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Do Immigrants catch-up with the Natives in terms of earnings? Evidence from Individual level data of Canada

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Abstract

This paper analyses differences in dynamic transitions into and out of any of the five hourly wage quintiles and quintile zero (unemployed and non-employed people) between immigrants and natives for the period 1993-2004. Using Longitudinal Level data from Survey of Labour and Income Dynamics (SLID) for men aged 25 to 55, we investigate how unobserved heterogeneity factors, and initial conditions may affect individuals' propensity to stay in or leave any of the wage quintiles. Furthermore, we also consider a dynamic multinomial logit model with the random effects approach. Empirical results show that state dependence exists in all hourly wage quintiles. Moreover, education, experience, marital status, immigrant minority status, and age at immigration are significant factors determining hourly wage differentials between immigrants and natives.

JEL Codes: C33, C35, J31, J38, J61

Keywords: Wages Mobility; Income Inequality; Immigrants and Natives; State Dependence;

1 Introduction

The dramatic increase in income inequality in Canada since the 1990s has encouraged researchers to focus income mobility that is gaining grounds as an important area of empirical research. To-date, a handful of researchers have determined whether any changes in income inequality has been associated with an increase or decrease in income mobility rates (Buchinsky and Hunt, 1999; Burkhauser and Poupore, 1997; Lillard and Willis, 1978; Moffitt and Gottschalk, 1998). We extend and complement these noteworthy studies by investigating the dynamic wage mobility process by focussing specifically on indigenous and immigrant populations in Canada. More specifically, this study analyses the factors affecting income inequality in Canada for the period 1993-2004 under a dynamics wage process. Our empirical modelling approach considers both endogenous initial conditions problem and unobserved individual heterogeneity. In doing so, we adopt the Maximum Likelihood Estimation (MLE) procedure with factor analytic schemes for unobserved individual heterogeneity and Wooldridge/specification approach to the initial conditions problem.

Our extensive review of the literature on this subject area gives us a strong indication that the bulk of the existing empirical literature does not precisely consider the flow rates of individuals moving into and out of any hourly wage quintiles with the control for observed characteristics and unobserved heterogeneity. Our review also revealed that several researchers consider the annual earnings (salary) as a whole and disregard the effect of hours of working in their computations. For instance, Drolet and Morissette (1998) used aggregate wage level to explain the increases in earnings inequality rates in Canada since the 1990s. However, these researchers' findings are based on a macroeconomic analysis which largely ignores the growing dispersion of hourly wages. In the recent study, Smith and Fernandez (2017) found that immigrants in Canada and the United States earn over \$200 less per month than native-born workers. Their findings revealed that immigrants in the United States disproportionately work in low-wage occupations, leading to large mean national differences between immigrants and native workers. However, the wage differential reduces after controlling for education and skills. According to their results, immigrants can catch-up with the natives if better opportunities in education and skills are provided equally to both native and immigrants.

Based on analysis from National Statistics Agencies of Canada, individual's income after-tax and total income inequalities rose significantly over the period 1989-2004. The individual's market-income inequality increased sharply between 1989 and 1993, falling down slowly over the period 1993-2004. However, all levels of inequality including total, market, and after-tax

income inequalities were still higher than the ones observed in 1989.¹ Furthermore, In the United States, for the period 1986 to 2000, after-tax income inequality rose by 0.033 which was slightly larger than the one observed in Canada over the same period. However, common to both countries, the increase in after tax-income inequality has been accompanied by an inequality in individual's market-income and not a reduction in income redistribution attributed to changes in Employment Insurance (EI) or Social Assistance (SA) programs (Heisz, 2007). According to Mahler and Jesuit (2006), after-tax income inequality also rose in other industrialized countries such as Finland, Germany, Norway, Sweden, and the United Kingdom over the same period.

A study by Brodaty (2008) on the dynamics of American earnings revealed that state dependence in the earnings mobility process was statistically significant and its magnitude was upwardly biased once individual unobserved heterogeneity was not taken into account. Weber (2002) found that ignoring unobserved individual heterogeneity greatly overestimated the degree of state dependence on the wage mobility process. An explanation for this outcome was the possible existence of some barriers for women to move out of the lower ranks of the wage distribution process to the upper ranks. Trzcinski (1997) found that any changes in self-employment status (relatively to being employed in both periods) increased the probability of moving both up and down in the U.S and Germany, and with much higher effects for the moving down in Germany. For Canada, some studies so far have analysed earnings (income) inequality and redistribution of income since the 1990s (Drolet and Morissette, 1998; Heisz, 2007; Picot, 1998; Schwanen, 2001).

In another study on the Canadian economy, Ostrovsky (2008) found that the economic fortunes of immigrants in Canada in the recent years have followed a downward trend. The author noted that workers who entered the labour market in the mid-1980s generally experienced lower levels of earnings instability in the several years of their working careers in Canada than those who entered the labour market in the mid-1990s. Furthermore, Ostrovsky (2008) study also revealed that attributes such as the foreign education, birthplace, and the ability to speak English or French played important roles in immigrants' earnings inequality. According to a survey by Statistics Canada (2008), immigrants who arrived during the 1990s were accounted for about 70 percent of the net labour force growth between 1991 and 2001. In a recent study by Islam and Parasnis (2016), it was shown that migrants have a higher wage than the natives

¹The average market income is the sum of earnings (from employment and self-employment), investment income, rose in other industrialized countries such as (private) retirement income, and any other sources of income. It is equivalent to the total income minus government transfers (Statistics Canada, CANSIM II (Table 202-0202). See figure 1 in appendix.

and that the level of education and other labour market characteristics imparted an important role in earning a higher level of wage. However, this difference does not exist once they have control for covariates.

In view of the above discussion, this paper attempts to answer five fundamental questions relating to wage differentials amongst immigrants and the natives in Canada. These are: 1) what are the determinants of the transitions into and out of any hourly wage quintiles of immigrants and natives? 2) What are the proportions of spurious and structural state dependence in wage mobility process and how are they different between immigrants and natives? 3) How do economic conditions at the time of entry to the labour market (for natives) or arrival in Canada (for immigrants) affect the probability of being in any of the five hourly wage quintiles and quintile zero? 4) What are unobserved type-specific transition matrices and how are they different between immigrants and natives? 5) What are the policy implications of the form of spurious and structural state dependence to improve wage mobility process and therefore reduce income inequality?

This study, as opposed to similar studies on the subject, makes some new contribution to the literature in a number of ways. First, it analyses how economic conditions at the time of entry in the labour market (for natives) and the arrival of immigrants affect the probability of being in any income bracket (five hourly wage quintiles and quintile zero). Second, the estimation process in this study effectively controls for unobservable heterogeneity which improves the credibility of results and its implications with reference to the labour market dynamics. Finally, this paper specifically, accounts for the unobserved type-specific transition matrices separately for immigrants and natives, thus making the findings more interesting and robust.

