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Should I Stay or Should I Go? The Impact of Taxation on Canadian Inter-Provincial Migration

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Should I Stay or Should I Go? The Impact of Taxation on Canadian Inter-Provincial Migration*

Abstract

This paper estimates the causal effect of income taxation on inter-provincial migration in Canada. We exploit a major tax decentralization reform between 1998-2001 that led to some provinces lowering their marginal and average tax rates more than others, particularly for top earners. Using a difference-in-differences design, we estimate a population stock-elasticity with respect to the net-of-average-tax rate of about 2.5-3 for young, unmarried high-income individuals. The estimates for older and married individuals are smaller and mostly statistically insignificant. We find that the population stock elasticity estimates are driven by a reduction the likelihood that young, unmarried and high-income individuals emigrate from their province of residence (i.e. out-migration) rather than a change to in-migration. This suggests that individuals react more strongly to tax changes in their home province rather than tax changes in other provinces.

JEL classification

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migration, taxation, within-country mobility

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1 Introduction

The migration response to income taxation is central to a government’s ability to generate revenue; it is much harder to tax constituents who are not there. For this reason, among others, there has been a growing literature seeking to understand how taxation influences the location decisions of tax filers. Existing estimates from the literature vary substantially (Kleven et al., 2020). The costs and benefits of migration are heavily influenced by details regarding the institutional setting being studied (e.g. country size, social systems, professional regulation) and the characteristics (e.g. nationality, demographics, occupation) of the population being studied. While it is well known that these dimensions have a large influence on how sensitive migration is to taxation, there has been little emphasis on whether tax incentives have a heterogeneous impact on the direction of migration. A tax reform in a given region may impact the migration choices of those currently residing in that region differently to those who live elsewhere. Put differently, do tax incentives differ in their propensity to attract new residents relative to their effect at discouraging existing residents from leaving?

In this paper, we study the impact of labor income taxes on the interprovincial migration of individuals in Canada. Canada offers a unique setting to study inter-regional migration. Like the United States, it is geographically large so moving between provinces typically requires moving to an entirely new labor market. However, unlike the United States, many social programs in Canada are either administered by the federal government (e.g. unemployment insurance) or have a floor that is governed by federal-provincial agreements (e.g. health care). In this respect, Canada’s social safety net have a greater similarity to those in many European countries. This unique mix of high migration frictions (i.e. geography) and low migration frictions (i.e. social safety net) makes Canada an interesting setting to study the impact of labor income taxes on mobility.

The setting for our study is a major tax decentralization reform that took place between 1998-2001. This reform granted all provinces in Canada greater flexibility to set their own marginal tax rates and tax brackets. Previously, provinces in Canada were only able to levy an income tax liability that was a fraction of a filer’s federal tax liability. Following this decentralization reform, provinces that had more access to natural resource revenues lowered their effective marginal tax rates more than other provinces, particularly for top earners. For those living in the more affected provinces with taxable incomes over \$100,000 CAD (around the top 1% of the taxable income distribution at the time), the average tax rate fell by an average of 2.8 percentage points relative to those in other provinces.¹ Using administrative data on a panel of tax filers between 1994-2005 and a difference-in-differences methodology,

¹The reforms led to small, negligible declines in average tax rates for lower earners in all provinces.

we estimate the causal effect of the net-of-ATR on the population stock. We also decompose the impact of tax changes on the population stock into changes in the out-migration from and the in-migration to the treated provinces.

Our study focuses on those who are the most mobile and experienced the largest tax cut as a result of the 2000-2001 reforms; people who are young (Bernard et al., 2008; Martínez, 2022), unmarried (Bernard et al., 2008; Young et al., 2016) and earn at least \$100,000 CAD annually. Using a difference-in-differences approach that compares the population of those living in resource-rich treated provinces to the other non-resource provinces, we estimate that the population of this group increased by 0.207 log-points in the years after the tax cuts were enacted. Our analysis accounts for responses to the reform during a transition period after the tax changes were announced but before they were enacted. Consistent with the anticipation of the reforms, we also find that the population of young, unmarried and high income earners increased in the treated provinces relative to the control provinces by approximately 0.131 log-points during the transition period.

We estimate the population stock elasticity with respect to the next-average-tax rate using a two-stage least squares framework along the lines of Kleven and Schultz (2014) and Martínez (2022). In particular, we use the tax reform as an instrument for the natural logarithm of the net-of-ATR. Our estimate of the population-stock elasticity with respect to the net-of-ATR ranges between 2.638% and 2.94% for our baseline sample of young, unmarried and high-income individuals. This elasticity is large when compared to studies that focus on all working-age people (see Kleven et al. (2020) for a review) but similar to studies focus on young adults (Liebig et al., 2007) and those in the early years of their career (Martínez, 2022). Our estimates suggest that the impacts of labor income taxation on migration choices are the largest in magnitude for those who have fewer ties to their initial region of residence and whose lifetime financial gain from moving is the largest. For example, we find that among high income tax filers, those who are younger respond much more strongly to the reform than older individuals. This

To evaluate whether the population change we estimate was driven by an increase in in-migration or reduction in emigration, we use a difference-in-differences approach that compares the location choices of the highest-income tax filers in resource-rich provinces to those with slightly lower incomes who also reside in treated provinces but who experience a smaller tax cut. This gives insight into whether tax incentives impact these two margins of migration differently. We find that out-migration fell by 2.3 percentage points and started when the tax reform was announced. We find that there was no statistically significant impact on in-migration into these regions. The validity of these estimates relies on the common-trends assumption: the assumption that the location choices of the highest-income

(treated) and slightly lower income (control) individuals would have followed the same path in the absence of the 2000-2001 tax reform. During the period we study, the prices of oil and natural gas rose considerably, which could have impacted migration choices through their impacts on broader macroeconomic forces differentially for tax filers. We perform several sensitivity checks (e.g. excluding workers in the natural resources sector) and placebo tests and find our main estimates to be robust. Our results suggest that taxation may be a more effective instrument at preventing out-migration than it is at attracting in-migration. One explanation for this is that migration is costly, and it is easier to incentive one not to move than it is to get them to move. Alternatively, local policies and reforms may be more salient than those that happen elsewhere.

Our paper makes several contributions to the literature on migration and taxation. First, our paper presents new evidence on how taxation differentially affects the inflow and outflow margins of migration in the same setting. Most of the previous research estimates how taxes affect in-migration and emigration separately (Feldstein & Wrobel, 1998; Bakija & Slemrod, 2004; Schmidheiny, 2006; Liebig et al., 2007; Young & Varner, 2011; Kleven et al., 2014; Young et al., 2016; Moretti & Wilson, 2017; Schmidheiny & Slotwinski, 2018; Agrawal & Foremny, 2019; Martínez, 2022; Cassidy et al., 2024; Advani et al., 2025; Agrawal et al., 2025; Bassetto & Ippedico, 2026). Although we are not the first to study both in-migration and out-migration simultaneously, to our knowledge we are the first to do so in the context of a broad tax decentralization reform.² Varner et al. (2018) and Rauh and Shyu (2024) both explore how out- and in-migration respond to an extremely large tax increase that applied only to millionaires in California.³ We focus on tax reforms that, while large, are more similar in magnitude to those studied in prior work. Furthermore, the tax reforms we study were implemented in several Canadian provinces at around the same time and affected a broader group of tax filers.

Our results also shed new light on how demographic characteristics influence the responsiveness of location choices to taxes. While many studies control for age, our paper is among the few who estimate migration responses separately for the young and old (Liebig et al., 2007; Agrawal & Foremny, 2019). Compared to previous work, we are the first to use panel data to follow tax filers over time and estimate the migration response to taxes separately for those in the early, mid and late career stages depending on their marital status.⁴ Our finding

²Conway and Rork (2006) study how estate, inheritance, and gift taxes influence the location choices of elderly individuals along both dimensions. They conclude that these types of taxes do not impact migration.

³Varner et al. (2018) also studies net-migration but their estimates are not statistically significant.

⁴Previous research documents that individuals are more likely to move between jobs earlier in their career (Topel & Ward, 1992; Molloy et al., 2011). Hunt and Mueller (2004) and Kaplan and Schulhofer-Wohl (2017) find that mobility declines sharply when people achieve higher tenure, get married and have children. Bernard et al. (2008) and Young et al. (2016) show that unmarried individuals are more mobile

that the migration choices of young, unmarried, high income tax-filers are very responsive to tax incentives is in line with what other studies have found. However, the fact that we estimate small (and mostly statistically insignificant) migration responses to taxes for other groups is unique. One possible explanation is that other studies pool data from groups whose underlying mobility is different. An alternative explanation is that the institutional setting in Canada (where the distance between cities and provinces is large but whose provincial social programs are similar) explains our results. In particular, since the social programs, education quality and healthcare is similar across provinces, the physical (geographic) frictions associated with moving might lead to responses being concentrated among the young and unmarried as well as along the out-migration (emigration) margin.

Finally, we are the first to estimate the causal impact of taxation on inter-provincial migration in Canada. Previous research focused on the patterns of and determinants of inter-provincial migration in Canada. Chen and Fougère (2010) provides a summary of this literature up until the late 2000s. Like other countries, inter-provincial migration rates in Canada vary by the age and income of the group being considered. Slightly more specific to Canada is the potential for differences in occupational licensing across provinces to affect migration decisions (Gunderson, 1994; Sobkow & Directorate, 2001). Finnie (1999, 2004) find that inter-provincial migration responses are also associated with moves from (small) rural to (large) urban settings. Most related to our study is Bernard et al. (2008). The document the patterns in inter-provincial migration in Canada between 1992-2004. Their results suggest that mobility between provinces decreased during this period. Relative to this paper, we report estimates of the causal effect of labor income taxes on migration decisions.

The remainder of this paper is organized as follows. Section 2 summarizes the geographic and institutional details about Canada and its income tax system that are relevant for our study. In Section 3, we describe the administrative tax return data that we use to estimate causal effects. Our empirical strategies and empirical results are presented in Section 4. Section 5 offers concluding remarks.

2 Institutional Setting

Individuals in Canada are responsible for paying an income tax levied by the federal government and a provincial income tax to whichever province they reside in as of the 31st of December. Provinces set their income tax rates according to the Tax Collection Agreement (TCA), which was established in 1962. Under this agreement which outlined the “Tax-On-Tax” (TOT) system, the federal government was responsible for defining the tax base, tax

than their married counterparts.

brackets, and tax rates. Provinces were able to set their own liabilities but they had to be proportional to those set by the federal government.⁵ This limitation resulted in provinces replying on deductions and tax credits to alter the progressivity of their provincial tax systems.⁶ Given Canada's large and diverse geography, the fiscal realities differ significantly across provinces and these limited tools were not sufficient to allow provincial governments to tailor their tax systems to their own circumstances and preferences. Another important difference between the fiscal capacities of provinces in Canada is the extent to which they can rely on tax revenues and royalties from natural resources. This can be seen in Figure 1, which shows the average share of annual provincial tax revenue coming from natural resources between 1980 to 1999 for each province. The three western provinces have historically generated 20% or more of their tax revenue from natural resources while eastern Canada has been more reliant on the personal income tax base.

In 1997 negotiations between the federal government and the provinces about an overhaul to the Canadian income tax system that would grant provinces greater autonomy over taxation began. These negotiations led to a 1998 amendment to the TCA that outlined how provinces would eventually be able to levy taxes directly on taxable income. The federal government formally announced in its 1999 budget that the new system, dubbed "Tax-On-Income" or TONI, would come into effect in 2001. The transition period between the TCA amendment in 1998, the announcement in the 1999 Budget and the implementation in 2001 allowed provinces time to legislate their new tax systems. Under the TONI system, provinces would be able to set their own tax brackets and rates independent of those set by the federal government.⁷ The federal government retained the responsibility of administering and collecting the taxes, and in return the provinces agreed to adopt the same tax base as the federal government.

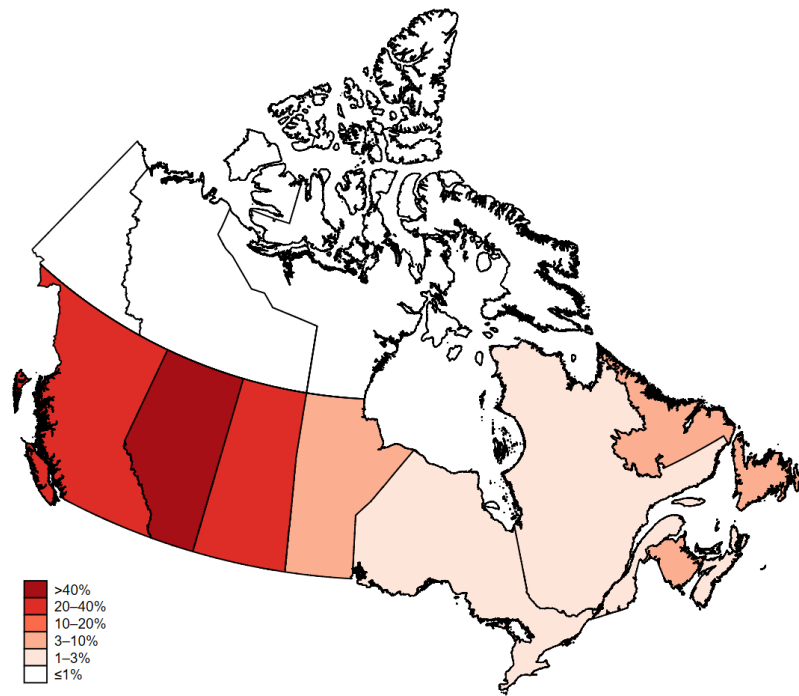
Most of the provinces passed legislation that announced their new tax schedules by the year 2000 with implementation dates of January 1, 2001. One province, British Columbia (BC), did not legislate their tax reform until 2001 due to an election which resulted in the governing party changing. While the tax reform within BC was legislated later than others, it was still anticipated. The political party which won the 2001 election campaigned on enacting large tax cuts, formally announced their intention to enact sweeping tax reforms

⁵This is true for all provinces with the exception of Quebec (QC), a predominantly French speaking province, which has been able to set their own tax schedules and rates since 1954.

⁶Provinces were unable to levy surtaxes or design tax credits under the initial TCA, however it was amended in 1977 to allow provinces more flexibility in the design of their tax system.

⁷Other changes enacted in 2001 included indexing federal tax brackets to inflation and lowering the capital gains inclusion rate from 75% to 50% in 2001. These changes affected tax filers in all provinces (outside of Quebec).

Figure 1: Average Share of Tax Revenue from Natural Resources, 1980-1999

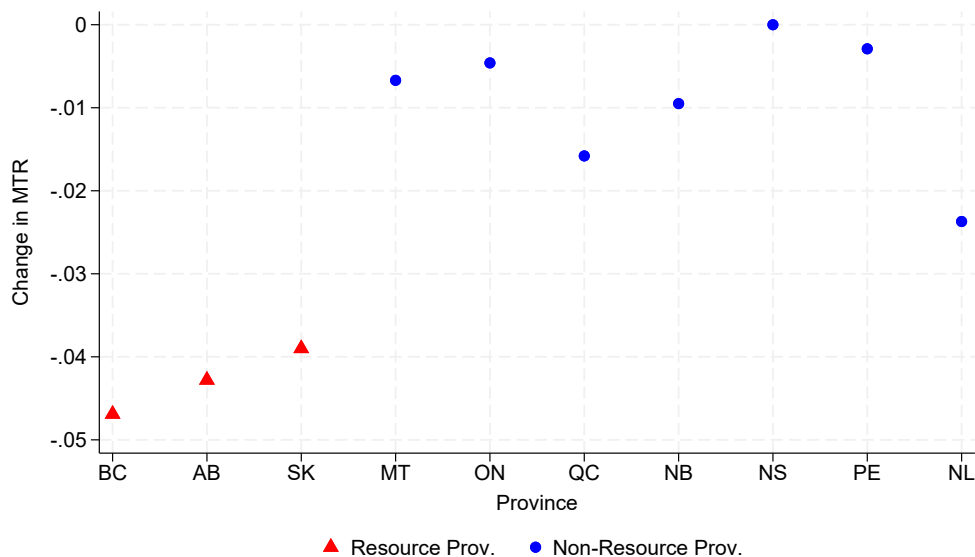


Notes: This figure presents the average share of tax revenue generate from natural resources between 1980-1999. Darker shades represent higher shares. Going from west (left) to east (right) the provinces are in the following order: British Columbia (BC), Alberta (AB), Saskatchewan, (SK), Manitoba (MB), Ontario (ON), Quebec (QC), New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PE), and Newfoundland and Labrador (NL). The three regions in the top, from left to right, are Nunavut, Regina, and Yukon. These are territories and omitted from the study.

after forming government in 2000 and passed legislation in 2001.⁸ Similarly, the province of Alberta first announced their intention to move to a flat-tax system with low marginal rates for high-income earners in 1998 before formally legislating it in their 1999 Budget. While this legislation didn't enact the tax changes until 2001, they were also announced more than two years in advance.

