more likely to live with married parents and more likely to live with no parents (i.e. grandparents, and rarely, foster care) in states that adopted welfare waivers which were a precursor to PRWORA.

would tend to decrease the policy effect size for *single* parents with more children as well as coupled parents. The data seem to indicate a curiously sharp divide in terms of the degree to which single versus coupled households adjust in response to new welfare reforms. Interestingly, there does not seem to be a big difference in how new reform strategies affected mothers versus fathers, although both subsamples produced moderately larger effect sizes relative to the overall mean.

The last set of subsamples is defined based on job type items in SLID. We find that new reform strategies had a moderately greater impact on those who were employed and on those who held commission-paying jobs. 'Commission-paying' refers to jobs that receive tips or commissions (e.g. waiting tables or working retail sales with commissions). In contrast, managers are likely to be relatively insulated from layoffs and experience low and idiosyncratic spells of unemployment, resulting in effects on welfare participation that were small and not statistically significant.

VI. Discussion and interpretation

This article undertakes to quantify the extent to which new reform policies detailed in Table 1 contributed to observed declines in welfare participation, in the presence of controls for standard welfare reform tools, labour market policy tools (i.e. unemployment and minimum wage), macroeconomic fluctuations (i.e. province-specific GDP growth, unemployment rates and lags of these variables) and controls for individual-level demographic differences. Thus, we aim to produce estimates suggestive of new reform strategies' relative effects on welfare participation, whether observed declines in welfare policy were associated more with policy or 'the economy', and which subpopulations were most affected by these new welfare reforms.

The empirical models suggest that new reform strategies significantly reduced the probability of welfare participation by a minimum of 13% overall and by much larger percentages in subpopulations described in the previous section. The finding that the mean person in the sample faces a reduced risk of welfare participation of 1.1–1.3 percentage points when new reform strategies are present replicates the effects reported in previous studies using data aggregated to province-year observations (without individual demographic controls used in this study). In contrast to the relatively precise estimation of the effect of new reform strategies on welfare participation, the effects of standard reform tools (i.e. reductions in benefits levels and stringent eligibility requirements) generally fail to pass the threshold of statistical significance and explain relatively small proportions of variance in welfare participation.

Based on Table 5, the participation rates of the disabled, immigrants, aboriginals and single parents, appear to have responded to the presence of new reform strategies significantly more than the average Canadian in our sample. The expected rate of welfare participation for these groups fell by two to four times the mean rate of decline associated with new reform policies. Previous research on welfare participation has very rarely included the disaggregated information recording policy heterogeneity in the coding scheme used in this study. Information about these newly coded policy changes will hopefully lead to further study of the relative importance of these policies and descriptive work documenting how they differentially affect subpopulations, including rates of transition into and out of welfare participation.

Acknowledgements

The authors would like to thank Rodney Andrews, Chetan Dave, Chunling Fu, Jim Murdoch and Geoff Zachernuk, and the very helpful support at the University of British Columbia and Research Data Centres (RDC).

Disclosure statement

No potential conflict of interest was reported by the authors.

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