In summary, the findings of this study show that education, experience, marital status, immigrant minority status, and age at immigration are significant factors determining hourly wage differentials between immigrants and natives. In additions, the results indicate that state dependence exists in all hourly wage quintiles among both immigrants and natives. For example, natives are estimated to have lower degrees of structural state dependence everywhere in the wage distribution than similar immigrants. Moreover, individuals with different unobserved types have different tendencies to be accumulated in the lower, middle, or upper parts of the wage distribution; which make the wage distribution segmented. The spurious effect is persistence in the lower and upper parts of the wage distribution suggesting that structural factors alone cannot explain the rise or fall in the rates of participation in hourly wage quintiles over the period 1993-2004 among immigrants and natives. Given the importance of

wage dynamics on income inequality trend, the outcome of this research is a valuable resource that benefits policy-makers not only in Canada but also in many other countries with similar labour market structures that relate to wage distribution for immigrants and natives.

The rest of the paper is organized into five sections. The next section explains structural and state dependence. Section 3 describes the data, its measures and sources. Section 4 presents an empirical specification of the dynamic model. Section 5 reports the empirical results. Section 6 concludes.

2 Structural and Spurious State Dependence

Any persistence in (or transition into and out of) the lowest, middle, and uppermost parts of the wage distribution can be a product of some measured and unmeasured variables. Exploring the main reasons of persistence is essential to properly estimate the parameters of interest in the dynamic framework model.² According to Heckman (1981a), individuals may differ in certain unmeasured variables that influence their probability of experiencing the event but are not influenced by the experience of it. If these variables are correlated over time and are not properly controlled, previous experience may appear to be a determinant of future experience only because it is a proxy for such temporally persistent unobserved variables. Improper treatment of unmeasured variables gives rise to a conditional relationship between future and past experience that is termed spurious state dependence. The initial conditions are typically assumed to be truly exogenous variables. This assumption is valid only if the disturbances that generate the processes are serially independent; this is not the case in dynamic models, though. Dynamic discrete choice models that assume the initial conditions are exogenous are effectively ignoring serial dependence attributable to unobserved individual heterogeneity and therefore lead to upwardly biased estimates of structural state dependence (Chay and Hyslop, 2000; Heckman, 1981a).

3 Data

In order to distinguish between true and spurious state dependence and to control for unobserved individual heterogeneity, longitudinal levels of Statistics Canada's Survey of Labour and Income Dynamics (SLID) with a large cross-sectional sample size is required. In

² Observed persistence is due to unobserved individual heterogeneity, structural state dependence, and some other significant observable covariates.

SLID, the focus extends from static measures to the whole range of transitions, durations, and repeat occurrences of people's financial and work situations. SLID has three complete and one incomplete longitudinal data. Each complete panel covers six years for almost 15,000 households, which is a suitable source of data for this research. The first panel is from December 1992 to the end of 1998, the second is from December 1995 to the end of 2001, and the third is from December 1998 to the end of 2004. The unit of analysis is household to which the respondent belonged as of December 31 of the reference year. All estimation results and descriptive statistics outputs are weighted by longitudinal weight variables provided by Statistics Canada.

The structural estimate of the dynamic model is based on two separate samples of immigrants and natives. The data is restricted to men between 25 and 55 over the period 1993-2004. The reason for such restriction is that men are less likely to be affected by a secular increase in school attendance or labour market participation than similar women. Moreover, men in this age group are more likely to have full-time jobs.³

The dynamic models for immigrants and natives control for the aggregate unemployment rate, extracted from CANSIM II (Table 282-0055). The unemployment rate for immigrants is the rate when they arrived in Canada.⁴ For natives (with 25 years of age) this is the rate at the time of entry to the labour market. Additionally, the models also control for the level of education, marital status, levels of Canadian work experience and specifically for immigrants, visible minority status, years since immigration, and age at immigration.

For education, we use a dummy variable indicating if a person has at least 12 years of schooling (high-school degree) at the time entry to the labour market. Marital status is defined if a person is married or common-law. Levels of Canadian work experience are set of dummy variables indicating if a person has at most 10, between 10 and 20, or more than 20 years of work experience. Visible minority group includes five categories of immigrants (Black, South East Asian or Oceanic, West Asian or North African (Arab), Latin American, and other groups than minorities).⁵ We ignored the effect of this variable for natives in my analysis. Years since immigration is a continuous variable indicating the individual's years of residing in Canada and finally, age at immigration is a continuous variable indicating the age of immigrant at the time of arrival in Canada.

³ In this paper, we looked at men who are paid-employed in their main jobs and have ignored self-employed workers in the analysis.

⁴ For immigrants under 25 at arrival, this rate is the rate when they are 25 years old; otherwise the rate at arrival has been applied.

⁵ Our analysis shows that only a small fraction of natives (about 2% of men aged 25-55) belongs to the visible minority group

Table 1 presents the mean characteristics of immigrants and natives. As weighted data shows, almost 44.6 percent of immigrants are visible minorities coming from South East Asia and Pacific Islands (29.8%), North Africa and West Asia (6.2%), and Latin America (3.1%). Further, about 5.5 percent of minorities are black. About 77 percent of immigrants and 73.4 percent of natives are married (or common-law) in the sample. The average unemployment rate at the time of entry to the labour market for immigrants and natives is almost 8.8%. About 75.7 percent of natives have at least 12 years of schooling, significantly lower than that of immigrants, which is 82.8%. On average, immigrants appear to have less Canadian experiences than natives as expected. Only 21.2 percent of natives have less than 10 years of Canadian experiences. The equivalent figure for immigrants is 40.7%, which is significantly higher than that of natives. A larger portion of natives has more than 10 years of Canadian experiences. Immigrants, on average, are more likely to be educated but have less Canadian experiences than comparable natives.