Figure 2 presents the change to the top effective marginal tax rate (EMTR) for each province in Canada between 1999 and 2001. Provinces are ordered from west to east and the three provinces with significant revenues from natural resources (British Columbia (BC), Alberta (AB) and Saskatchewan (SK)) are represented by the red triangles. While the non-resource provinces lowered their top EMTR by around 1-2 percentage points, the three resource provinces lowered their top EMTR by 4-5 percentage points.⁹

Figure 2: Changes in Top Marginal Tax Rate (MTR) between 1999 and 2001 by Province



Notes: This figure reports the change to the top effective marginal tax rate by province between 1999 and 2001. Provinces with significant natural resource revenues are represented by the red triangles, all others are blue circles. Province abbreviations are as follows: British Columbia (BC), Alberta (AB), Saskatchewan, (SK), Manitoba (MB), Ontario (ON), Quebec (QC), New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PE), and Newfoundland and Labrador (NL).

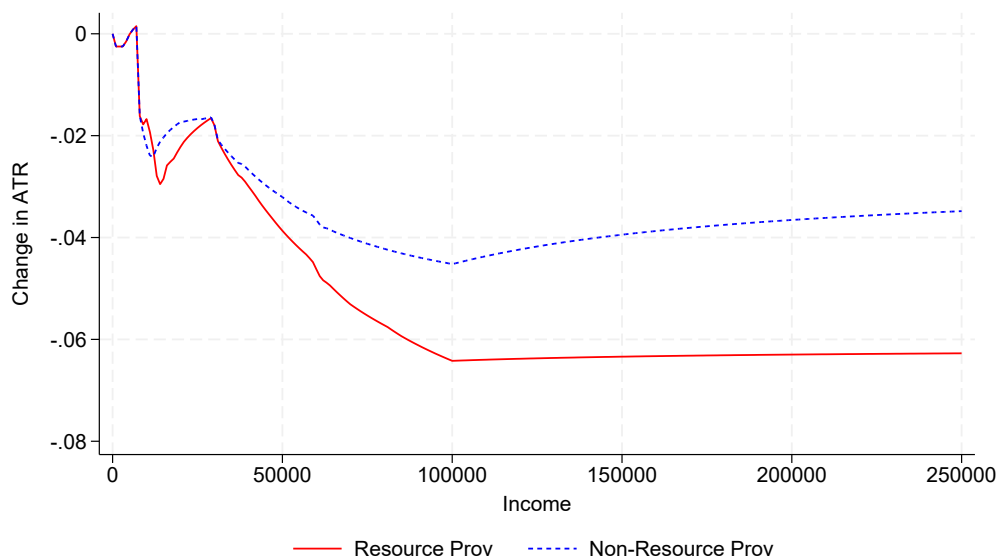
Figure 3 plots the average change to the average tax rate (ATR) between 1999 and 2001 as a function of taxable income separately for the resource provinces and the non-resource provinces. This figure shows that the TONI decentralization reform led all provinces to lower

⁸The party was also predicted to win the election with a high likelihood (Abbott, 2020), meaning that the 2001 tax cuts in British Columbia were also likely anticipated in 2000 or earlier.

⁹see Figure A.1 in the Appendix for the full changes to each provinces tax schedule.

their ATRs at all income levels. However, the reduction in ATRs was much larger in the resource provinces, especially for those with high incomes. Within the resource provinces, the average-tax-rate fell by approximately 6.4 percentage points for those earning \$100,000. This income level corresponded to the 97th percentile of the taxable income distribution. For filers in the resource provinces whose taxable income was \$50,000 (approximately the 80th percentile of the taxable income distribution), the ATR fell by only 3.9 percentage points, on average. To contrast, ATRs fell by 4.5 points at the \$100,000 income level and by 3.2 percentage points at the \$50,000 income level in the non-resource provinces between 1999 and 2001. Thus, the introduction of the TONI system that decentralized the income tax system led to two distinct sources of variation. The first was the differential change in ATRs across provinces, particularly for high-income earners. The second source of variation was the heterogeneous change in ATRs within each province between those with high- and low-incomes.

Figure 3: Changes in ATR by Income: 1999-2001



Notes: This figure presents the change to the average tax rate as a function of taxable income between 1999 and 2001. Resource provinces are represented by the dashed red line and non-resource provinces are represented by the solid blue line.

3 Data

To track the mobility of tax filers over time, we utilize the Longitudinal Administrative Databank (LAD). The LAD is a 20% representative panel constructed from Canadian indi-

vidual tax returns and spans 1982-2021. Every year, one in five new tax filers are randomly sampled into the LAD. Once an individual is in the LAD they are followed until emigration from Canada or death. Our analysis focuses on the 12-year window around the 1998-2001 TONI reform or 1994-2005. Our primary estimation sample is tax filers who appear in the LAD in all years between 1990-2010. In selecting this group, we trade-off attrition bias against having a group of tax filers who are established in Canada, file an annual tax return and who may make location decisions in all years we study.¹⁰ This restriction leaves us with over 2.5 million observations per year.

The LAD contains information a tax filer’s demographic characteristics, total annual income, taxable income, and if relevant, their spouse’s total and taxable incomes (if their spouse files a tax return). The personal characteristics that we utilize are age, sex, marital status (unmarried, married/common-law), immigration status (born in Canada or not), and whether the individual has minor children.¹¹ We use the variable indicating the province in which an individual files their return to determine the province in which they reside. To track movement between provinces, we define two variables to capture out-migration and in-migration separately. For out-migration we define an indicator variable equal to one if an individual files taxes in a different province in year $t + 1$ relative to year t . Our in-migration variable is an indicator for whether the individual is filing their taxes in a new province in the present year; that is, their province in year t is different from year $t - 1$.¹² This distinction allows us to study whether changes to the population stock attributable to taxes is driven by changes to the likelihood that existing residents remain in the province or by changes to the likelihood that individuals migrate to that province. We supplement the data from the LAD with provincial-level macroeconomic control variables, including the unemployment rate, GDP per capita and program spending¹³ These control variables allow us to account for provincial-level macroeconomic shocks that may affect migration choices independent of taxes.

We calculate each tax filer’s tax liability, marginal tax rate and average tax rate using information on their province of residence, marital status and income using the Canadian Tax and Credit Simulator (Milligan, 2019). To ease the computational burden with such a

¹⁰For the estimation, we drop the years 1990-1993 and 2006-2010 to limit the possibility that our estimates are confounded by a large capital gains tax reform in Canada in 1994 and the Great Recession of 2007-2009.

¹¹The variable indicating a tax-filer has a child can be inaccurate at times, such as when a household is comprised of multiple generations. For this reason, we use a combinations of variables to define our indicator for whether the tax-filer has children. See Appendix A for a discussion on this.

¹²With this definition for in- and out-migration, individuals who migrate between resource provinces are also considered as movers. In Appendix table B.1 we present estimates under an alternative definition that only considers movement between resource and non-resource provinces. Our estimates are similar under this alternative definition.

¹³Program spending includes all government expenditure except for debt charges.

large sample of tax filers, we partition individuals into groups defined by \$1,000 income bins, the calendar/tax year, a binary marital status indicator and their province of residence ¹⁴ We estimate the causal effect of ATRs on migration choices separately for mutually exclusive groups defined by income, marital status and age. For married tax filer’s we use the arithmetic average of their ATR and their spouse’s ATR as the relevant tax rate affecting decisions. The decision to study married and unmarried tax filers separately is motivated by the fact that moving often requires finding new employment, housing and bearing a financial cost. While the cost of moving may be similar for married and unmarried individuals, securing gainful employment for both members of a couple may be more difficult than for an unmarried individual. Consequently, married tax filers may be less responsive to tax reforms than unmarried individuals.¹⁵

Figure 3 shows that the 1998-2001 TONI reforms only differentially affected the ATRs between the resource and non-resource provinces for incomes above approximately \$50,000. To account for the fact that the TONI reforms affected individuals differently, we partition the sample into three income-groups based on the tax filer’s total (broad) income in 1999.¹⁶ These groups are: low (\$0-\$49,999), medium (\$50,000-\$99,999) and high (\$100,000+).¹⁷ We define these groups for individuals and their spouse’s separately. The decision to define groups based on a tax filer’s income in a single year ensures that the composition of the groups do not change over time. As mentioned previously, most of our analysis focuses on the responses of those in the high income group since they experienced the largest tax cut as a result of the TONI reforms.

An individual’s age is an important determinant of their mobility and potential response to taxes (Schwartz, 1976; Millington, 2000). Younger individuals are more likely to switch jobs (Topel & Ward, 1992) and are less likely to be tied to assets such as a home which can make moving more burdensome. Figure 4 presents the average migration rate between 1994-1999 for all tax-filers in our sample by age. After age 18, the likelihood of moving provinces

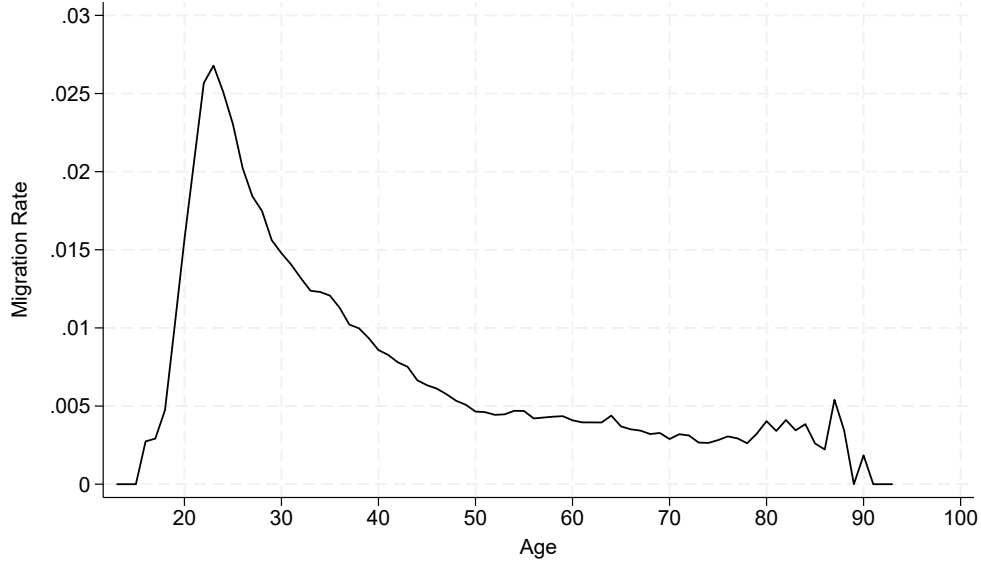
¹⁴The bottom income bin is \$0 and the top income bin is \$250,000 since the top federal and provincial tax brackets begin well below that level during the period we study. To assign individuals to an income bin, we round their total (broad) income to the nearest \$1,000.

¹⁵The decision to study married and unmarried households separately implies that each regression specification is based on an unbalanced sample even though the original sample from the LAD is a balanced panel. This is because individuals in our data set may switch from being unmarried to married over time (or vice versa). This could bias our results, especially for the group of younger tax filers. In Appendix Table D.1 we show attrition from the unmarried sample does not differ between the resource and non-resource provinces.

¹⁶In Appendix Table B.2 and Table B.3, we present results using income groups defined with alternative base years, showing that our baseline estimates are robust.

¹⁷As mentioned previously, \$50k corresponds to roughly the 80th percentile of the income distribution for 1999 so individuals in the medium group (as well as those at the top of the low group are still relatively well-off. In Appendix Table B.4 and Table B.5 we present results that demonstrate our findings are robust to altering these income bins.

Figure 4: Average Migration Rate by Age, 1994-1999



Notes: This figure presents the average migration rate between 1994 and 1999 by age. Migration can vary substantially year-over-year so we present the average to smooth out the distribution.

rises sharply and peaks around the mid-20s before rapidly declining and stabilizing between age 50-60. Given these pre-TONI reform differences in mobility by age, we also partition the sample into three age groups based on a tax filer's age in the year 2000 (the midpoint of our study period): age 28-35, age 36-59, age 60+.¹⁸ In ascending order these groups roughly correspond to early career (most mobile), mid-career (less mobile), and retirement age (least mobile). We will refer to these age groups, in ascending order, as young, middle age, and old.

Most of our analysis will focus on the group that experienced the largest tax cut and who we expect to be most mobile - those who are unmarried, earning \$100,000 or more, and aged 28-35 at the time of the reform. This is our unmarried, young, high-income sample, hereafter referred to as our baseline sample. In Appendix Tables B.2, we examine whether varying the size of the age and income bins affects our baseline estimates. Reassuringly, our results are relatively insensitive to these variations.

¹⁸In Appendix Tables B.6-B.8, we present results that demonstrate our findings are robust to altering these age bins

4 Empirical Analysis

Our analysis proceeds in two steps. First, we estimate the impact net-of-ATRs on the population stock using a difference-in-differences methodology that compares changes in the number of individuals residing in the resource provinces to the changes in the number of individuals residing in the non-resource provinces around the time of the 1998-2001 TONI reforms. This analysis leads to an estimate of the population-stock elasticity with respect to the net-of-ATR for our baseline sample (as well as for other groups). Second, we use a difference-in-differences methodology that compares the location decisions of the highest income tax filers to those of slightly lower income tax filers living in the same province. This design allows us to estimate the impact of taxation on the likelihood on out-migration and in-migration separately.

4.1 Changes to Population Levels

In this subsection, we estimate the impact of the 1998–2001 TONI reforms on the number of individuals residing in the treated provinces for our baseline sample of young, high-income and unmarried tax filers. We exploit the fact that provinces who have historically been able to rely on revenue from natural resources legislated larger tax cuts than non-resource provinces.

4.1.1 Empirical Strategy

To estimate the impact of the TONI reforms on population stocks, we aggregate the data by province, year, marital status, income group, and age group.¹⁹ As mentioned previously, our baseline sample comprises young, unmarried tax filers whose 1999 income was above \$100,000 CAD, though we also report estimates for other groups. We begin by estimating an event study specification to assess the validity of the parallel trends assumption for our setting: in the absence of the TONI reforms, the population of our sample in the resource provinces and non-resource provinces would have evolved similarly. In particular, we estimate the following regression.

$$\log(N_{pt}^g) = \alpha + \sum_{\substack{y=1994 \\ y \neq 1997}}^{2005} \beta_y (\mathbb{1}[t = y] \times Resource_p) + \delta' X_{pt} + \gamma_p + \zeta_t + u_{pt}^g, \quad (1)$$

where $\log(N_{pt}^g)$ is the natural logarithm of the count of the number of people from group g who reside in province p in year t . $Resource_p = \mathbb{1}[p \in \{SK, AB, BC\}]$ is a dummy variable

¹⁹Our analysis drops data from the three territories (Yukon Territory, Northwest Territory and Nunavut) due to their extremely small populations.

equal to 1 for the resource provinces is equal to zero otherwise. γ_p and ζ_t are the province and year fixed effects. The vector X_{pt} includes the provincial macroeconomic controls discussed in Section 3. The omitted (reference) year in our specification is 1997 since it is the first year before the announcement of the TONI reforms.

We then estimate the more parsimonious difference-in-differences model to estimate the causal effect of the 1998-2001 TONI reforms.

$$\begin{aligned} \log(N_{pt}^g) = & \alpha + \beta_1(\text{Resource}_p \times \text{Post}_{98-00}) + \beta_2(\text{Resource}_p \times \text{Post}_{01+}) \\ & + \delta' X_{pt} + \gamma_p + \zeta_t + e_{pt}^g \end{aligned} \quad (2)$$

Here $\text{Post}_{98-00} = \mathbb{1}[1998 \leq t < 2001]$ is a dummy variable equal to 1 during the transition years of 1998-200 during which the TONI reforms were announced but not yet implemented and equal to zero otherwise. $\text{Post}_{01+} = \mathbb{1}[t \geq 2001]$ is the indicator for the post-implementation period. All other variables have the same meaning as Equation (1). As discussed in Section 2, these tax reforms were well anticipated since the tax decentralization legislation by the federal government was announced in 1998 (and passed in 1999) and the provinces began announcing their intention to cut taxes as early as 1999. Including the Post_{98-00} and Post_{01+} dummies allow us to separately identify the migration response that occurred during the transition period from the response that occurred after the implementation of the tax reforms.²⁰

Following Kleven and Schultz (2014) and Martínez (2022), we estimate the population stock elasticity with respect to the net-of-ATR using two-stage least squares. The (endogenous) net-of-ATR is instrumented with the interaction terms from (2) above. Equations (3) and (4) represent the first stage and structural equations, respectively.

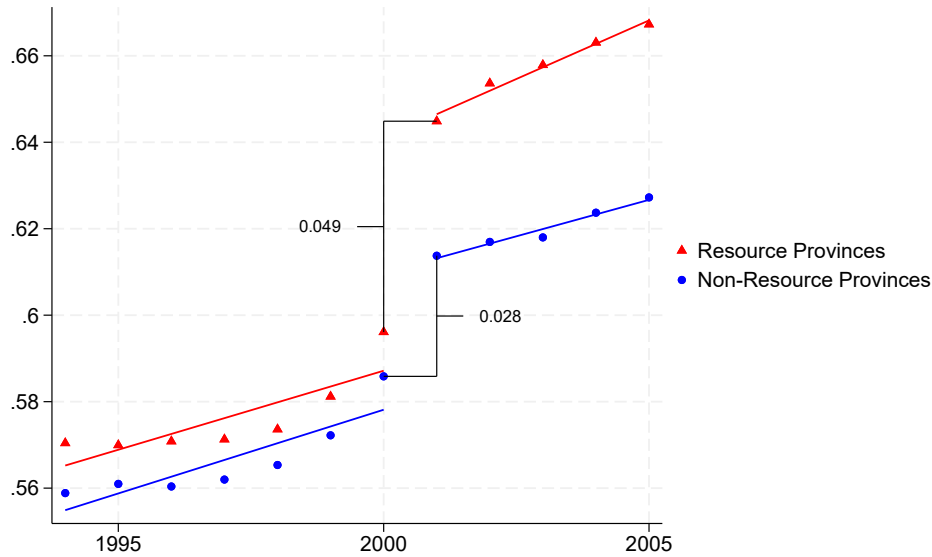
$$\begin{aligned} \log(1 - \tau_{pt}^g) = & \beta_0 + \beta_1(\text{Resource}_p \times \text{Post}_{98-00}) + \beta_2(\text{Resource}_p \times \text{Post}_{01+}) \\ & + \delta' X_{pt} + \gamma_p + \zeta_t + e_{pt}^g \end{aligned} \quad (3)$$

$$\log(N_{pt}^g) = \alpha_0 + \eta \log(1 - \hat{\tau}_{pt}^g) + \alpha_1' G_{pt} + \gamma_p + \zeta_t + u_{pt}^g \quad (4)$$

In equation (3), $1 - \tau_{pt}^g$ is the net-of-ATR for group g in province p in year t . The coefficient η is the population stock elasticity with respect to the net-of-ATR for group g . and the elasticity is captured by the coefficient η . We instrument the natural logarithm of the net-of-ATR with both the transition period and post-implementation dummy variables

²⁰Since provinces announced their tax reforms at different times, we present results from a staggered difference-in-differences framework along the lines of Cengiz et al. (2019) in Online Appendix Table B.9. Reassuringly, the estimates from those specifications are similar to the main estimates reported below.

Figure 5: Net-of-ATR Over Time: Resource vs. Non-Resource Provinces (\$127,000)



Notes: This figure presents the evolution of the average net-of-ATR for the resource provinces (red triangles) and non-resource provinces (blue circles). The net-of-ATR is calculated for a tax filer whose income is \$127,000 CAD (the average income of our young and unmarried sample during the 1994-2005 period).

described above. The exclusion restriction in our setting is that the announcement and implementation of the TONI reforms only affected location choices through its effect on the net-of-ATR. We present evidence that supports this assumption in Section 4.3 below.

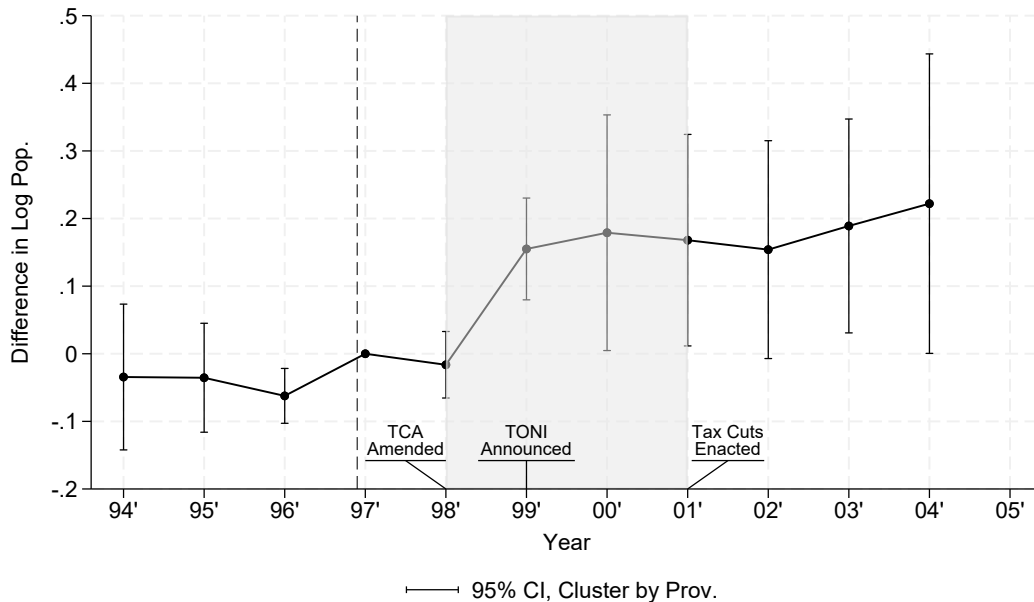
Figure 5 plots the evolution of the average net-of-ATR between 1994-2005, separately for the resource/treated provinces (red triangles) and non-resource/control provinces (blue circles). The net-of-ATRs are calculated for a hypothetical tax files whose income is constant at \$127,000 (the average for our group of young and unmarried tax filers) between 1994-2005. Figure 5 shows that net-of-ATRs evolved similarly between 1994-1999 before diverging sharply after 2000 when the TONI reforms were implemented by the various provinces. In particular, the net-of-ATR increased by an average of 4.9 percentage points between 2000 and 2001 in the treated resource provicnes and only increased by 2.8 percentage points in the control provinces.

4.1.2 Results

Figure 6 presents the event-study coefficients from Equation (1). There is little evidence of a trend in the coefficients prior to the announcement of the TONI reforms suggesting that the parallel trends assumption is plausible in our setting. Figure 6 show that the population in resource provinces began to grow more quickly than the population in the non-resource

provinces in 1999, the year after the TONI reforms were announced and the year the federal legislation was passed. This trend continues through 2000-2001 when the provinces enacted their tax reforms and stabilizes thereafter. Overall, the estimates in Figure 6 suggest that the number of young, unmarried tax filers in the resource provinces grew by nearly 20 percent in the treated provinces relative to the control provinces after the implementation of the TONI reforms.

Figure 6: Change in Log Population: Unmarried, Young, and High Income



Notes: This figure presents the reduced-form estimate of the relative difference in log-population for unmarried, young, high-income individuals living in the resource-provinces compared to the non-resource provinces. The estimate includes our full set of demographic controls outlined in the data section. Confidence intervals are calculated off of standard errors clustered by province.

Table 1 reports the first-stage (Panel A), reduced form (Panel B) and 2SLS estimates from Equation 3 and Equation 4. For each specification, we report the coefficient estimate and standard errors which are clustered at the provincial level.²¹ The specifications in columns 1 and 3 include only the post-implementation interaction term while columns 2 and 4 include both interaction terms from equation (2). Our estimates in Panel A suggest that the TONI reforms increased the net-of-ATR for our sample of young, unmarried and high income individuals living in the resource provinces by 3-4 percentage points compared to the non-resource provinces. The inclusion of the provincial-level macroeconomic controls

²¹Our main estimates are based on standard errors clustered at the province level. To check the robustness of our estimates to only having 10 clusters, Online Appendix Table C.2 and Table C.3 presents estimates that use alternative inference methods. The estimates remain statistically significant.

(columns 3 and 4) has little impact on our estimates.

Table 1: DiD and Elasticity Estimates

	(1)	(2)	(3)	(4)
<i>Panel A: Log Net-of-ATR</i>				
DiD_{98-00}		0.007 (0.008)		0.018*** (0.005)
DiD_{01+}	0.031*** (0.004)	0.033*** (0.001)	0.037*** (0.001)	0.045*** (0.003)
<i>Panel B: Log Population</i>				
DiD_{98-00}		0.117*** (0.0200)		0.131*** (0.0374)
DiD_{01+}	0.162** (0.064)	0.200** (0.065)	0.147** (0.059)	0.207*** (0.052)
<i>Panel C: 2SLS</i>				
$\eta_{98-00,01+}$		3.813** (1.303)		2.940*** (0.816)
η_{01+}	3.553** (1.291)		2.638** (1.061)	
KP F-Statistic	53.01	397.1	86.51	338.7
Macro Controls			✓	✓
Observations	120	120	120	120

Notes: This table reports the first-stage, reduced-form, and 2SLS estimates used to identify the population-stock elasticity with respect to the net-of-ATR. Panel A presents the first-stage difference-in-differences (DiD) estimates for changes in the net-of-ATR. Panel B presents the corresponding reduced-form DiD estimates for changes in log population. Panel C reports the implied 2SLS elasticity estimates. The coefficients labeled $DiD_{98'-00'}$ capture pre-reform differences between treated and control groups during the 1998–2000 period, while DiD_{2001} measures the change associated with the implementation of the 2001 reform. The coefficients labeled $\eta_{01'}$ use only the 2001 reform as the source of variation for net-of-ATR, while $\eta_{98'-00',01'}$ combines the pre-reform variation from 1998–2000 with the 2001 reform. Columns (1) and (2) report specifications without macroeconomic controls, while columns (3) and (4) include macroeconomic controls. The KP F-statistic reports the Kleibergen–Paap first-stage statistic for the corresponding 2SLS specification. All regressions include province and year fixed effects. Standard errors, clustered at the province level, are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. Inference uses the t distribution with 9 degrees of freedom. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panel B of Table 1 reports coefficient estimates from the reduced-form estimating equation (i.e. equation (2)). The estimate in column 1 suggests that that the population of young, unmarried high-income tax filers increased by 16.2 percent in the (treated) resource provinces compared to the (control) non-resource provinces after 2001 when the TONI reforms were implemented. The specification in column 2 adds the interaction terms for both the transition period (1998-2000) and the post-implementation period (2001+). Consistent with Figure 6, the population in the treated provinces increases by an average of 11.7 percent in the transition period and by 20 percent in the post-implementation period compared with the control provinces. Both estimates are statistically significant at the one-person

level. The inclusion of the macroeconomic controls in columns 3 and 4 has little quantitative impact on the coefficient estimates for β_1 and β_2 .

Individuals adjusting their behavior in anticipation of a pre-announced policy change is expected, particularly when there is a long period of time between the announcement of the policy and its implementation. Consistent with our estimates in Table 1, Advani et al. (2025) present evidence of a large immigration response during the transition period before the implementation of a tax reform in the United Kingdom. Similar to our setting, the tax reform they study was announced twenty months before it took effect.²²

Panel C of Table 1 presents the two-stage least squares estimates of the population-stock elasticity with respect to the net-of-ATR. Focusing on column three, we estimate an elasticity of 2.64 when using only the post-implementation term as an instrument for the (natural logarithm of the) net-of-ATR. The corresponding first-stage F-statistic exceeds conventional thresholds, indicating that the instrument is strong. When we instrument the net-of-ATR with the interaction terms for both the transition period and the post-implementation period, our estimate of the population stock elasticity is similar at 2.94. The estimate in columns 3 and 4 of Panel C are statistically significant at the one percent level.

Our estimated population stock elasticity of 2.94 (or 2.64) suggests that provincial income taxes have an economically meaningful impact on the location decisions of young, unmarried high income individuals. Furthermore, our estimates fall within the range of prior estimates in the literature. For example, Kleven et al. (2020) estimate a population stock elasticity of 0.1 for millionaires in the United States. On the other hand, Martínez (2022) estimates a population stock elasticity of between 2 and 4 for the top 1 percent of income earners in Switzerland. In the latter setting, the higher elasticity estimates are for individuals who are more active in the labor force, similar to our young and high-income sample.²³

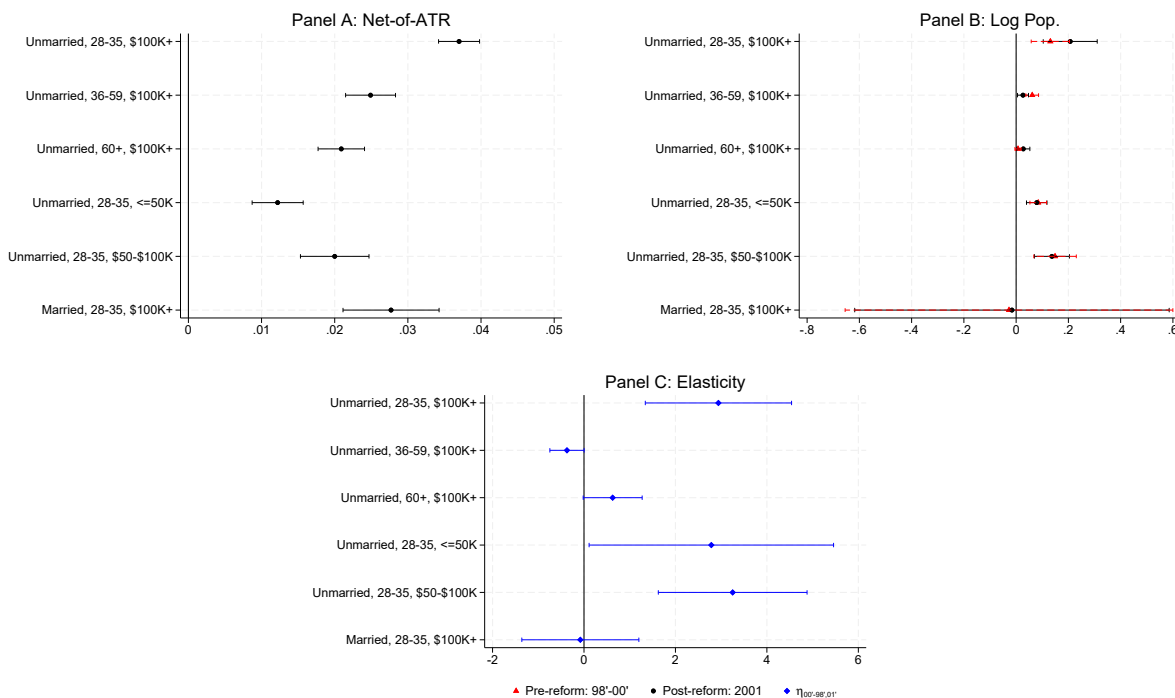
Our estimates suggest that the location choices of tax filers who are ex-ante more likely to be mobile are indeed responsive to taxes. Figure 7 reports estimates of the first stage effect (Panel A), reduced-form (Panel B) and the population-stock elasticity (Panel C) for other demographic groups. The first estimate in each panel is for our baseline sample of young, unmarried and high income tax filers. The remaining rows present estimates for (i) unmarried and middle-aged high income individuals, (ii) unmarried and old high income individuals, (iii) unmarried and young individuals with relatively low incomes (below \$50,000 CAD), (iv)

²²As another example, Burman and Randolph (1994) and Auerbach and Poterba (1988) document anticipatory responses for capital gains realizations prior to the implementation of the Tax Reform Act of 1986. Other papers present evidence of intertemporal shifting of income for high income earners before the implementation of tax reforms in the United States (Slemrod, 1996; Kreiner et al., 2016).