(Table 1 about here)

This study used hourly wage rather than annual earnings since it is more relevant for policy measures. This is because we cannot control the skill dynamics of the workers in the labour market by considering the aggregate annual earnings alone. For instance, skilled immigrants may find well-paid part-time jobs for fewer hours whereas an unskilled worker can work fulltime with lower per hour wage. Therefore, it is important to take hourly wage rather than annual earnings. Table 1 also provides information regarding hourly wage quintiles of immigrants and natives. Almost 8.7 percent of immigrants do not work in the sample. The equivalent figure for natives is 7.5%. The differences between immigrants and natives are prominent along the wage distribution. Immigrants are more accumulated in the first and last quintiles and less in the middle, while natives are more observed in the last quintiles and less in the first (Figure 2 in the appendix). The differences between immigrants and natives will be more observed if the heterogeneity between immigrant groups is considered. Figures 3 and 4 in the appendix show some disparities among different groups of immigrants in the upper and lower parts of the wage distribution.⁶ Figures 5 and 6 in the appendix compare immigrants' and natives' observed rates of participation in each hourly wage quintile over the period 1993-2004. The gap between immigrants and natives in quintile one has been narrowing gradually during the period 1993-2004. Rates of participation in the middle quintiles (quintiles two to four) changed cyclically for immigrants over the period 1993-2004. Natives' rates of participation changed smoothly in

⁶ Only blacks are less likely to be unemployed (or non-employed) than natives. About 6.5 percent of blacks in the sample do not work, lower than the percentage of natives, which is 7.5%.

quintile four but declined substantially in quintiles two and three. Immigrants' and natives' rates of participation in the last quintile (fifth quintile) inclined dramatically over the period 1993-2004.

As one of the objectives of this paper is to study the factors affecting transitional rates into and out of any of the five hourly wage quintiles and quintile zero. To do this, we calculated the mean characteristics of different transition and persistence states for immigrants and natives. In Tables 2 to 5, we can see that for immigrants any persistence in (or transitions into and out of) the lowest part of the wage distribution is associated with having less Canadian experiences, less likely to be married (or common-law), less likely to be educated, more from visible minority group (mostly from South East Asia and Pacific Islands), older at arrival, having lower years since immigration, and facing the higher unemployment rate at the time of entry to the labour market. Moving from the lowest part of the wage distribution to the uppermost part, immigrants are more likely to be educated, more experienced, more likely to be married, less from a visible minority group, and younger at arrival. They also have higher years since immigration and arrived in Canada when the aggregate unemployment rate was lower. The same pattern has been observed among natives. Moving from the first quintile to the fifth, natives are more likely to be married and educated, more experienced, and facing a relatively lower unemployment rate at the time of entry to the labour market. Comparing immigrants and natives, immigrants are more likely to have at least 12 years of schooling everywhere in the wage distribution. Immigrants on average have less Canadian experiences but are more likely to be educated.

(Tables 2 to 5 about here)

Table 6 shows conditional probability of leaving previous year's quintile for the period 1993-2004 by immigrants and natives. This table reveals several interesting relationships and patterns among immigrants and natives. There are some similarities and differences in the dynamic hourly wage quintiles between immigrants and natives. As seen, both immigrants and natives have more persistence in the bottom and top quintiles and less in the middle. Immigrants compared to natives have less persistence in quintile zero and more movement to the quintile one. One possible reason for this pattern is the presence of new immigrants in the sample who are unemployed and so have more chances to find a job in the lower part of the wage distribution. This is consistent with Finnie (1997)'s findings on earnings mobility for Canada. Moreover, reasons to be unemployed (or out of the labour force) are different between immigrants and natives and can be due to some factors which are not observed in the data. Natives are more likely to move up to the next quintiles, if they are initially in quintiles one and

two. Immigrants and natives in the middle and upper parts of the wage distribution have almost the same chances to move up to their next quintiles. Downward mobility rates from any hourly wage quintiles are higher for natives than for immigrants. The full transition matrices show that overall upward mobility rate is almost the same between immigrants and natives (16.8% and 16.7% for immigrants and natives respectively). However, immigrants compared to natives have lower downward mobility rate (14.4% and 16% for immigrants and natives respectively). One reason for such pattern is due to the higher stability and lower downward mobility rates for immigrants compared to natives along the wage distribution. Moreover, wage distribution for immigrants is skewed towards quartile one. The vast majority of movements reach an adjacent quintile for immigrants and natives.⁷ There is a positive correlation between the initial quintile and downward mobility and a negative correlation with upward mobility for immigrants and natives. Thus the quintile and its lag are not independent, and being in one quintile one year increases the probability to be in the same quintile the year after (state dependence). These results are consistent with Brodaty (2008). Overall, immigrants are less mobile (more persistent) than natives.⁸ The steady-state rate for immigrants is 68.8%, slightly higher than that for natives, which is 67.4%.

(Table 6 about here)

To see if there is any heterogeneity in these dynamics among immigrants, we calculated transition matrices by immigrant groups, presented in Table 7. There are substantial differences among visible minority group in persistence in (and transition into and out of) any hourly wage quintiles. As seen, Arabs and Latin Americans have more persistence in the last quintile (100th percentile), while South East Asians and Oceanic are more stable in the first and blacks are more stable in the second part of the wage distribution. Moreover, blacks and Arabs have less persistence in the fourth quintile, while South East Asians, Oceanic and Latin Americans are less stable in the third part of the wage distribution. The full transition matrices show that among different groups of immigrants, Latin Americans are the most stable and have the least downward mobility rate. Moreover, they have the lowest mobility rate from quintile five and the highest mobility rate from quintile one. Further, Arabs have the highest and South East Asians and Oceanic have the lowest upward mobility rates. In general, stability rates among immigrants except for blacks are less in the middle part of the wage distribution than natives.

⁷ For immigrants, the probability of moving from quintile one to two is 12%, higher than that of moving from quintile one to five, which is 1.6%. The equivalent probabilities for natives are 14.8% and 2.2% respectively.

⁸ A comparison between the entries in Table 6 and those in Table 7 illustrates that Blacks and Arabs are more unstable (more mobile) than natives.

The vast majority of the movements reach an adjacent quintile for almost all groups of immigrants. There is a positive correlation between the initial quintile and downward mobility and a negative correlation with upward mobility for almost all groups of immigrants as expected.

(Table 7 about here)

4 The Model and Empirical Specification

To analyse any movements into and out of any hourly wage quintiles and quintile zero (unemployed and non-employed), we choose a dynamic multinomial logit model with an error term composed of an individual-specific unobserved effect (time-invariant but varying across individuals) and a random error (varying both across time and individuals). We analyse the dynamic structure of the model as a first-order Markov process. Furthermore, we assume that individuals (*indexed by i , $i=1, 2, \dots, N$*) belong to any of the following six mutually exclusive and totally exhaustive boundaries of wage quintiles of q at time t ($t = 1, 2, 3, \dots, T_i$) as below:

- $q_t = 0[0]$ (*People who donot work*)
- $q_t = 1(0,20]$ (*People with wages in range from minimum observed wage to the 20th percentile*)
- $q_t = 2(20,40]$ (*People with wages between the 20th percentile and 40 th percentile*)
- $q_t = 3(40,60]$ (*People with wages between the 40th percentile and 60 th percentile*)
- $q_t = 4(60,80]$ (*People with wages between the 60th percentile and 80 th percentile*)
- $q_t = 5(80,100]$ (*People with wages above the 80th percentile*)

Let the value, for individual i , of belonging to quintile q at time t (V_{iqt}) be specified as:

$$V_{iqt}^* = X_{it}\beta_{1q} + Z_{it}\gamma_{2q} + D_{it}\delta_{3q} + \epsilon_{iqt} \quad (1)$$

Where,

$$\epsilon_{iqt} = \mu_{iq} + v_{iqt} \quad (2)$$

X_{it} is a vector of observed time varying variables, including marital status, levels of Canadian work experience, and years since immigration. Z_{it} is a vector of dummy variables indicating the previous wage quintile occupied by the individual i (time state dependence).