²³Schmidheiny and Slotwinski (2018) also study migration in Switzerland and estimate the population stock elasticity to be between 1.98 and 45.86.

unmarried and young individuals with middle incomes (between \$50,000-\$100,000) and (v) for young and married high income individuals.²⁴

Figure 7: Estimates for Alternative Groups



Notes: This figure presents estimates for how the TONI reform impact the net-average-tax rate (panel A), the natural logarithm of the population count (panel B), and the stock-population elasticity with respect to the net-of-ATR (panel C) for alternative groups. For the elasticity, we utilize the specification presented in Equations (3) and (4). 95% confidence intervals are based off of standard errors clustered by province.

The estimates in Panel A confirm that the TONI reforms led to larger tax cuts for high income individuals living resource provinces, regardless of age or marital status. In particular, our coefficient estimate for β_2 from equation (3) is 3.7 percentage point for our baseline sample and ranges between 2.5-3.0 percentage points for high income tax filers that are older (i.e. age 36-59 and age 60+) or who are married.²⁵ The estimates for β_2 for the low- and middle-income groups (i.e. rows 4 and 5 in Panel A) range between 1-2 percentage points.

In Panel B, our estimates of the reduced-form effect (i.e. equation (2)) suggest that the TONI reforms had little effect on the locations choices of older, high income tax filers even

²⁴For the sub-sample of married tax filers, we only consider the income of the main tax filers in the LAD. In our sample, there are very few young (i.e. age 28-35 in the year 2000) married couples where both individuals have incomes above \$100,000.

²⁵Our estimates of the first stage effect are the largest for the young age group because they are on a steep part of their age-earnings profile and have the highest incomes by the end of our sample. Consequently, they experience the biggest reduction in their net-of-ATR due to the TONI reforms.

though they experienced a large tax cut (see rows 2 and 3). The reduced-form estimate is the largest in magnitude for our baseline sample, followed by the young, unmarried middle income group. Recall that this individuals received incomes between \$50,000 and \$100,000 prior to the implementation of the TONI reforms. This meant that they were above the 80th percentile but below the 97th percentile of the taxable income distribution in the late 1990s. The population stock estimates we document are consistent with the results in Schwartz (1976) and Millington (2000) who find the older individuals have a lower propensity to move and respond less to factors that influence migration than younger individuals. Our findings differ somewhat from recent papers by Agrawal and Foremny (2019) and Martínez (2022). While they estimate large mobility responses to taxes among young, high-income individuals like us, they also find that older, high-income individuals are also responsive in the Spanish and Swiss settings, respectively. A potential explanation for why we only document large mobility responses to taxes among the young has to do with the relatively large distances between provinces in Canada compared to European countries. In particular, if the financial and non-financial costs of moving are increasing in the distance of the move, the tax incentive will have to be larger to lead to migration responses in a larger country.

To summarize, we find that the 1998-2001 TONI reforms led to an economically meaningful increase to the population of young and unmarried tax filers in the resource provinces who experienced the largest tax cut as a result of the reforms. While older and married high-income filers also experienced a large tax cut as a result of the TONI reforms, we estimate smaller and mostly statistically insignificant population-stock elasticities for these groups.

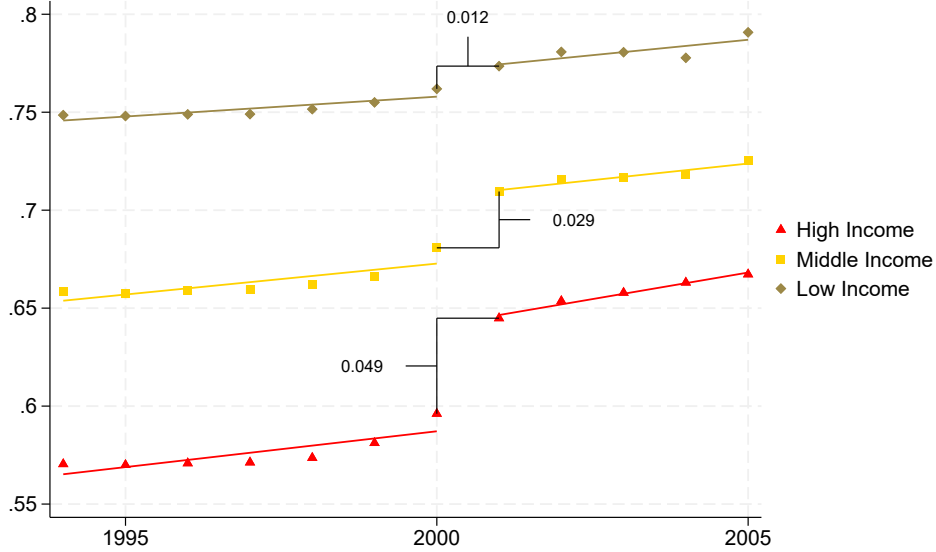
4.2 Migration Directions

4.2.1 Empirical Strategy

In this section, we examine whether the increase in the population of young, unmarried and high-income tax filers in the resource provinces was driven by higher in-migration or reduced emigration. To do so, we restrict the data to the resource (treated) provinces and adopt a difference-in-differences methodology that compares the location choices of these young, unmarried and high-income tax filers who experienced the largest tax cut to young and unmarried tax filers with lower incomes who live in the same province. In particular, we use the middle income group (i.e. total income between \$50,000 and \$100,000 in 1999) and low income group (i.e. total income below \$50,000 in 1999) as two control groups. This research design is similar to the one used by Martínez (2022) who compares the migration patterns of individuals who live in the same region but who differ by income. Unlike Martínez

(2022) who estimates how net-migration changes, we estimate the impact of taxation on the in-flow and out-flow of residents.

Figure 8: Net-of-ATRs Over Time: High vs. Medium vs. Low in Resource Provinces



Notes: This figure plots the average net-of-ATRs for our high, medium and low-income groups within the resource provinces. The red triangles represent the high-income group, the yellow squares the middle-income group, and the brown diamonds the low-income group. The net-of-ATR for each income group is calculated at the using the mean income of that group between 1994-2005 for the resource provinces. These incomes are \$127,000, \$57,000, and \$25,000 for the high, medium, and low groups, respectively.

We begin by estimating an event study specification that compares the propensity of high-income individuals to move to or emigrate from the resource provinces to the propensity to move for those in the medium and low-income groups. Specifically, we estimate the following equation using 1997 as the omitted reference year.

$$\log(Y_{ipt}) = \alpha + \sum_{\substack{y=1994 \\ y \neq 1997}}^{2005} \beta_y (\mathbb{1}[t = y] \times HighInc_{ipt}) + \delta'_1 X_{ipt} + \delta'_2 G_{pt} + \gamma_p + \zeta_t + e_{ipt} \quad (5)$$

Similar to Section 4.1 above, we also estimate the following more parsimonious difference-in-differences model.

$$\begin{aligned} Y_{ipt} = & \alpha + \beta_1 (HighInc_{ipt} \times Post_{98-00,t}) \\ & + \beta_2 (HighInc_{ipt} \times Post_{01+,t}) \\ & + \delta'_1 X_{ipt} + \delta'_2 G_{pt} + \gamma_p + \zeta_t + e_{ipt} \end{aligned} \quad (6)$$

In equations (6) and (5), the dependent variable is either the in-migration or out-migration dummy variable for individual i , living in province p in year t described in Section 3. $HighInc_{ipt} = \mathbb{1}\{Income_{i,1999} > 100,000\}$ is the indicator for being in the high-income (treatment) group that experiences a large tax cut due to the TONI reforms. $Post_{98-00}$ and $Post_{01+}$ and the transition period and post-implementation period binary variables described earlier. X_{ipt} , G_{pt} , γ_p , and ζ_t are vectors of individual controls variables, province-level macroeconomic controls, province fixed-effects, and year fixed-effects, respectively. The coefficients β_1 and β_2 can be interpreted as the causal effect of the TONI reform on location choice if the migration decisions of high-income individuals residing in the resource provinces would have followed the same path as the medium and low-income individuals in the comparison group in the absence of the reforms (i.e. parallel trends).

Our estimates based on equations 5 and 6 below report Huber-White robust standard errors. We make this choice because restricting the analysis to the resource provinces reduces the number of regional clusters from (an already small) 10 to three so cluster-robust standard errors are unlikely to be reliable. For all specifications reported in this section, we check the sensitivity of our estimates to alternative inference methods. Online Appendix C Tables C.5–C.8 report these estimates. For example, we report estimates that implement a cluster wild-bootstrap procedure using both Rademacher weights and the Webb six-point distribution. Reassuringly, these robustness checks do not overturn our main findings.

Figure 8 plots the evolution of average net-of-ATRs for high-income, medium-income and low-income tax filers between 1994-2005. For the purposes of this figure, we calculate the net-of-ATRs for the mean level of total income for each group during our study period. These income levels are \$127,000 (high group), \$57,000 (medium group) and \$25,000 (low group). The figure shows that the net-of-ATRs were stable and followed similar trends prior to the implementation of the TONI reforms before increasing for all groups. However, the high-income group experienced the largest tax cut (on average 4.9 percentage points), while the medium and low groups saw smaller reductions in their ATR (2.9 and 1.7 percentage points, respectively).

4.2.2 Results

Figure 9 report the event study coefficient estimates and 95 percent confidence intervals from the estimation of equation (5).²⁶ The estimates reported in Panel A are based on using the medium-income group of tax filers as the control group while Panel B uses the low-income

²⁶Our main estimates are based on estimating linear probability models (LPM). Given that underlying migration rates are low, we check the sensitivity of our results to estimating Probit and Logit models instead of a LPM. Online Appendix Table D.2 reports these results which corroborate our main estimates.

group of filers as the control group. For both specifications, the likelihood that individuals in our high-income group emigrate from one of the resource provinces follows a similar path as the likelihood that medium- and low-income individuals. This is reassuring because it supports our parallel trends assumption.²⁷ In the years following the announcement of the tax decentralization reform and subsequent provincial tax cuts, high-income individuals become less likely to leave resource provinces. This reduction of approximately 2 percentage points persists from 1999-2005.²⁸

Figure 9 Panels C and D plots the event study coefficients for the in-migration dependent variable. Regardless of the control group, the estimates suggest that the impact of the TONI reforms on in-migration was small and statistically insignificant. This is especially the case when the middle income group is the control group (Panel C). Furthermore, when low income tax filers are used as the control group (Panel D), there appears to be a pre-trend with the relative in-migration rate of treated tax filers falling relative to the control group after 1996. Since the event study estimates are either small and statistically insignificant (Panel C) or inconclusive (Panel D), most of the discussion below will focus on the out-migration dependent variable.

Table 2 report the coefficients from the estimation of the more parsimonious equation (6). The dependent variable in Panel A (resp. Panel B) is the out-migration (resp. in-migration) binary variable. The estimates in all specifications include the demographic control variables and the provincial-level macroeconomic variables described earlier. The estimates in columns 1 and 2 (resp. 3 and 4) use the medium-income (resp. low income) tax filers as the comparison group.²⁹

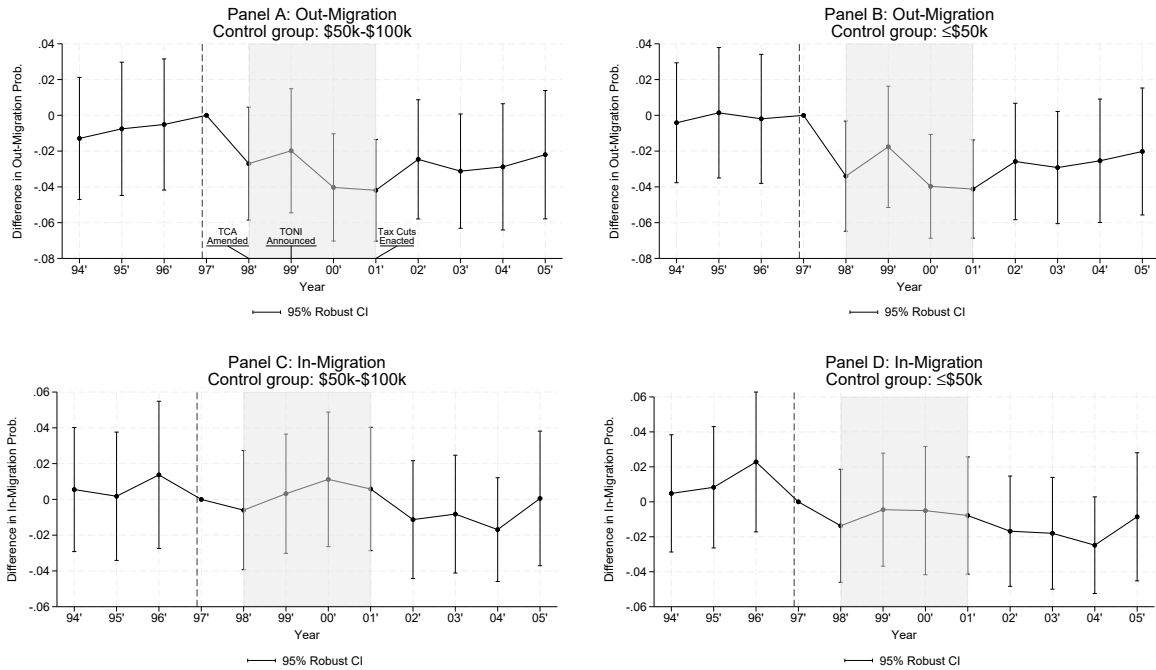
The estimate in Panel A, column 1 suggests that the TONI reforms reduced the out-migration of high income earners by 1.6 percentage points relative to middle income earners. The estimate in column 3 is similar when low income tax filers are used as the control group (1.8 percentage points). Both estimates are statistically significant and confirm the graphical evidence in Figure 9. Including both the transition period and post-implementation period dummy variables in columns 2 and 4 confirms that the migration response to the TONI reforms began in the implementation period and persisted after 2001. In particular, the

²⁷In Panels A and B, out-migration appears to decrease in 1998. However, because of the way out emigration variable is defined, this implies that the moves took place sometime in the year 1999 (i.e. $Emigrate_{ipt} = (L_{i,p,t} \cap L_{i,p',t+1})$, where $L_{i,p,\tau}$ is a binary variable equal to 1 if individual i resides in province p in year τ and is equal to zero otherwise.

²⁸In Appendix Table C.4 we present bootstrapped confidence intervals and P-values for the coefficients around the timing of the tax reform, they remain significant under alternative inference procedures.

²⁹In Appendix Table D.3 and Table D.4 we demonstrate that these estimates are robust to changing the set of controls. We present only the estimates utilizing the medium-income group as a control for brevity, results relative to the low-income group are available upon request.

Figure 9: Migration Event Studies



Notes: This figure presents estimates for how the TONI reform impact out-migration from, and in-migration to the resource provinces for the young and unmarried sample. Panels A and B present the estimates from Equation 6 for the out-migration dependent variable. In Panel A the control group is our medium-income group and for Panel B it is the low-income group. Panels C and D present the estimates from Equation 6 for the in-migration dependent variable. In Panel C the control group is our medium-income group and for Panel D it is the low-income group. Confidence intervals are based on H-C White standard errors.

Table 2: Out-Migration and In-Migration

	\$50k-\$100k		≤ \$50k	
	(1)	(2)	(3)	(4)
<i>Panel A: Out-Migration</i>				
DiD_{98-00}		-0.022** (0.008)		-0.029*** (0.008)
DiD_{01+}	-0.016** (0.006)	-0.023*** (0.008)	-0.018*** (0.006)	-0.029*** (0.008)
<i>Panel B: In-Migration</i>				
DiD_{98-00}		-0.003 (0.010)		-0.0166* (0.00935)
DiD_{01+}	-0.010 (0.007)	-0.011 (0.008)	-0.018*** (0.007)	-0.024*** (0.008)
Controls	✓	✓	✓	✓
Observations	41,340	41,340	275,340	275,340

Notes: This table reports difference-in-differences (DiD) estimates for the impact of the 2000–2001 tax reforms on the net-of-ATR and migration outcomes. Panel A reports the coefficient estimates when the dependent variable is the out-migration dummy and Panel C reports estimates when the in-migration dummy is the dependent variable. Columns (1) and (2) use individuals earning \$50,000–\$100,000 in 1999 as the control group, while columns (3) and (4) use individuals earning less than \$50,000 in 1999 as the control group. The coefficients labeled DiD_{98-00} capture pre-reform differences between treated and control groups during the 1998–2000 transition period, while DiD_{01+} measures the change associated with the post-implementation period. All regressions include the full set of demographic, income, and macroeconomic controls. Huber–White heteroskedasticity-robust standard error are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

estimates in column 2 suggest that the out-migration rate of young and unmarried high-income tax filers fell by approximately 2.2-2.3 percentage points relative to the group of middle income tax filers.

To put this 2.3 percentage point decline in the out-migration rate into context, note that the baseline out-migration rate of young and unmarried high-income tax filers in the pre-reform period was 4.8 percentage points.³⁰ Thus, we estimate an approximately 50 percent decline in the emigration rate due to the TONI reforms. We can also use the baseline out-migration rate and baseline net-of-ATR to calculate the out-migration elasticity implied by our estimates.

$$\eta_{out} = -\frac{\frac{-0.023}{0.048}}{\frac{0.0160}{0.656}} = 19.6$$

This elasticity is large relative to most estimates in the literature. A key distinction, however, is that our estimate reflects a reduction in out-migration following a tax decrease, rather than an increase in out-migration in response to a tax increase. For example, Rauh

³⁰See Table A.1 for baseline migration rates.

and Shyu (2024) study the introduction of a millionaire tax in California and find a large increase in out-migration, which they interpret as a one-time adjustment. It is possible that the responses to tax increases and tax decreases are not symmetric. Furthermore, it could be that factors like a favorable climate and a unique concentration of industries in California lead to smaller responses to taxes than they do in the Canadian provinces of British Columbia, Alberta and Saskatchewan.

Panel B of Table 2 reports estimates from equation (6) when the in-migration binary variable is the dependent variable. Consistent with Figure 9, the estimates reported in Panel B suggest a small and statistically insignificant impact of the TONI reform when the control group is middle income tax filers with 1999 incomes between \$50,000-\$100,000. For example, the estimates in columns 2 suggest that the TONI reforms lowered the in-migration rate by a statistically insignificant 0.3 percentage points during the transition period and by a statistically insignificant 1.1 points during the post-implementation years. Taken at face value, the estimates in columns 3 and 4 (low income tax filers as the comparison group), suggest that the TONI reforms lowered the in-migration rate of high-income tax filers in the resource provinces. As mentioned earlier, however, the estimates for this specification in Figure 9 display clear pre-trends. Since these estimates are likely to be less reliable compared to those that use tax filers who are more similar to the young and high-income treated group, we discount them here.

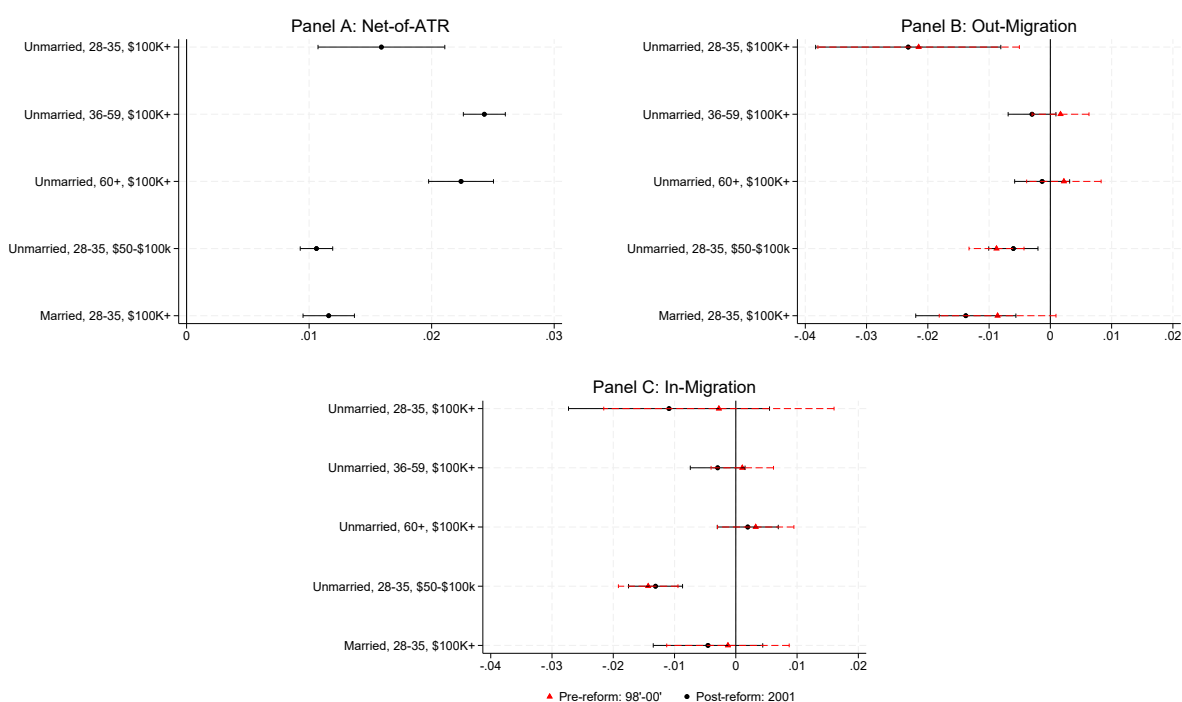
One potential explanation for the pre-trends observed in Figure 9 is that the incomes and migration choices of low-income tax filers were driven by the rising natural resource prices (particularly oil and gas) during the boom of the late 1990s and early 2000s. (Fortin & Lemieux, 2015) document how this economic shock sharply reduced income inequality in the resource provinces during this period. It is plausible that tax filers with incomes below \$50,000 CAD (i.e. below the 80th percentile of the income distribution) benefited disproportionately from the resource boom and that this may have led to higher in-migration for these tax filers relative to those with higher incomes. This possibility further supports our choice to prefer the estimates in columns 1 and 2 that use tax filers with pre-reform incomes between \$50,000-\$100,000 as the better control group for the treated tax filers with pre-reform incomes above \$100,000.

We conclude this subsection by briefly discussing the impact of the TONI reforms on in-migration rates and out-migration rates for other groups. In particular, Figure 9 plots the β_2 coefficients from equation (6) for our baseline sample (top row), as well as for older unmarried tax filers (rows 2 and 3), for the case where the treated group is those whose 1999 incomes were between \$50,000-\$100,000 (row 4) and for young and married high income tax filers (row 5). Panel A plots the first stage for the effect of the TONI reforms on the

net-of-ATR while Panels B and C report estimates for the out-migration and in-migration dependent variables, respectively.

Similar to the patterns in Figure 7, the estimates in Figure 9 suggest that the TONI reforms had little effect on the out-migration or in-migration choices of other groups. For example, the estimates in rows 2 and 3 suggest a small and statistically insignificant impact on both out-migration and in-migration for high income tax filers in the age 35-59 and age 60+ groups even though they experience a similarly large tax cut as our baseline group of younger tax filers.

Figure 10: Estimates for Alternative Groups



Notes: This figure presents estimates for how the TONI reform impact the net-average-tax rate (panel A), out-migration (panel B), and in-migration (panel C) for alternative groups. The medium-income group is utilized as the control group for all estimates presented within this figure with the exception of the estimate for the unmarried, 28-35 year old, and earning between \$50-\$100k sample. For this group we utilize those with the same demographics but earning less than \$50k as the control. For the married sample we condition on only the income of the primary earner, allowing the income of the spouse to be high, medium or low. 95% confidence intervals are based off of H-C robust standard errors.

Taken together, our results suggest that the increase in the population of unmarried, young, high-income tax filers in the resource provinces documented in Section 4.1 was driven by a reduction of out-migration from those regions. There are at least two possible explanations as to why the in-migration decisions of tax filers were less responsive to taxes. Firstly, migration is costly in a country as large as Canada where distances between provinces are

large and an annual tax savings of at least \$2,000 may not be sufficient to drive in-migration. On the other hand. An alternative explanation is that local policies may be more salient than the policies of other regions. This increased salience may make tax filers more responsive to policy changes in their own region compared to changes in other regions. This asymmetry in the salience of tax reforms in ones home province compared to other provinces would make in-migration more “sticky” than out-migration.

4.3 Robustness

The causal interpretation of the estimates reported above rely on the parallel trends assumption. In particular, we require that the location choice decisions of the young, unmarried and high-income tax filers living in the resource provinces would have followed the same path as tax filers in the control group. For the population-level regressions, the control group is young, unmarried and high income tax filers living in the control provinces. For the out-migration and in-migration analysis, the preferred control group is middle income tax filers who also live in the resource provinces. Perhaps the greatest threat to our identification assumption is that the macroeconomic shocks, particularly those to natural resource prices described earlier, differentially impacted high income individuals in British Columbia, Alberta and Saskatchewan compared to others. In this section, we test the sensitivity of our estimates to this possibility by (i) excluding workers in the natural resources sector, (ii) excluding Alberta (the province whose economy is most dependent on the oil and gas sector) and (iii) excluding both Alberta and Saskatchewan (the province with the second-highest reliance on natural resources) from the analysis.

Table 3 reports the results from these sensitivity checks. The estimates in Panel A are base on the aggregated provincial-level data similar to those in Section 4.1 above. The estimates reported in Panel B use the micro-level data, similar to Section 4.2. Since the results of our sensitivity checks are similar in both panels, we focus our discussion on the estimates in Panel A for brevity.

The estimates in Panel A, column 1 are obtained by first excluding workers in the natural resources sector in the microdata and then re-aggregating the data at the province-year-group level.³¹ The LAD contains the NAIC1 code for the primary sector of employment for all tax filers. We use this variable to drop all tax filers working in mining and oil and gas extraction. To control for the possibility that workers’ chosen sector of employment responded to the TONI reforms, we classify workers as being in the natural resources sector or not based on their pre-implementation (year 2000) occupation. The estimate in row 1

³¹Recall, group here refers to cells defined by age, marital status and income.

is the first-stage effect and $\eta_{98-00,01+}$ is the corresponding population-stock elasticity. It is reassuring that estimates of the first-stage effect (3.8 percentage points) and the population-stock elasticity (2.901) are very similar to those reported in Table 1 (3.7 percentage points and 2.94, respectively).

The estimates reported in columns 3 and 5 of Table 3 suggest that excluding Alberta or excluding both Alberta and Saskatchewan leads to estimates that are similar in magnitude to our main estimates above. We interpret the results from these sensitivity checks as evidence supporting our parallel trends assumption.

Table 3: Sensitivity to Oil Prices

	No RSW		Excl. AB		Only BC	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Log Population</i>						
$\Delta(1 - \bar{\tau})^A$	0.038*** (0.002)		0.042*** (0.004)		0.042*** (0.004)	
$\eta_{98-00,01+}$	2.901*** (0.811)		4.017*** (0.694)		3.091*** (0.649)	
KP F-Statistic	299.9		226.4		149.8	
Observations	120		110		95	
<i>Panel B: Out-Migration</i>						
Control Group	\$50-\$100k	\leq \$50k	\$50-\$100k	\leq \$50k	\$50-\$100k	\leq \$50k
$\Delta(1 - \bar{\tau})^I$	0.015*** (0.003)	0.026*** (0.003)	0.015*** (0.004)	0.024*** (0.004)	0.012*** (0.004)	0.021*** (0.004)
DiD_{98-00}	-0.022** (0.009)	-0.030*** (0.009)	-0.023** (0.010)	-0.027*** (0.009)	-0.021** (0.001)	-0.022** (0.009)
DiD_{01+}	-0.027*** (0.008)	-0.032*** (0.008)	-0.023*** (0.009)	-0.025*** (0.008)	-0.024*** (0.008)	-0.023*** (0.008)
Observations	38,340	271,080	20,285	145,075	16,985	110,075

Notes: This table reports sensitivity tests examining whether the estimated relationship between taxes and migration is driven by changes in oil prices during the late 1990s and early 2000s. Panel A reports the first-stage and 2SLS estimates using province-level aggregated data. $\Delta(1 - \bar{\tau})^A$ denotes estimates of the first-stage effect where the natural logarithm of the endogenous net-of-ATR is instrumented with the post-implementation interaction variable described in the text. The population stock elasticity estimate is $\eta_{98-00,01+}$. Panel B reports individual-level difference-in-differences (DiD) estimates for the probability of out-migration. Columns (1)–(2) exclude individuals working in resource-related sectors (No RSW), columns (3)–(4) exclude Alberta from the treated group, and columns (5)–(6) restrict the treated region to British Columbia only. In columns 1, 3 and 5 (resp. 2, 4 and 6) comparison group is tax filers who earned between \$50,000–\$100,000 (resp. less than \$50,000) in 1999 as the control group. The specifications in in Panel A include the full set of macroeconomic controls variables described in the text. The specifications in Panel B include the full set of income, demographic, and macroeconomic controls. The standard errors in Panel A are clustered at the province level. The estimates in Panel B use Huber–White heteroskedasticity-robust standard errors. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix Table D.5 reports the results of a series placebo checks where we estimate equations (1)–(3) (Panel A) and equations (5)–(6) (Panel B) for the 1990–1999 period

and (falsely) assume that the TONI reforms were implemented in 1994, 1995 and 1996, respectively. If the location choice decisions of young, unmarried high-income earners were diverging from the control group in the mid 1990s, say because of differences shocks to resource prices or economic outcomes in general, then the coefficient estimates reported in Table Table D.5 would be statistically significant.³² Reassuringly, the estimates suggest that there were no statistically different changes in migration during the mid-1990s.

5 Conclusion

This paper presents the first estimates of the causal effect of personal income taxation on inter-provincial migration in Canada. We are also one of a very small number of papers to decompose population-level responses to taxes into out- and in-migration responses in the same setting. Compared to studies for other jurisdictions, we focus our analysis on those who are ex-ante the most mobile: the young, unmarried individuals and high income tax filers. We show that for this group, a major tax decentralization reform between 1998-2001 in Canada led to an increase in the population of this group in provinces that reduced their ATRs more relative to control provinces experienced smaller tax cuts. Our results suggest that the population-stock elasticity for young, unmarried and high income tax filers is between 2.5 and 3.5, similar to what studies in other settings find. We show that the location choice decisions of young, unmarried and high-income tax filers are driven by reduced emigration from the resource provinces rather than individuals moving in from other provinces across Canada. While we mostly focus on the sub-sample of young, unmarried and high-income tax filers, we also show that the 1998-2001 TONI reforms we use for quasi-experimental variation in tax rates had a negligible effect on other groups that experienced similarly large tax cuts. In particular, we find that older, unmarried and high income tax filers are not responsive to taxes, nor are young, married and high-income individuals. While outside the scope of this paper, a promising avenue for future work is to check whether the asymmetric out-migration and in-migration findings we document exist in other settings.