For usual identification, we take quintile zero as the reference quintile, D_{it} is vector of time-invariant variables, including level of education, age at immigration, the unemployment rate, and visible minority group.

The assumption regarding the error term, ϵ_{iqt} , can be summarized as follows:

ϵ_{iqt} is composed of the two terms: μ_{iq} and v_{iqt} . Where : v_{iqt} is assumed to be serially uncorrelated and to follow a Type I extreme value distribution. μ_{iq} is an unobserved, individual specific factor and independent of X_{it} , D_i , and I_{it} but not Z_{it} (endogeneity problem). If μ_{iq} is treated as a parameter to be estimated (fixed effects approach), then there is a severe incidental parameter problem. Following Chamberlain (1984), the consistency of the maximum likelihood estimator requires that $T \rightarrow \infty$. SLID, as well as most household panel data sets, contains many individuals but only a small and fixed number of T . Random effects analysis in this context may therefore seem more efficient than fixed effects analysis.

The model also controls for the endogenous initial conditions. The initial conditions problem arises when the start of the observation period does not coincide with the start of the stochastic process that generates individuals' participation experience. According to Chay and Hyslop (2000), dynamic discrete choice models that assume the initial conditions are exogenous are effectively ignoring serial dependence attributable to unobserved heterogeneity and therefore lead to upwardly biased estimates of structural state dependence. To account for this problem, we adopt the method suggested by Wooldridge (2005). Following him, consider the distribution of the unobserved effects, μ_{iq} , conditional on Z_{i1} and the mean values of exogenous time-varying variables over time ($\bar{X}_i$). Z_{i1} is a vector of initial hourly wage quintiles. μ_{iq} can be written as:

$$\mu_{iq} = \bar{X}_i \lambda_q + Z_{i1} \rho_q + v_{iq} \quad (3)$$

Therefore V_{iqt}^* can be written as:

$$V_{iqt}^* = X_{it} \beta_q + Z_{it} \gamma_q + D_{it} \delta_q + X_i \lambda_q + Z_{i1} \rho_q + v_{iq} + v_{iqt} \quad (4)$$

Following Mroz (1999), we assume that the probability distribution of v_{iq} can be approximated by a discrete factor distribution with a finite number of support points. Assuming a discrete distribution for the unobserved factors implies that the cumulative distribution function is approximated by a step function. In particular, the distribution of v_{iq} is given by:

$$P_Y(v_{iq} = v_q^m) = \pi^m, m = 1, 2, \dots, M \quad (5)$$

Where,

$$\pi_m > 0 \quad (6)$$

π_m is the probability that the unobserved factor takes on the values of v_q^m . To be specific, there are m types of individuals and each individual, i , at any quintiles of q is endowed with a set of unobserved characteristics, v_{iq}^m . To estimate simultaneously the parameters β_i , γ_q , δ_q , $(v_{iq}^1, \dots, v_{iq}^m)$, and $P_1, \dots, P_m$, we use a logistic transformation as

$$\pi^m = \frac{\exp(p_m)}{\sum_{j=1}^m \exp(p_m)} \quad (7)$$

Where,

$$0 < \pi^m < 1 \quad (8)$$

and

$$\sum_{m=1}^M \pi_m = 1 \quad (9)$$

To select the number of support points, we calculate the value of the AIC (Akaike Information

Criteria) and the BIC (Bayesian Information Criteria) when an additional point of support

is added. We stop adding more support points to the model when either values start decreasing.

The likelihood contribution for individual i with observed quintile states $q_1, \dots, q_T$ given all observed and unobserved effects can be written as:

$$L_i(v_i) = \prod_{t=2}^T p_{it}(q_t/v_i) \quad (10)$$

Where v_i is a vector of $v_{it}q$ for $q_t = 0, 1, \dots, 5$.

$q_t = q$ if $v_{itq}^* > v_{ilt}^*$ for $q \neq l$ in equation (6). This results a six-state multinomial logit with the random effects as:

$$P_{it}(q_t = q/v_i) = \frac{\exp(X_{it}\beta_q + Z_{it}\gamma_q + D_{it}\delta_q + X_i\lambda_q + Z_{i1}\rho_q)}{\sum_{j=0}^5 \exp(X_{it}\beta_q + Z_{it}\gamma_q + D_{it}\delta_q + X_i\lambda_q + Z_{i1}\rho_q)} \quad (11)$$

As earlier mentioned there are m types of individuals i with the set of unobserved characteristics, v_i^m , that is a vector of $(v_{iq}^1, \dots, v_{iq}^m)$. We can write unconditional log-likelihood function as:

$$\log L_i(v_i) = \log \sum_{m=1}^M \pi_m L_i(v_i^m) \quad (12)$$

and therefore we have

$$L_{TN} = \prod_{t=2}^T \prod_{i=1}^N \sum_{m=1}^M \pi_m P_{it}(q_t/v_i) \quad (13)$$

5 Empirical Results

This section reports empirical results from maximizing the likelihood function of the multinomial logit model controlling for the endogenous initial conditions problem and unobserved heterogeneity for immigrants and natives separately (Tables 10 and 11).⁹ To show the efficiency of the model specification, we also report the estimation results of the model when there is no control for the endogenous initial conditions problem and unobserved heterogeneity (Tables 8 and 9).

Tables 8 to 11 about here)

We experimented with different values of support points for both immigrants and natives. The results show that a model with $M=3$ fitted the data well for immigrants. For natives, $M=6$ fitted the data well. Tables 12 and 13 report the values of AIC, BIC, the number of parameters, and the value of the objective function for different model specifications for immigrants and natives. We used BIC to choose the number of support points in the estimation of each model.

(Tables 12 to 13 about here)

As expected, assuming that the initial conditions are exogenous and also ignoring unobserved factors generates inflated estimates of the degree of state dependence for immigrants and natives. When the model ignores the effects of unobserved factors, it erroneously assumes that the correlation between state dependence variables and time-invariant unobserved factors is zero. This invalid assumption overestimates state

⁹ As SLID is not a representative random sample, the likelihood function is weighted with the weight variables provided by statistics Canada.

dependence parameters. This is consistent with many other studies on dynamic analysis frameworks of discrete choice modelling, for example, Brodaty (2008), Stewart (2007), Hansen et al. (2006), and Henley (2000).