³²For the population-level analysis (Panel A), the control group is young, unmarried and high income individuals living in the non-resource provinces. For the out/in-migration analysis (Panel B), the control group is either middle income tax filers (columns 1, 3 and 5) or low income tax filers (columns 2, 4 and 6) living in the same province as the treatment group.

6 References

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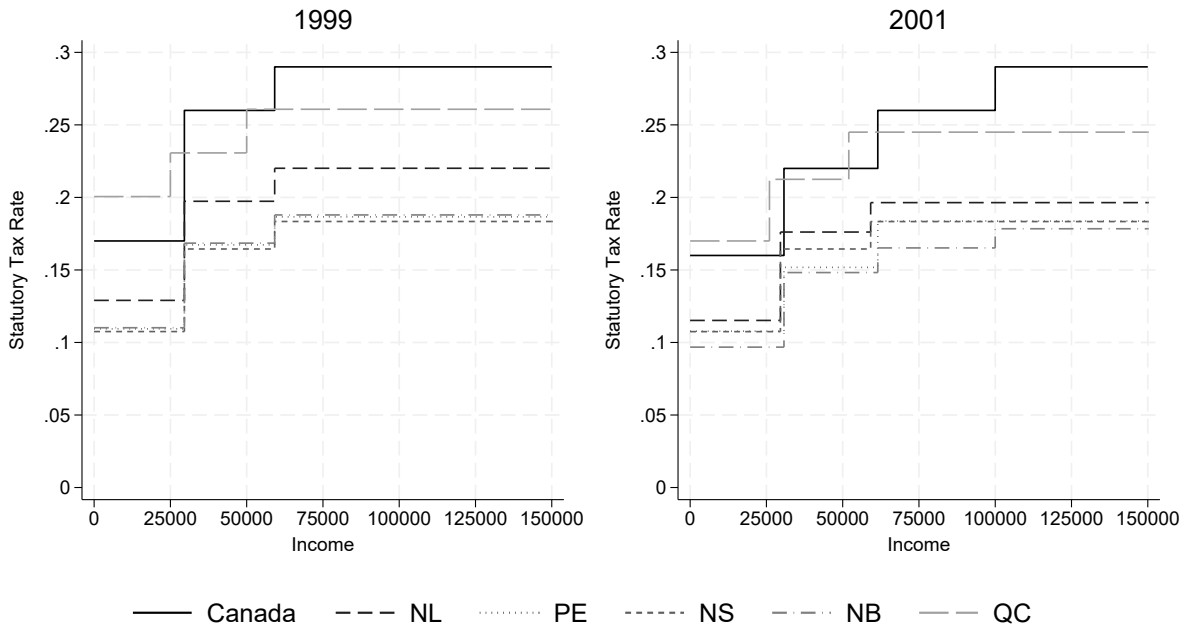
Appendix A.

Variable Definitions

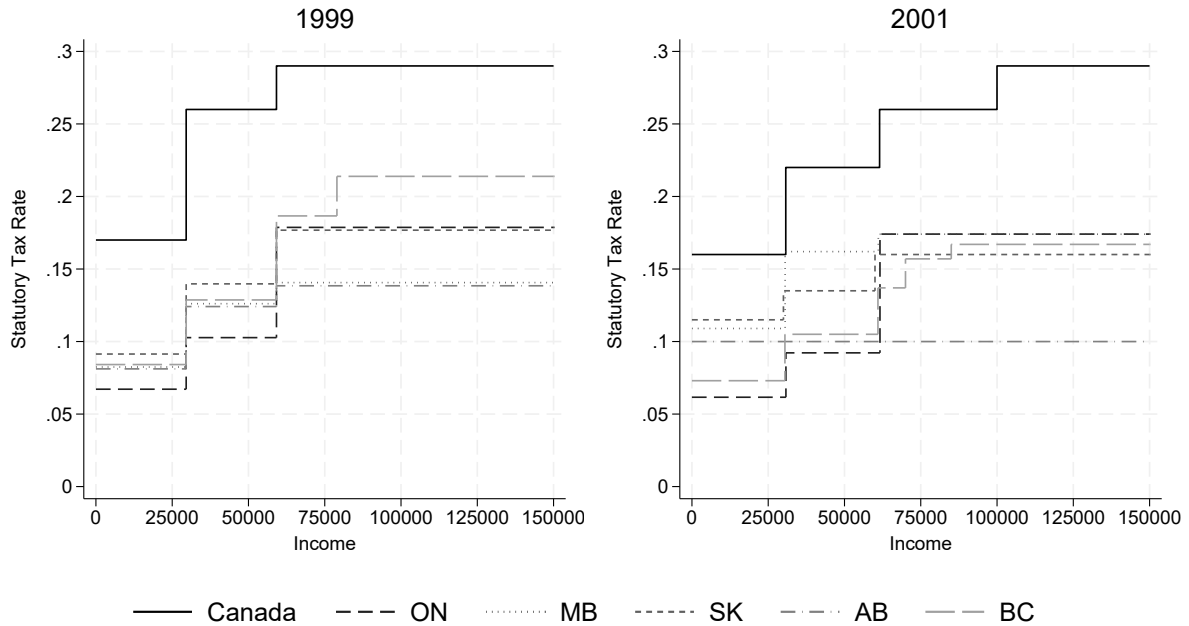
In the LAD after a tax-filer reports that they have a child then the data will indicate that this person has children indefinitely. For our study we take the stance that presence of children will influence migration while the child is growing up, but less so once they reach adulthood. For that reason once the child of a tax-filer reaches adulthood we consider the tax-filer to again be without children. Additionally, the variable indicating the presence of children does so for all members of the household. For example, if a 19 year-old who works continues to live with their parents and younger siblings, then their file will indicate they have child. This is because many of these variables are constructed at the household level. To rectify this issue, we use another variable that indicates whether the tax-filer is living with their parents, no matter the age of said tax-filer. If a tax filer is living with their parents then we assume that any children present are their parents and not theirs if the age gap between the tax-filer and the child is greater than 17 years. This is to correctly assign child-having status to household with three generations.

Figure A.1: Income Tax Schedules

Income Tax Schedules: Part A



Income Tax Schedules: Part B



Notes: This figure presents the tax brackets and corresponding rates for all provinces and federally in 1999 and 2001. The top left panel presents the brackets and corresponding rates in 1999 for Canada and the five provinces east of Ontario. The top right panel presents the 2001 brackets and rates for the same provinces. The 1999 and 2001 brackets and rates for Ontario and the four provinces to the east, three of them being the resources provinces, is presented in the bottom panels. The statutory rate presented is a calculated by combing the the basic income tax rates with any applicable surtaxes.

Table A.1: Summary Statistics of Tax Filers: Aged 28–35 and Unmarried

	Pre-period: 1994–1999					
	Resource Provinces			Non-Resource Provinces		
	>\$100k	\$50k–\$100k	≤ \$50k	>\$100k	\$50k–\$100k	≤ \$50k
Average Tax Rate	0.344 (0.085)	0.295 (0.068)	0.195 (0.091)	0.344 (0.085)	0.292 (0.083)	0.183 (0.097)
Out-Migration	0.048 (0.214)	0.035 (0.183)	0.033 (0.180)	0.048 (0.214)	0.023 (0.151)	0.017 (0.131)
In-Migration	0.053 (0.225)	0.045 (0.207)	0.039 (0.194)	0.053 (0.225)	0.018 (0.134)	0.014 (0.117)
Female	0.204 (0.403)	0.314 (0.464)	0.575 (0.494)	0.204 (0.403)	0.322 (0.467)	0.544 (0.498)
Has Kids	0.023 (0.150)	0.034 (0.181)	0.229 (0.420)	0.023 (0.150)	0.040 (0.197)	0.000 (0.407)
Age	28.14 (2.870)	27.82 (2.867)	27.51 (2.874)	28.14 (2.870)	27.72 (2.859)	27.50 (2.899)
Taxable Income	\$95,500 (\$101,400)	\$45,600 (\$22,000)	\$20,900 (\$18,500)	\$95,500 (\$101,400)	\$43,300 (\$22,800)	\$21,400 (\$13,100)
Taxable Income (censored)	\$87,200 (\$63,000)	\$45,600 (\$21,500)	\$20,900 (\$13,500)	\$87,200 (\$63,000)	\$43,300 (\$21,400)	\$21,400 (\$12,500)
Observations	9,450	122,250	782,475	31,460	352,865	3,011,335
	All Years: 1994–2005					
	Resource Provinces			Non-Resource Provinces		
	>\$100k	\$50k–\$100k	≤ \$50k	>\$100k	\$50k–\$100k	≤ \$50k
Average Tax Rate	0.341 (0.079)	0.295 (0.061)	0.194 (0.092)	0.351 (0.091)	0.298 (0.075)	0.187 (0.097)
Out-Migration	0.036 (0.186)	0.029 (0.167)	0.028 (0.164)	0.020 (0.139)	0.019 (0.136)	0.014 (0.117)
In-Migration	0.043 (0.202)	0.035 (0.185)	0.033 (0.177)	0.018 (0.133)	0.016 (0.124)	0.012 (0.110)
Female	0.221 (0.415)	0.321 (0.467)	0.596 (0.491)	0.277 (0.447)	0.336 (0.472)	0.562 (0.496)
Has Kids	0.043 (0.203)	0.056 (0.229)	0.295 (0.456)	0.050 (0.218)	0.078 (0.268)	0.282 (0.450)
Age	30.42 (4.212)	30.20 (4.263)	30.26 (4.303)	30.17 (4.076)	30.08 (4.320)	30.24 (4.355)
Taxable Income	\$126,800 (\$172,300)	\$56,600 (\$38,400)	\$24,800 (\$24,600)	\$132,400 (\$398,200)	\$54,300 (\$36,700)	\$23,200 (\$17,300)
Taxable Income (censored)	\$105,800 (\$70,900)	\$56,100 (\$30,500)	\$24,800 (\$18,100)	\$100,900 (\$72,100)	\$53,900 (\$29,700)	\$23,200 (\$16,700)
Observations	14,605	191,945	1,360,975	45,845	538,375	4,707,360

Notes: This table reports summary statistics for unmarried tax filers aged 28–35. The upper panel reports statistics for the pre-reform period (1994–1999) and the lower panel reports statistics for the full sample period (1994–2005). Means are reported with standard deviations in parentheses. Taxable income is reported in Canadian dollars. Observations correspond to individual-year observations. Sample sizes are rounded to comply with Statistics Canada disclosure rules.

Appendix B.

Table B.1: Alternative Out-Migration and Alternative In-Migration

	\$50k–\$100k		≤ \$50k	
	(1)	(2)	(3)	(4)
<i>Panel A: Alternative Out-Migration</i>				
DiD_{98-00}		-0.020*** (0.006)		-0.024*** (0.006)
DiD_{01+}	-0.018*** (0.004)	-0.025*** (0.005)	-0.018*** (0.004)	-0.026*** (0.005)
<i>Panel B: Alternative In-Migration</i>				
DiD_{98-00}		-0.0010 (0.007)		-0.017** (0.007)
DiD_{01+}	-0.010* (0.005)	-0.013** (0.007)	-0.013** (0.005)	-0.018*** (0.006)
Observations	41,340	41,340	275,340	275,340

Notes: This table reports difference-in-differences (DiD) estimates for the impact of the 2000–2001 tax reforms on alternative measures of migration. In contrast to the baseline specification, migration is defined as movements between regions rather than between provinces. Specifically, alt out-migration captures moves from resource provinces to non-resource provinces, while alt in-migration captures moves from non-resource provinces to resource provinces. Columns (1) and (2) use individuals earning \$50,000–\$100,000 in 1999 as the control group, while columns (3) and (4) use individuals earning less than \$50,000 in 1999 as the control group. The coefficients labeled $DiD_{98'-00'}$ capture pre-reform differences between treated and control groups during the 1998–2000 period, while DiD_{2001} measures the change associated with the implementation of the 2001 reform. All regressions include the full set of income, demographic, and macroeconomic controls. Huber–White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.2: Alternative Income-Frequency Definitions: Population Levels

	(1)	(2)
	Any year 1997–1999	Mean income 1994–1999
<i>Panel A: Net-of-ATR</i>		
DiD_{01+}	0.0394*** (0.00386)	0.0433*** (0.00481)
<i>Panel B: DiD</i>		
DiD_{98-00}	0.100** (0.0384)	0.102* (0.0583)
DiD_{01+}	0.207*** (0.0346)	0.0564 (0.0583)
<i>Panel C: 2SLS</i>		
$\eta_{98-00,01+}$	2.852*** (0.464)	0.546 (0.679)
KP F-Statistic	121.1	70.76
Observations	120	120

Notes: This table reports sensitivity tests using alternative income-frequency definitions for the high-income group. Panel A reports first-stage DiD estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports reduced-form DiD estimates for changes in log population. Panel C reports the corresponding 2SLS elasticity estimates. All regressions include province and year fixed effects along with macroeconomic controls. Standard errors, clustered at the province level, are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.3: Alternative Income-Frequency Definitions: Migration Direction

	Any year 1997–1999		Mean income 1994–1999	
	\$50k–\$100k (1)	≤ \$50k (2)	\$50k–\$100k (3)	≤ \$50k (4)
<i>Panel A: Net-of-ATR</i>				
<i>DiD</i> ₀₁₊	0.0186*** (0.00244)	0.0340*** (0.00249)	0.0245*** (0.00449)	0.0555*** (0.00457)
<i>Panel B: Out-Migration</i>				
<i>DiD</i> _{98–00}	-0.0197*** (0.00712)	-0.0246*** (0.00688)	-0.0115 (0.00875)	-0.0146* (0.00821)
<i>DiD</i> ₀₁₊	-0.0145** (0.00671)	-0.0199*** (0.00653)	0.00421 (0.0114)	0.00471 (0.0110)
<i>Panel C: In-Migration</i>				
<i>DiD</i> _{98–00}	-0.00170 (0.00788)	-0.0139* (0.00763)	-0.0174 (0.0130)	-0.0196 (0.0125)
<i>DiD</i> ₀₁₊	-0.00166 (0.00721)	-0.0145** (0.00699)	-0.00593 (0.0132)	-0.00970 (0.0128)
Observations	49,005	268,700	17,815	296,985

Notes: This table reports sensitivity tests using alternative income-frequency definitions for the high-income group. Panel A reports first-stage DiD estimates for changes in the net-of-average tax rate (net-of-ATR). Panels B and C report difference-in-differences (DiD) estimates for the probability of out-migration and in-migration, respectively. Columns (1)–(2) the medium-income group as the control and columns (3)–(4) use the low-income group as the control, as described in Table ???. Within each definition, the control groups are indicated in the table header. All regressions include province and year fixed effects along with demographic and macroeconomic controls. Huber–White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.4: Alternative Income Bins: Population Levels

	(1) > \$75k	(2) > \$125k	(3) > \$150k
<i>Panel A: Net-of-ATR</i>			
<i>DiD</i> ₀₁₊	0.0279*** (0.00262)	0.0396*** (0.00543)	0.0439*** (0.00631)
<i>Panel B: DiD</i>			
<i>DiD</i> ₉₈₋₀₀	0.152*** (0.0385)	0.181*** (0.0550)	0.232*** (0.0578)
<i>DiD</i> ₀₁₊	0.194*** (0.0320)	0.196*** (0.0488)	0.245*** (0.0489)
<i>Panel C: 2SLS</i>			
$\eta_{98-00,01+}$	3.655*** (0.672)	2.531** (0.485)	2.716*** (0.485)
KP F-Statistic	80.05	53.39	63.85
Observations	120	120	115

Notes: This table reports sensitivity tests using alternative income thresholds for the high-income group. Panel A reports first-stage DiD estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports reduced-form DiD estimates for changes in log population. Panel C reports the corresponding 2SLS elasticity estimates. Each column defines the high-income group using a different income threshold based on income in 1999. All regressions include province and year fixed effects along with macroeconomic controls. Standard errors, clustered at the province level, are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.5: Alternative Income Bins: Migration Direction