Our attention in this research focuses more on estimated transition probabilities, the proportion of spurious and structural state dependence, and type specific transition matrices (Tables 14 to 18). The estimated transitions matrices are evaluated at the corresponding sample means and are based on the estimates reported in Tables 8 to 11. Because the models presented in this paper have a non-linear nature, the magnitudes of the coefficient estimates provide little information about the size of the effects of the observable covariates. Therefore, to analyse the effect of these covariates on probability of being in any hourly wage quintiles, we calculated marginal effects of significant parameters and noted that education and experience are significant factors determining hourly wage differentials between immigrants and natives.

For immigrants, education has a negative significant effect on log-odd (logit) probability of being in the lower parts of the wage distribution (quintiles one and two) and a positive significant effect on logit probability of being in the last quintile (quintile five), all other factors fixed. For natives, education has a positive significant effect on logit probability of being in any hourly wage quintiles. My calculation shows that the marginal effect of having at least 12 years of schooling is negative in the first and second quintiles and positive in the last quintile for both immigrants and natives, indicating that immigrants and natives with higher years of education have greater chances to work in the uppermost part of the wage distribution. Marginal effect of education is significantly higher among immigrants than among natives. For example, for immigrants marginal effects of education on probability of being in the first and second quintiles are -3.73% and -3.61% respectively, while the marginal effect of education on probability of being in quintile five is 7.87%. For natives, marginal effects of education on probability of being in the first and second quintiles are -2.7% and -1.3% respectively, while the marginal effect of education on probability of being in quintile five is 4.8%. Immigrants who have Canadian experience are less likely to be in the lower part of the wage distribution (quintile two), all other factors fixed. For natives, the positive marginal effect of having more Canadian experience is highest in the middle part of the wage distribution (third quintile).

Being married (or common-law) increases logit probability of being in the lowest part

of the wage distribution (quintile one) among immigrants, all other factors fixed. Being married (or common-law) has a positive significant effect on logit probability of being in any hourly wage quintiles among natives. Unemployment rate at the time of entry to the labour market is not a significant factor determining wage differentials among immigrants. This is not the case for natives, though. There is some heterogeneity among different groups of immigrants in the probability of being in any hourly wage quintiles. For example, Arabs have a lower logit probability of being in quintiles two and three, while being Latin American has no significant effects on the log-odd probability of being in any hourly wage quintiles, other factors being fixed. Marginal effects of being Arab in quintiles two and three are -3.35% and -3.65% respectively. Blacks are more likely to be in the third quintile, while South East Asians are estimated to be in the first part of the wage distribution, all other factors fixed. Age at immigration (but not years since immigration) is a significant factor determining the probability of being in any hourly wage quintiles. This is in line with Schaafsma and Sweetman (2001) study on immigrants' earnings which also found a strong correlation between age at immigration and earnings.

Furthermore, our results show that immigrants who are younger at arrival are more likely to be in the middle part of the wage distribution. In fact, the probability of being in the lowest and uppermost part of the wage distribution is higher for immigrants who are older at arrival. Marginal effects of age when it changes from 30 to 20 are positive in the first and fifth quintiles (0.42% and 1.75% respectively) and negative in quintiles two, three, and four (-2.52%, -8.1%, and -6.2% respectively). Immigrants who are older at arrival are more likely to work at the bottom and uppermost part of the wage distribution (first and fifth quintiles). There is a possible correlation between age at arrival and education/experience among immigrants in the uppermost part of the wage distribution which make immigrants who are older at arrival be more likely in the uppermost part of the distribution. State dependence exists in all hourly wage quintiles. All state dependence variables and their initial values are highly statistically significant in all hourly wage quintiles.

Tables 14 and 15 reports estimated conditional probabilities of leaving previous year's quintile with and without controlling for endogenous initial conditions problem and unobserved heterogeneity for immigrants and natives. As expected, when controls for these factors are incorporated in the model, there is a reduction in estimated stability rates (and an increase in most transition probabilities). Reduction in the stability rates is due to the fact that some portion of observed persistence is attributed

to unobserved serial correlations (Heckman, 1981b). For earning mobility process Brodaty (2008) found that stability will be reduced when the model controls for these factors. This fact has been confirmed by various studies with different applications. For example, Hansen et al. (2006) found this pattern in analysing transitions into and out of social assistance in Canada. Arulampalam et al. (2000) also found the same results for modelling the unemployment incidence of British men.

(Tables 14 to 15 about here)

The overall conclusions from Tables 14 and 15 are as follows:

- For the model which does not control for spurious effects, persistence in being unemployed (or non-employed) is higher among immigrants than among natives. The probability of being unemployed (or non-employed) next year if one is unemployed (or non-employed) this year is 72.1% for immigrants, higher than that for natives, which is 68.2% (The differences between estimated transition matrices reported in Table 14 and observed transition matrices reported in Table 6 are due to the observed explanatory variables). Further, transition probabilities from first and middle parts of the wage distribution into the unemployment (or non-employment) state are higher among immigrants than natives; but the structural portions of these probabilities are higher among natives.
- Natives have more chances to be employed next year if they are unemployed (or non-employed) this year than similar immigrants, when the model does not control for spurious effects. The probabilities of moving into the first and second quintiles from quintile zero are 16.3% and 7.8% respectively for natives, higher than those for immigrants, which are 15.9% and 6.7%. The same pattern has been obtained in the transition from first to the second wage quintile. The probability of moving from first to the second wage quintile for natives is 16.1%, higher than that for immigrants, which is 14.4%. When moving from middle to the uppermost part of the wage distribution, immigrants and natives behave differently. Immigrants in the upper part of the wage distribution are more likely to move up to the next quintiles than comparable natives. For immigrants, the probability of moving into quintiles three, four, and five from their previous quintiles are 16.8%, 15.2%, and 16.2% respectively. The equivalent figures for natives are 15.4%, 14.9%, and 14.1%, which are lower than those for immigrants. Looking at structural parts of these transitions in Table 15, except in quintile two in which natives have a higher probability (20.2%) to move up to the next quintile, immigrants always do better off in the upper part of the wage distribution.
- The full transition matrices for immigrants and natives show that the vast majority of

the movements reach an adjacent quintile. For example, for immigrants, when the model ignores the effect of spurious factors, the probability of moving from first to the second quintile is 14.4%, higher than that of moving from first to the fifth quintile, which is 2.3%. The equivalent figures for natives are 16.1% and 1.7%. Initial quintile has a positive correlation with downward mobility and a negative correlation with upward mobility for immigrants and natives. These results are in line with Brodaty (2008) and are true when the model control and ignore the spurious effects.

The transition probabilities that are reported in Tables 14 and 15 can be used to decompose the estimated state dependence into structural and spurious state dependence. The distinction between true and spurious state dependence is very crucial for economic policy-making. Ignoring the effect of spurious factors leads to erroneous policy decision-making. Immigrant-native differences in persistence in and hourly wage quintiles are more apparent when the spurious effects are removed from the estimation. One possible explanation for this is the differences between immigrants and natives in unobserved characteristics such as labour market preferences (some barriers to the labour market for immigrants due to the labour market discrimination), abilities, or unemployment experiences. Table 16 shows the proportion of structural and spurious state dependence in hourly wage quintiles for immigrants and natives. The table clearly illustrates the effect of spurious effects in immigrant-native differences in unemployment (or non-employment) state, as well as in any hourly wage quintiles of one to five. As seen, immigrants have higher degrees of structural state dependence in all hourly wage quintiles than natives, except in quintile zero in which immigrants and natives have almost the same portions of structural and spurious effects. Immigrants and natives have the highest structural persistence in quintiles three (87.9%) and four (57.8%) respectively, higher than the equivalent figures in the bottom and top of the wage distribution. For natives, persistence in the last quintile (quintile five) stems to a greater extent (66%) from unobserved heterogeneity factors, while for immigrants only 24.9 percent of the persistence is spurious. In general, persistence in the first and last quintiles for natives predominantly stems from unobserved heterogeneity factors, while immigrants have a greater proportion of structural persistence. Differences between immigrants and natives in structural persistence in the lower, middle and upper parts of the wage distribution reinforce the necessity of having a dynamic model which controls for both spurious and structural factors.

(Table 16 about here)

Individuals with different unobserved characteristics have different tendency to be in the upper or lower part of the earnings distribution. As a result, the earnings distribution can be highly segmented in the long-run (Brodaty, 2008). To analyse how immigrants and natives behave on the basis of their unobserved types, we constructed type-specific transition matrices for immigrants and natives.

Tables 17 and 18 reports the type specific-transition matrices for immigrants and natives. There are three unobserved heterogeneity types for immigrants and each type has a probability mass of 84.2%, 14.2%, and 1.6% of the sample. Type one immigrants have a higher probability of persistence in any hourly wage quintiles. There is almost equal mobility into upper and lower parts of the wage distribution from any hourly wage quintiles. This makes upward and downward mobility rates almost the same for type one immigrants. Type two and type three immigrants are attracted towards the quintiles four and five respectively. This makes wage distribution very segmented in the upper parts of the wage distribution for these types of immigrants. Type two immigrants have a higher probability to move into quintile three if they are initially unemployed (or non-employed). Type three immigrants have some probabilities to move into quintile three if they are initially in any hourly wage quintiles.

(Tables 17 and 18 about here)

There are six unobserved heterogeneity types for natives and each type has a probability mass of p_1 , p_2 , p_3 , p_4 , p_5 , and p_6 of the sample. Almost each type is attracted towards a specific quintile. For example, type one individuals have the highest probability to move into the quartile one, if they are initially in any of the first four quintiles and quintile zero. Type two and three individuals are more attracted to the quintiles two and three respectively, whereas type four and type five are attracted to the quintiles four and five. Type zero natives have a higher persistence in the middle part of the wage distribution. With regard to overall upward and downward mobility, type one and type two individuals have higher upward mobility than downward, whereas type three, type four, and type five have higher downward mobility than upward.

Overall, Tables 17 and 18 suggest that immigrant-native gaps in the persistence of or transitions into or out of, any of the hourly wage quintiles are due to some measured and unmeasured factors. The results also point to the importance of controlling for the endogenous initial conditions problem and unobserved heterogeneity factors. We also note that individuals with different unobserved types have different tendencies to be

accumulated in the lower, middle, or upper parts of the wage distribution; which make the wage distribution segmented.

Finally, Tables 19 and 20 show the predicted and observed distribution of wage quintiles. The predicted distributions are calculated for each year. Overall, the predicted distributions are almost similar to the observed frequencies, indicating that the empirical models fit the data well. One measure of goodness of fit in discrete choice modelling is likelihood ratio test. This measure is defined as $1 - [LL(\beta)/LL(0)]$, where $LL(\beta)$ is the value with the log-likelihood function at the estimated parameters and $LL(0)$ is the value with all parameters equal to zero. The index ranges from zero (no model) to one (perfect model). Table 21, reports the likelihood ratio indices for the final models.

6 Summary and Conclusions

This paper analyses transitions into and out of any of the five hourly wage quintiles and quintile zero, accounting for unemployment and non-employment state. We initially analyse the dynamic structure of the model as a first-order Markov process. To take into account the effect of the endogenous initial conditions problem and unobserved individual heterogeneity, we use longitudinal levels of SLID in my estimation. The model is a dynamic multinomial logit with discrete factor approximation for the specification of unobserved individual heterogeneity. To avoid the effect of a secular increase in labour market participation or school attendance, the data is restricted to males aged 25 to 55 years old between 1993 and 2004. All estimation results, as well as descriptive statistics, are weighted with the weight variables provided by Statistics Canada.

The observed raw data shows that immigrants from a visible minority group on average are accumulated more in the first and second parts of the wage distribution, while comparable natives are observed more in the middle and uppermost parts of the distribution. In comparison with other groups of immigrants, Arabs and Latin Americans have a lower mobility rate from the last quintile and a higher mobility rate from the first. This makes the quintile distribution very segmented among Arabs and Latin Americans. Moreover, Asians have more chances to work in the uppermost part of the wage distribution than other groups of immigrants. Moving from the lower part of the wage distribution to the upper part, both immigrants and natives are more likely to be educated and married, more experienced, and face a lower unemployment rate

at the time of entry to the labour market. On average, immigrants are more likely to be educated but have less experience than similar natives. Overall upward mobility rate is almost the same between immigrants and natives. However, immigrants compared to natives have lower downward mobility rate.

Empirical results show that education, experience, marital status, immigrant minority status, and age at immigration are significant factors determining hourly wage differentials between immigrants and natives. Moreover, the results indicate that state dependence exists in all hourly wage quintiles among both immigrants and natives. Not all observed persistence in hourly wage quintiles is structural for immigrants and natives. Some portion of this persistence stems from unobserved heterogeneity factors and spurious effects. Natives are estimated to have lower degrees of structural state dependence everywhere in the wage distribution than similar immigrants. Further, both immigrants and natives have the highest structural persistence in almost middle parts of the wage distribution. Persistence in the last quintile for natives in greater extent stems from unobserved heterogeneity factors; while immigrants have always a smaller proportion of spurious state dependence. The results, in this study, show that individuals with different unobserved types have different tendencies to be accumulated in the lower, middle, or upper parts of the wage distribution; which make the wage distribution segmented. Immigrants and natives have three and six unobserved types respectively. Each type is attracted towards a specific type.