	> \$75k		> \$125k		> \$150k	
	\$50k-\$75k (1)	≤ \$50k (2)	\$50k-\$125k (3)	≤ \$50k (4)	\$50k-\$150k (5)	≤ \$50k (6)
<i>Panel A: Net-of-ATR</i>						
<i>DiD</i> ₀₁₊	0.00890*** (0.00144)	0.0196*** (0.00145)	0.0254*** (0.00407)	0.0371*** (0.00422)	0.0266*** (0.00534)	0.0410*** (0.00552)
<i>Panel B: Out-Migration</i>						
<i>DiD</i> ₉₈₋₀₀	-0.00627 (0.00536)	-0.0145*** (0.00492)	-0.0222** (0.0110)	-0.0311*** (0.0109)	-0.0170 (0.0110)	-0.0254** (0.0108)
<i>DiD</i> ₀₁₊	-0.00634 (0.00491)	-0.0122*** (0.00453)	-0.0229** (0.0104)	-0.0290*** (0.0103)	-0.00509 (0.0120)	-0.0117 (0.0119)
<i>Panel C: In-Migration</i>						
<i>DiD</i> ₉₈₋₀₀	0.00950 (0.00602)	-0.00652 (0.00559)	-0.00985 (0.0126)	-0.0237* (0.0124)	-0.0207 (0.0148)	-0.0339** (0.0146)
<i>DiD</i> ₀₁₊	0.00123 (0.00529)	-0.0127*** (0.00485)	-0.0113 (0.0116)	-0.0241** (0.0115)	-0.0146 (0.0146)	-0.0267* (0.0145)
Observations	41,340	280,780	41,340	273,995	41,340	273,455

Notes: This table reports sensitivity tests using alternative income thresholds for defining the treated high-income group. Panels B and C report difference-in-differences (DiD) estimates for the probability of out-migration and in-migration, respectively. Each pair of columns uses a different income threshold to define the treated group, while the control group is defined by the adjacent lower income bin indicated in the table header. Panel A reports first-stage DiD estimates for changes in the net-of-average tax rate (net-of-ATR). All regressions include province and year fixed effects along with demographic and macroeconomic controls. Huber-White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.6: Alternative Age Bins: Population Analysis

	(1)	(2)	(3)	(4)
	20–29	20–39	20–34	30–39
	in 2000	in 2000	in 2000	in 2000
<i>Panel A: Net-of-ATR</i>				
DiD_{01+}	0.028*** (0.009)	0.035*** (0.005)	0.036*** (0.003)	0.037*** (0.003)
<i>Panel B: Log Population</i>				
DiD_{98-00}	0.231*** (0.086)	0.149*** (0.047)	0.134*** (0.020)	0.122*** (0.027)
DiD_{01+}	0.369*** (0.073)	0.310*** (0.032)	0.132*** (0.031)	0.111*** (0.033)
<i>Panel C: 2SLS</i>				
$\eta_{98-00,01+}$	4.809*** (1.120)	4.590*** (0.556)	1.778*** (0.555)	1.365** (0.563)
KP F-Statistic	22.49	56.55	94.24	95.04
Observations	120	120	120	120

Notes: This table reports sensitivity tests using alternative age bins for the young sample. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports the reduced-form DiD estimates for changes in log population. Panel C reports the corresponding 2SLS elasticity estimates. Each column uses a different age bin defined by age in 2000. All regressions include province and year fixed effects along with the full set of macroeconomic controls. Standard errors, clustered at the province level, are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.7: Alternative Age Bins: Migration Direction (Control Group: \$50k–\$100k)

	(1)	(2)	(3)	(4)
	20–29	20–39	20–34	30–39
	in 2000	in 2000	in 2000	in 2000
<i>Panel A: Net-of-ATR</i>				
DiD_{01+}	0.0024 (0.006)	0.014*** (0.003)	0.021*** (0.002)	0.023*** (0.002)
<i>Panel B: Out-Migration</i>				
DiD_{98-00}	-0.031* (0.018)	-0.028*** (0.009)	-0.010* (0.006)	-0.007 (0.006)
DiD_{01+}	-0.038** (0.017)	-0.028*** (0.009)	-0.009* (0.005)	-0.006 (0.006)
<i>Panel C: In-Migration</i>				
DiD_{98-00}	0.004 (0.020)	0.001 (0.0112)	0.000 (0.007)	-0.001 (0.007)
DiD_{01+}	-0.008 (0.018)	-0.013 (0.009)	-0.004 (0.006)	-0.004 (0.006)
Observations	11,420	38,260	72,910	61,490

Notes: This table reports sensitivity tests using alternative age bins for the young sample, defined by age in 2000. Panel A reports first-stage DiD estimates for changes in the net-of-average tax rate (net-of-ATR). Panels B and C report DiD estimates for the probability of out-migration and in-migration, respectively. The control group consists of individuals earning \$50,000–\$100,000 in 1999. All regressions include province and year fixed effects along with demographic and macroeconomic controls. Huber–White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.8: Alternative Age Bins: Migration Direction (Control Group: < \$50k)

	(1)	(2)	(3)	(4)
	20–29	20–39	20–34	30–39
	in 2000	in 2000	in 2000	in 2000
<i>Panel A: Net-of-ATR</i>				
<i>DiD</i> ₀₁₊	0.023*** (0.006)	0.025*** (0.003)	0.037*** (0.002)	0.038*** (0.002)
<i>Panel B: Out-Migration</i>				
<i>DiD</i> _{98–00}	-0.043** (0.017)	-0.036*** (0.009)	-0.016*** (0.006)	-0.012* (0.006)
<i>DiD</i> ₀₁₊	-0.035** (0.017)	-0.031*** (0.009)	-0.012** (0.005)	-0.0091 (0.006)
<i>Panel C: In-Migration</i>				
<i>DiD</i> _{98–00}	-0.017 (0.019)	-0.013 (0.011)	-0.012* (0.006)	-0.011 (0.007)
<i>DiD</i> ₀₁₊	-0.019 (0.017)	-0.026*** (0.009)	-0.014** (0.006)	-0.014** (0.006)
Observations	106,625	278,050	445,485	338,865

Notes: This table reports sensitivity tests using alternative age bins for the young sample, defined by age in 2000. Panel A reports first-stage DiD estimates for changes in the net-of-average tax rate (net-of-ATR). Panels B and C report DiD estimates for the probability of out-migration and in-migration, respectively. The control group consists of individuals earning less than \$50,000 in 1999. All regressions include province and year fixed effects along with demographic and macroeconomic controls. Huber–White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Treatment Timing

Table B.9: Alternative Treatment Timing

	Announced		Legislated	
	(1)	(2)	(3)	(4)
<i>Panel A: Log Population</i>				
$\Delta(1 - \bar{\tau})^A$	0.031*** (0.004)		0.038*** (0.003)	
<i>DiD</i>	0.179*** (0.038)		0.194*** (0.041)	
η	3.703*** (0.720)		3.396*** (0.894)	
KP F-Statistic	160.4		107.4	
Observations	290		290	
<i>Panel B: Out-Migration</i>				
Control Group	\$50k–\$100k	\leq \$50k	\$50k–\$100k	\leq \$50k
$\Delta(1 - \bar{\tau})^I$	0.004 (0.003)	-0.002 (0.003)	0.014*** (0.003)	0.012*** (0.003)
<i>DiD</i>	-0.021*** (0.007)	-0.025*** (0.007)	-0.021*** (0.006)	-0.026*** (0.006)
Observations	41,340	275,340	41,340	275,340

Notes: This table reports estimates examining the sensitivity of our results to alternative treatment timing assumptions. Panel A presents IV estimates using province-level population data, where the change in the net-of-average tax rate (net-of-ATR), $\Delta(1 - \bar{\tau})^A$, instruments for tax-induced variation in the tax environment. The corresponding elasticity estimate η is obtained from the 2SLS specification. Panel B reports individual-level difference-in-differences (DiD) estimates for the probability of out-migration. Columns labeled “Announced” center treatment timing around the year in which provinces formally announced their tax reforms in provincial budgets, while columns labeled “Legislated” center treatment timing around the year in which the reforms were enacted into law. Within each timing specification, the first column uses individuals earning \$50,000–\$100,000 in 1999 as the control group, while the second column uses individuals earning less than \$50,000. The aggregate tax change $\Delta(1 - \bar{\tau})^A$ is constructed using province-level data, while $\Delta(1 - \bar{\tau})^I$ is constructed using individual-level data. All regressions include province, year, and stack fixed effects along. Regressions in Panel A include the full set of macroeconomic controls, Panel B regressions include the full set of income, demographic, and macroeconomic controls. Standard errors in Panel A are clustered at the province level. For outcomes constructed using micro data, Huber–White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Here, we explore how our results change when we utilize two different staggered DiD specifications. Our first approach uses the year that a province formally announced their tax cuts in their budgets as the center of the DiD; 2000 for Saskatchewan, 1999 for Alberta, and 2000 for British Columbia. For a more conservative estimation assuming less anticipation we center the DiD around the year our treated provinces legislated their tax reforms. This is 2000 for Saskatchewan, 2000 for Alberta, and 2001 for British Columbia. To estimate the elasticity, we use only the never-treated provinces as the control group rather than also using the yet-

to-be treated provinces. This helps us to avoid issues that can arise in staggered-adoption two-way fixed effects designs when treatment effects are dynamic over time (Goodman-Bacon, 2021). For the estimates of how the out-migration likelihood changes, we continue to present the results from using either the medium-income group or the low-income group.

We present the estimates for the first stage, the change in population, and the population-stock elasticity with respect to the net-of-average-tax rate from our specification comparing resource and non-resource provinces in Panel A of Table B.10. In Panel B we present the first stage and changes to out-migration from our specification comparing income groups within the resource provinces.

Columns one and two of Table B.10 presents the results of utilizing the announcement date as the treatment year. In Panel A we see that the first-stage estimate for change in net-of-average-tax rate, $\Delta(1 - \bar{\tau})^A$, is slightly smaller than our primary estimate that used 2001 as the post-reform period, but still large and significant. This is expected, this specification includes 1-2 years of 'post' years where the differences in tax rates between the resource and non-resource provinces has yet to emerge, so this lowers the first stage. The change to population, DiD, is similar to that estimated from the specification that includes both the pre- and post-reform indicators. The elasticity, η , is roughly one log-point higher than our primary specification which is also to be expected. Using the announcement year better captures the anticipatory migration changes, in addition to the smaller first stage this will raise the expected elasticity. Moving to Panel B, we see that the first stage estimate for the change in net-of-average-tax rate relative to either the medium or low-income group, $\Delta(1 - \bar{\tau})^I$, is statistically zero. While this seems counter-intuitive due to the large first stage in Panel A, this is also expected. Recall that panel B is comparing outcomes between groups of differing income within the resource provinces, rather than comparing the outcomes of high-income tax filers living in either a resource or a non-resource provinces (panel A). Prior to the tax changes in 2001, the net-of-average-tax rate for those in our medium and low-income group are significantly higher than high-income group. Including these years in the post-period mechanically lowers the first-stage. The key outcome here is that the estimate for how out-migration changed, DiD , is not statistically different than our primary specification.

Columns three and four present the estimates when we use the legislation year as the beginning of the post-period. In both Panels A and B, the first-stage estimates are larger, reflecting the fact that fewer pre-implementation years are included in the post-period and therefore the estimated tax change is less diluted by years in which statutory tax rates had not yet shifted. Importantly, the estimated elasticities and the reduced-form effects on out-migration are statistically indistinguishable from both our primary specification and

the specification that centers treatment timing on the announcement year. This stability indicates that our conclusions are not sensitive to the precise timing convention and provides strong evidence of a substantial change in migration behavior during the announcement-to-implementation window surrounding the 2000–2001 tax reforms.

Appendix C.

Table C.1: Log Population Event Study: Bootstrapped Inference

	(1)	(2)	(3)	(4)
	Rademacher		Webb 6-point distribution	
Year	<u>Conf. Int.</u>	<u>P-Value</u>	<u>Conf. Int.</u>	<u>P-Value</u>
1998	[-.149, -.0844] ∪ [-.0814, .4721]	.5796	[-.0873, .1398]	.586
1999	[.0904, .3701]	.0330	[.0800, .3655]	.034
2000	[-.2535, .7896]	.0601	[-.3706, .8701]	.071
2001	[-.0516, .4456]	.0771	[-.1093, .7924]	.079

Notes: This table reports bootstrapped confidence intervals and P-values for the coefficients of our event study estimating the change in population of our young, unmarried, high-income sample in the resource provinces relative to the non-resource provinces. We present results from two bootstrapping procedures; Rademacher weights, and the Webb 6-point distribution. For both procedures we cluster at the province level.

Table C.2: Population Analysis: Alternative Standard Errors

		(1)	(2)	(3)
		Post	Pre + Post	
		DiD_{01+}	DiD_{98-00}	DiD_{01+}
<i>Panel A: Net-of-ATR</i>				
Coefficient		0.0370	0.0180	0.0452
H-W Robust	SE	(0.00388)	(0.00463)	(0.00347)
Cluster Province	SE	(0.00143)	(0.00458)	(0.00278)
Bootstrap: Rademacher	CI	[-.0294, .0429]	[-.0777, -.0426]	[-.0028, .0169]
	p-value	.026	.033	.014
Bootstrap: Webb	CI	[-.0276, .0441]	[.0047, .0549]	[.0222, .0794]
	p-value	.011	.026	.015
<i>Panel B: Log Population</i>				
Coefficient		0.147	0.131	0.207
H-W Robust	SE	(0.0379)	(0.0419)	(0.0340)
Cluster Province	SE	(0.0593)	(0.0374)	(0.0527)
Bootstrap: Rademacher	CI	[-.116, .736]	[-.0143, .379]	[-.0137, .825]
	p-value	.302	.072	.070
Bootstrap: Webb	CI	[-.271, .984]	[-.0085, .369]	[-.215, .926]
	p-value	.321	.056	.075
<i>Panel C: 2SLS</i>				
Coefficient		2.638	2.940	
H-W Robust	SE	(0.634)	(0.535)	
Cluster Province	SE	(1.061)	(0.816)	
Bootstrap: Rademacher	CI	$(-\infty, \infty)$	$(-\infty, \infty)$	
	p-value	.295	.111	
Bootstrap: Webb	CI	$(-\infty, \infty)$	$(-\infty, \infty)$	
	p-value	.303	.118	

Notes: This table reports the main population results using alternative methods for statistical inference. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports the corresponding reduced-form DiD estimates for changes in log population. Panel C reports the associated 2SLS elasticity estimates. Column (1) includes only the post-reform indicator DiD_{2001} , while columns (2) and (3) additionally include the pre-reform indicator DiD_{98-00} . For each specification we report Huber–White heteroskedasticity-robust standard errors, standard errors clustered at the province level, and bootstrap inference using both Rademacher weights and the Webb six-point distribution.

Table C.3: Population Analysis: HAC Standard Errors

	(1)	(2)	(3)
	Post	Pre + Post	
	DiD_{01+}	DiD_{98-00}	DiD_{01+}
<i>Panel A: Net-of-ATR</i>			
Coefficient	0.0370	0.0180	0.0452
HAC (1 lag) SE	(0.00385)	(0.00480)	(0.00340)
HAC (2 lags) SE	(0.00367)	(0.00448)	(0.00344)
<i>Panel B: Log Population</i>			
Coefficient	0.147	0.131	0.207
HAC (1 lag) SE	(0.0453)	(0.0434)	(0.0394)
HAC (2 lags) SE	(0.0492)	(0.0395)	(0.0410)
<i>Panel C: 2SLS</i>			
Coefficient	2.638	1.045	
HAC (1 lag) SE	(0.631)	(0.377)	
HAC (2 lags) SE	(0.739)	(0.410)	

Notes: This table reports the main population results using heteroskedasticity and autocorrelation consistent (HAC) standard errors. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports the corresponding reduced-form DiD estimates for changes in log population. Panel C reports the associated 2SLS elasticity estimates. Column (1) includes only the post-reform indicator DiD_{2001} , while columns (2) and (3) additionally include the pre-reform indicator DiD_{98-00} . For each specification we report HAC standard errors using one and two lags.