The significant proportion of spurious effect in persistence in the lower and upper parts of the wage distribution indicates that structural factors alone cannot explain the rise or fall in the rates of participation in hourly wage quintiles over the period 1993-2004 among immigrants and natives. Public policies should act on both dimensions (spurious and structural state dependence) of the wage persistence to reduce wage inequality. Public policies that improve unobserved heterogeneity effects (abilities and skills) such as public or private job training programs may attract both immigrants and most natives to the specific wage quintiles and then help to reduce income inequality. Policies that lessen labour market discrimination help capable immigrants to move out of the lower part of the wage distribution to the upper part. Moreover, policies which induce longer unemployment spells such as unemployment insurance or social assistance programs lead to larger skill losses among natives and immigrants, mostly among immigrants, making these policies more costly. Any modifications in employment insurance or social assistance programs redistribute the hourly wage pattern among working populations and therefore reduce wage inequality among

natives and immigrants. The effectiveness of these policies is not addressed in this paper but is of great interest for future research.

References

- Arulampalam W, Booth AL, Taylor MP, Unemployment persistence. *Oxford economic papers* 2000;52; 24-50
- Brodaty T, Introduire de l'hétérogénéité inobservée dans la mobilité des salaires. *Revue économique* 2008;59; 621-629
- Buchinsky M, Hunt J 1999. *Wage mobility in the United States*. MIT Press; 1999.
- Burkhauser RV, Poupore JG, A cross-national comparison of permanent inequality in the United States and Germany. *The Review of Economics and Statistics* 1997;79; 10-17
- Chamberlain G, Panel data. *Handbook of econometrics* 1984;2; 1247-1318
- Chay K, Hyslop D, Identification and estimation of dynamic binary response models: empirical evidence using alternative approaches (Working Paper No. 5). Berkley. CA: University of California-Berkeley Center for Labor Economics 2000;
- Drolet M, Morissette R. The Upward Mobility of Low Paid Canadians, 1993-95. *Statistics Canada*; 1998.
- Finnie R 1997. Earnings dynamics in Canada: the earnings mobility of Canadians 1982-1992. 1997.
- Hansen J, Lofstrom M, Zhang X, State dependence in Canadian welfare participation. 2006;
- Heckman JJ 1981a. Heterogeneity and state dependence. *Studies in labor markets, Studies in labor markets*. University of Chicago Press; 1981a. p. 91-140.
- Heckman JJ, The incidental parameters problem and the problem of initial conditions in estimating a discrete time-discrete data stochastic process. 1981b;
- Heisz A. Income inequality and Redistribution in Canada, 1976 to 2004. *Statistics Canada Ottawa*; 2007.
- Henley A, Self-Employment Choice: State Dependence, Initial Conditions and Unobserved Heterogeneity. *School of Management and Business Research Paper* 2000;7;
- Islam A, Parasnis J, Native-Migrant Wage Differential Across Occupations: Evidence from Australia. *International Migration* 2016;54; 89-109
- Lillard LA, Willis RJ, Dynamic aspects of earning mobility. *Econometrica: Journal of the Econometric Society* 1978; 985-1012
- Mahler VA, Jesuit DK, Fiscal redistribution in the developed countries: new insights from the Luxembourg Income Study. *Socio-Economic Review* 2006;4; 483-511
- Moffitt RA, Gottschalk P 1998. Trends in the variances of permanent and transitory earnings in the US and their relation to earnings mobility. *Boston College Department of Economics*; 1998.
- Mroz TA, Discrete factor approximations in simultaneous equation models: Estimating the impact of a dummy endogenous variable on a continuous outcome. *Journal of Econometrics* 1999;92; 233-274
- Ostrovsky Y. Earnings inequality and earnings instability of immigrants in Canada. *Statistics Canada*; 2008.
- Picot G, What is happening to earnings inequality and youth wages in the 1990s? 1998;
- Schaafsma J, Sweetman A, Immigrant earnings: age at immigration matters. *Canadian journal of Economics* 2001; 1066-1099
- Schwanen D, Trade Liberalization and Inequality in Canada in the 1990s. *Institute for Research on Public Policy* 2001;
- Smith WC, Fernandez F, Education, Skills, and Wage Gaps in Canada and the United States. *International Migration* 2017;55; 57-73
- Stewart MB, The interrelated dynamics of unemployment and low-wage employment. *Journal of applied econometrics* 2007;22; 511-531

Trzcinski E, The choice of self-employment, wage and salary employment, versus nonemployment: A comparison of Germany and the United States. Vierteljahrshefte zur Wirtschaftsforschung 1997;66; 62-70

Weber A 2002. State dependence and wage dynamics: A heterogeneous Markov chain model for wage mobility in Austria. Reihe Ökonomie/Economics Series, Institut für Höhere Studien (IHS); 2002.

Wooldridge JM, Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity. Journal of applied econometrics 2005;20; 39-54

List of Tables

Table1. Mean Characteristics by Immigrants and Natives, Canada 1993-2004

Specification	Variables	Immigrants	Natives
Quintile Dummies	People who do not work ¹	0.087	0.075
	People with hourly wages in the first quintile	0.202	0.164
	People with hourly wages in the second quintile	0.166	0.18
	People with hourly wages in the third quintile	0.167	0.193
	People with hourly wages in the fourth quintile	0.181	0.196
	People with hourly wages in the fifth quintile	0.195	0.192
Observed Characteristics	Educated ²	0.828	0.757
	Black	0.055	-
	South East Asian and Oceanic	0.298	-
	North African and West Asian (Arab)	0.062	-
	Latin American	0.031	-
	Age at arrival	21.096	-
	Married ³	0.77	0.734
	Unemployment Rate ⁴	8.741	8.748
	Years Since Immigration	20.783	-
	Less Experienced ⁵	0.407	0.212
	More Experienced ⁶	0.35	0.391
Number of Observations		4536	47514
Number of Individuals		756	7919
<p>Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The figures are rounded to the three decimal points.</p> <p>1. Unemployed or non-employed people.</p> <p>2. At least 12 years of schooling at the time of entry to the panel.</p> <p>3. Married or common-law.</p> <p>4. Unemployment rate at the time of entry to the labour market. For immigrants under 25 at arrival, the rate is the rate when they are 25 years old; otherwise the rate at arrival has been applied.</p> <p>5. At most 10 years of Canadian full-time work experiences.</p> <p>6. Between 10 and 20 years of Canadian full-time work experiences.</p>			