Table C.4: Out-Migration Event Study: Bootstrapped Inference

	(1)	(2)	(3)	(4)
	Rademacher		Webb 6-point distribution	
Year	<u>Conf. Int.</u>	<u>P-Value</u>	<u>Conf. Int.</u>	<u>P-Value</u>
Panel A: Control				
\$50k-\$100k				
1998	[-.0700, -.0237]	0	[-.0700, .0258]	.068
1999	[-.0466, -.0130]	0	[-.1323, .0714]	.125
2000	[-.0605, -.0376]	0	[-.0711, -.0068]	.044
2001	[-.0448, -.0354]	0	∪ [-.0751, -.0088] [-.0037, .0014]	.051
Panel B: Control				
≤\$50k				
1998	[-.0864, -.0268]	0	[-.1060, .0304]	.083
1999	[-.1032, -.0038]	0	[-.134, .1303]	.11
2000	[-.0692, -.0374]	0	[-.0692, -.0193]	.031
2001	[-.0834, -.0340]	0	[-.1273, .0504]	.079

Notes: This table reports bootstrapped confidence intervals and P-values for the coefficients of our event study estimating the change in out-migration of our young, unmarried, high-income sample in the resource provinces relative to our medium and low-income sample, also living in the resource provinces. We present results from two bootstrapping procedures; Rademacher weights, and the Webb 6-point distribution. For both procedures we cluster at the province level.

Table C.5: Migration Direction Analysis: Alternative Standard Errors

		(1)	(2)	(3)
		Post	Pre + Post	
		DiD_{01+}	DiD_{98-00}	DiD_{01+}
<i>Control Group: \$50k-\$100k</i>				
<i>Panel A: Net-of-ATR</i>				
Coefficient		0.016	-0.026	0.007
H-W Robust	SE	(0.003)	(0.00284)	(0.00303)
Cluster Province	SE	(0.003)	(0.00882)	(0.00545)
Bootstrap: Rademacher	CI	[.011, .031]	[-.0391, -.0166]	[-.00141, .02329]
	p-value	0	0	.25
Bootstrap: Webb	CI	[-.037, .071]	[-.1528, .1002]	[-.0708, .1094]
	p-value	.105	.219	.345
<i>Panel B: Out-Migration</i>				
Coefficient		-0.0161	-0.0215	-0.0232
H-W Robust	SE	(0.00636)	(0.00839)	(0.00771)
Cluster Province	SE	(0.00470)	(0.00698)	(0.00588)
Bootstrap: Rademacher	CI	[-.0236, -.0109]	[-.0592, -.0366] \cup [-.0283, .0005]	[-.1062, -.0138]
	p-value	0	0	0
Bootstrap: Webb	CI	[-.0822, .0518]	[-.1062, .1095]	[-.1497, .0612]
	p-value	.154	.074	.091

Notes: This table reports the migration-direction results using alternative methods for statistical inference. The control group consists of individuals earning \$50,000–\$100,000 in 1999. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports the corresponding DiD estimates for the probability of out-migration. Column (1) includes only the post-reform indicator DiD_{2001} , while columns (2) and (3) additionally include the pre-reform indicator DiD_{98-00} . For each specification we report Huber–White heteroskedasticity-robust standard errors, standard errors clustered at the province level, and bootstrap inference using both Rademacher weights and the Webb six-point distribution. All regressions include province and year fixed effects along with demographic and macroeconomic controls.

Table C.6: Migration Direction Analysis: Alternative Standard Errors

		(1)	(2)	(3)
		Post	Pre + Post	
		DiD_{01+}	DiD_{98-00}	DiD_{01+}
<i>Panel A: Net-of-ATR</i>				
Coefficient		0.016	-0.026	0.007
H-W Robust	SE	(0.003)	(0.00284)	(0.00303)
Cluster Province	SE	(0.003)	(0.00882)	(0.00545)
Bootstrap: Rademacher	CI	[.011, .031]	[-.0391, -.0166]	[-.00141, .02329]
	p-value	0	0	.25
Bootstrap: Webb	CI	[-.037, .071]	[-.1528, .1002]	[-.0708, .1094]
	p-value	.105	.219	.345
<i>Panel B: Out-Migration</i>				
Coefficient		-0.0161	-0.0215	-0.0232
H-W Robust	SE	(0.00636)	(0.00839)	(0.00771)
Cluster Province	SE	(0.00470)	(0.00698)	(0.00588)
Bootstrap: Rademacher	CI	[-.0236, -.0109]	[-.0592, -.0366] \cup [-.0283, .0005]	[-.1062, -.0138]
	p-value	0	0	0
Bootstrap: Webb	CI	[-.0822, .0518]	[-.1062, .1095]	[-.1497, .0612]
	p-value	.154	.074	.091

Notes: This table reports the migration-direction results using alternative methods for statistical inference. The control group consists of individuals earning less than \$50,000 in 1999. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports the corresponding DiD estimates for the probability of out-migration. Column (1) includes only the post-reform indicator DiD_{2001} , while columns (2) and (3) additionally include the pre-reform indicator DiD_{98-00} . For each specification we report Huber–White heteroskedasticity-robust standard errors, standard errors clustered at the province level, and bootstrap inference using both Rademacher weights and the Webb six-point distribution. All regressions include province and year fixed effects along with demographic and macroeconomic controls.

Table C.7: Migration Direction Analysis: HAC Standard Errors

	(1)	(2)	(3)
	Post	Pre + Post	
	DiD_{01+}	DiD_{98-00}	DiD_{01+}
<i>Panel A: Net-of-ATR</i>			
Coefficient	0.020***	-0.023**	0.012*
HAC (1 lag) SE	(0.007)	(0.009)	(0.009)
HAC (2 lags) SE	(0.008)	(0.006)	(0.007)
<i>Panel B: Out-Migration</i>			
Coefficient	-0.017***	-0.021**	-0.024***
HAC (1 lag) SE	(0.006)	(0.009)	(0.009)
HAC (2 lags) SE	(0.006)	(0.008)	(0.008)

Notes: This table reports the migration-direction results using heteroskedasticity and autocorrelation consistent (HAC) standard errors. The control group consists of individuals earning \$50,000–\$100,000 in 1999. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports the corresponding DiD estimates for the probability of out-migration. Column (1) includes only the post-reform indicator DiD_{2001} , while columns (2) and (3) additionally include the pre-reform indicator $DiD_{98'-00'}$. For each specification we report HAC standard errors using one and two lags. All regressions include province and year fixed effects along with demographic and macroeconomic controls. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C.8: Migration Direction Analysis: HAC Standard Errors

	(1)	(2)	(3)
	Post	Pre + Post	
	DiD_{01+}	DiD_{98-00}	DiD_{01+}
<i>Panel A: Net-of-ATR</i>			
Coefficient	0.0275*	-0.0555***	0.00896
HAC (1 lag) SE	(0.0138)	(0.0138)	(0.0111)
HAC (2 lags) SE	(0.0149)	(0.0138)	(0.0115)
<i>Panel B: Out-Migration</i>			
Coefficient	-0.0187***	-0.028***	-0.028***
HAC (1 lag) SE	(0.00626)	(0.009)	(0.009)
HAC (2 lags) SE	(0.00663)	(0.010)	(0.009)

Notes: This table reports the migration-direction results using heteroskedasticity and autocorrelation consistent (HAC) standard errors. The control group consists of individuals earning less than \$50,000 in 1999. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panel B reports the corresponding DiD estimates for the probability of out-migration. Column (1) includes only the post-reform indicator DiD_{2001} , while columns (2) and (3) additionally include the pre-reform indicator $DiD_{98'-00'}$. For each specification we report HAC standard errors using one and two lags. All regressions include province and year fixed effects along with demographic and macroeconomic controls. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix D.

Table D.1: Difference in Marriage Probability

	(1)	(2)
Treated	Res. Prov., >\$100k	Res. Prov., >\$100k
Control	Res. Prov., \$50k–\$100k	Non-Res. Prov., >\$100k
DiD_{98-00}	0.0135 (0.00998)	-0.0123 (0.0121)
DiD_{01+}	0.0216** (0.00849)	-0.00444 (0.0115)
Female	-0.0260*** (0.00245)	-0.0364*** (0.00427)
Immigrant	0.0594*** (0.0117)	0.0674*** (0.0158)
Has Kids	0.407*** (0.00202)	0.348*** (0.00345)
Observations	158,995	51,025

Notes: The sample is all tax filers age 28-35 tax, earning above \$100,000 in 1999 who file a return each year between 1990–2010. In Panel A, the dependent variable is the tax filer’s marital status. All specifications include province, year, and age fixed effects. Demographic controls include dummy variables for gender, marital status, and presence of children. Income controls include the log of own and spousal income, and a dummy for whether either reports zero income. Demographic controls include the GDP per capita (income measurement), unemployment rate, and program spending all at the province level. Standard errors are clustered at the province level. Inference uses the t distribution with 9 degrees of freedom. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

in Table D.1 we see that there is no significant difference between the likelihood of a person residing in a resource-province post-tax reform getting married as compared to someone living in a non-resource province. This helps alleviate the possibility that attrition bias due to more people dropping out of our sample due to marriage in resource-provinces than the others.

Table D.2: Migration Direction Analysis: Probit and Logit

	\$50k–\$100k		≤ \$50k	
	(1)	(2)	(3)	(4)
	Probit	Logit	Probit	Logit
<i>Panel A: Out-Migration</i>				
DiD_{98-00}	-0.220*	-0.507*	-0.332***	-0.775***
	(0.129)	(0.307)	(0.124)	(0.296)
DiD_{01+}	-0.327**	-0.732**	-0.384***	-0.887***
	(0.135)	(0.336)	(0.130)	(0.326)
<i>Panel B: In-Migration</i>				
DiD_{98-00}	0.0599	0.167	-0.116	-0.241
	(0.112)	(0.252)	(0.108)	(0.242)
DiD_{01+}	-0.0867	-0.188	-0.251**	-0.574**
	(0.123)	(0.296)	(0.119)	(0.286)
Observations	41,340	41,340	275,340	275,340

Notes: This table reports the migration-direction results using nonlinear probability models. Panels A and B report estimates from Probit and Logit specifications for the probability of out-migration and in-migration, respectively. Columns (1)–(2) use individuals earning \$50,000–\$100,000 in 1999 as the control group, while columns (3)–(4) use individuals earning less than \$50,000. All regressions include province and year fixed effects along with the full set of demographic and macroeconomic controls. Standard errors are Huber–White heteroskedasticity-robust and reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table D.3: Migration Direction Analysis: Incremental Controls

	(1)	(2)	(3)	(4)	(5)	(6)
Control Group	\$50k–\$100k					
<i>Panel A: Net-of-ATR</i>						
DiD_{01+}	0.018*** (0.003)	0.015*** (0.003)	0.015*** (0.003)	0.019*** (0.003)	0.016*** (0.003)	0.016*** (0.003)
<i>Panel B: Out-Migration</i>						
DiD_{01+}	-0.015** (0.006)	-0.016** (0.006)	-0.016** (0.006)	-0.015** (0.006)	-0.016** (0.006)	-0.016** (0.006)
<i>Panel C: In-Migration</i>						
DiD_{01+}	-0.009 (0.007)	-0.010 (0.007)	-0.010 (0.007)	-0.010 (0.007)	-0.010 (0.007)	-0.010 (0.007)
Age Fixed Effects		✓	✓		✓	✓
Demog. Controls			✓			✓
Macro. Controls				✓	✓	✓
Observations	41,340	41,340	41,340	41,340	41,340	41,340

Notes: This table reports the migration-direction results under alternative sets of controls. The control group consists of individuals earning \$50,000–\$100,000 in 1999. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panels B and C report the corresponding DiD estimates for the probability of out-migration and in-migration. All specifications include the post-reform indicator DiD_{2001} . Columns progressively add controls: column (1) includes province and year fixed effects only; column (2) additionally includes age fixed effects; column (3) adds demographic controls; column (4) includes macroeconomic controls; column (5) includes age fixed effects and macroeconomic controls; and column (6) includes the full set of age, demographic, and macroeconomic controls. Huber–White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table D.4: Migration Direction Analysis: Incremental Controls

	(1)	(2)	(3)	(4)	(5)	(6)
Control Group	\$50k–\$100k					
<i>Panel A: Net-of-ATR</i>						
<i>DiD</i> _{98–00}	-0.023*** (0.003)	-0.027*** (0.003)	-0.027*** (0.003)	-0.023*** (0.003)	-0.026*** (0.003)	-0.026*** (0.003)
<i>DiD</i> ₀₁₊	0.010*** (0.003)	0.0066** (0.003)	0.0063** (0.003)	0.011*** (0.003)	0.008** (0.003)	0.007** (0.003)
<i>Panel B: Out-Migration</i>						
<i>DiD</i> _{98–00}	-0.020** (0.008)	-0.021** (0.008)	-0.021** (0.008)	-0.020** (0.008)	-0.022** (0.008)	-0.022** (0.008)
<i>DiD</i> ₀₁₊	-0.022*** (0.008)	-0.023*** (0.008)	-0.023*** (0.008)	-0.022*** (0.008)	-0.023*** (0.008)	-0.023*** (0.008)
<i>Panel C: In-Migration</i>						
<i>DiD</i> _{98–00}	-0.001 (0.010)	-0.002 (0.010)	-0.002 (0.010)	-0.002 (0.010)	-0.003 (0.010)	-0.003 (0.010)
<i>DiD</i> ₀₁₊	-0.010 (0.008)	-0.010 (0.008)	-0.011 (0.008)	-0.011 (0.008)	-0.011 (0.008)	-0.010 (0.008)
Age Fixed Effects		✓	✓		✓	✓
Demog. Controls			✓			✓
Macro. Controls				✓	✓	✓
Observations	41,340	41,340	41,340	41,340	41,340	41,340

Notes: This table reports the migration-direction results under alternative sets of controls. The control group consists of individuals earning \$50,000–\$100,000 in 1999. Panel A reports first-stage difference-in-differences (DiD) estimates for changes in the net-of-average tax rate (net-of-ATR). Panels B and C report the corresponding DiD estimates for the probability of out-migration and in-migration. Columns progressively add controls: column (1) includes province and year fixed effects only; column (2) additionally includes age fixed effects; column (3) adds demographic controls; column (4) includes macroeconomic controls; column (5) includes age fixed effects and macroeconomic controls; and column (6) includes the full set of age, demographic, and macroeconomic controls. Huber–White heteroskedasticity-robust standard errors are reported in parentheses. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table D.5: Placebo Test

	1994		1995		1996	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Log Population</i>						
<i>DiD</i>	0.032		0.032		0.041	
	(0.108)		(0.096)		(0.075)	
Observations	80		80		80	
<i>Panel B: Out-Migration</i>						
Control Group	\$50k–\$100k	≤ \$50k	\$50k–\$100k	≤ \$50k	\$50k–\$100k	≤ \$50k
<i>DiD</i>	-0.0007	-0.005	0.004	-0.002	0.006	-0.003
	(0.008)	(0.008)	(0.009)	(0.009)	(0.010)	(0.010)
Observations	51,555	279,765	51,555	279,765	51,555	279,765

Notes: This table reports placebo tests that assign the tax reform to earlier years (1994–1996) prior to the actual implementation of the reform. We utilize the years spanning 1990–1997 for this analysis. We use 1997 as the last year to avoid overlapping with the 1998–2001 reform. Panel A reports population-level results, including first-stage estimates for changes in the net-of-average tax rate (net-of-ATR) and the corresponding 2SLS elasticity estimates. Panel B reports difference-in-differences (DiD) estimates for the probability of out-migration. For Panel B, columns alternate between control groups of individuals earning \$50,000–\$100,000 and those earning less than \$50,000 in 1999. All population regressions include province and year fixed effects along with macroeconomic controls and report standard errors clustered at the province level. Migration regressions include the full set of demographic and macroeconomic controls and report Huber–White heteroskedasticity-robust standard errors. Sample sizes are rounded to comply with Statistics Canada disclosure rules. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.