Table2. Mean Characteristics by Persistence in Hourly Wage Quintiles, Immigrants, Canada 1993-2004

Observed Characteristics	Immigrants					
	Persistence in Quintile					
	Zero ¹	1st	2nd	3rd	4th	5th
Educated²	0.768	0.726	0.783	0.862	0.852	0.959
Black	0.036	0.061	0.124	0.091	0.025	0.011
South East Asian and	0.267	0.455	0.336	0.258	0.252	0.248
North African and West	0.147	0.087	0.051	0.045	0.021	0.015
Latin American	0.075	0.048	0.036	0.025	0.025	0.002
Age at Arrival	22.74	24.621	22.635	18.525	18.757	18.55
Married³	0.616	0.688	0.82	0.817	0.805	0.834
Unemployment Rate⁴	8.527	9.336	9.24	8.63	8.343	8.246
Years Since	21.383	14.84	17.103	23.817	24.589	25.521
Less Experienced⁵	0.554	0.614	0.5	0.246	0.263	0.256
More Experienced⁶	0.312	0.295	0.388	0.473	0.317	0.35
Number of Observations	154	493	376	440	508	603
<p>Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The figures are rounded to the three decimal points.</p> <ol style="list-style-type: none"> 1. Unemployed or non-employed people. 2. At least 12 years of schooling at the time of entry to the panel. 3. Married or common-law. 4. Unemployment rate at the time of entry to the labour market. For immigrants under 25 at arrival, the rate is the rate when they are 25 years old; otherwise the rate at arrival has been applied. 5. At most 10 years of Canadian full-time work experiences. 						

Table3. Mean Characteristics by Persistence in Hourly Wage Quintiles, Natives, Canada 1993-2004

Observed Characteristics	Natives					
	Persistence in Quintile					
	Zero ¹	1st	2nd	3rd	4th	5th
Educated²	0.357	0.598	0.69	0.768	0.839	0.953
Married³	0.416	0.596	0.716	0.759	0.832	0.843
Unemployment Rate⁴	8.123	9.099	8.912	8.759	8.64	8.557
Less Experienced⁵	0.531	0.33	0.174	0.182	0.121	0.113
More Experienced⁶	0.265	0.386	0.453	0.379	0.373	0.414
Number of Observations	2202	5340	4991	4498	4942	4968

Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The figures are rounded to the three decimal points.

1. Unemployed or non-employed people.
2. At least 12 years of schooling at the time of entry to the panel.
3. Married or common-law.
4. Unemployment rate at the time of entry to the labour market. For immigrants under 25 at arrival, the rate is the rate when they are 25 years old; otherwise the rate at arrival has been applied.
5. At most 10 years of Canadian full-time work experiences.
6. Between 10 and 20 years of Canadian full-time work experiences.

Table4. Mean Characteristics by Transitions into and out of Hourly Wage Quintiles, Immigrants, Canada 1993-2004

Observed Characteristics	Immigrants					
	Transitions into and out of Quintiles					
	Lowest Part of the Wage Distribution		Middle Part of the Wage Distribution		Uppermost Part of the Wage Distribution	
	1st to 2 nd	2 nd to 1 st	2 nd to 3 rd	3 rd to 2 nd	4 th to 5 th	5 th to 4 th
Educated 1	0.802	0.804	0.845	0.805	0.9	0.867
Black	0.072	0.059	0.037	0.081	0.052	0.043
South East Asian and Oceanic	0.293	0.337	0.189	0.212	0.229	0.207
North African and West Asian	0.094	0.124	0.066	0.055	0.019	0.012
Latin American	0.054	0.05	0.06	0.068	~ 0	~ 0
Age at Arrival	22.125	24.009	22.351	19.058	20.713	18.898
Married 2	0.706	0.735	0.815	0.722	0.84	0.802
Unemployment Rate 3	9.22	8.825	8.996	8.923	8.38	8.238
Years Since Immigration	16.45	16.212	18.6	21.899	21.843	23.954
Less Experienced 4	0.594	0.608	0.514	0.335	0.352	0.256
More Experienced 5	0.294	0.256	0.303	0.365	0.33	0.424
Number of Observations	106	101	89	91	130	139

Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The figures are rounded to the three decimal points.

7. Unemployed or non-employed people.
8. At least 12 years of schooling at the time of entry to the panel.
9. Married or common-law.
10. Unemployment rate at the time of entry to the labour market. For immigrants under 25 at arrival, the rate is the rate when they are 25 years old; otherwise the rate at arrival has been applied.
11. At most 10 years of Canadian full-time work experiences.

Table5. Mean Characteristics by Transitions into and out of Hourly Wage Quintiles, Natives, Canada 1993-2004

Observed Characteristics	Natives					
	Transitions into and out of Quintiles					
	Lowest Part of the Wage Distribution		Middle Part of the Wage Distribution		Uppermost Part of the Wage Distribution	
	1 st to 2 nd	2 nd to 1 st	2 nd to 3 rd	3 rd to 2 nd	4 th to 5 th	5 th to 4 th
Educated ¹	0.697	0.642	0.772	0.75	0.904	0.898
Married ²	0.711	0.713	0.738	0.762	0.844	0.846
Unemployment Rate ³	9.105	8.859	9.053	8.836	8.711	8.436
Less Experienced ⁴	0.294	0.23	0.276	0.18	0.149	0.111
More Experienced ⁵	0.423	0.449	0.387	0.416	0.427	0.378
Number of observations	1028	1139	1012	1237	1147	1190
Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The figures are rounded to the three decimal points.						
1. Unemployed or non-employed people. 2. At least 12 years of schooling at the time of entry to the panel. 3. Married or common-law. 4. Unemployment rate at the time of entry to the labour market. For immigrants under 25 at arrival, the rate is the rate when they are 25 years old; otherwise the rate at arrival has been applied. 5. At most 10 years of Canadian full-time work experiences. 6. Between 10 and 20 years of Canadian full-time work experiences.						

Table 6. Quintile Mobility Rates, Conditional Probability of Leaving Previous Year's Quintile for the period 1993-2004, by Immigrants and Natives, Canada 1993-2004

Origin Quintile	Destination Quintile						Direction			
	Zero ¹	1 st	2 nd	3 rd	4 th	5 th	Down	Stable	Up	Total
Immigrants										
1	0.711	0.18	0.041	0.047	0.009	0.011	0	0.711	0.289	0.1
1st	0.055	0.718	0.12	0.056	0.034	0.016	0.055	0.718	0.227	0.211
2nd	0.019	0.146	0.645	0.126	0.035	0.029	0.165	0.645	0.19	0.17
3rd	0.014	0.055	0.155	0.578	0.143	0.054	0.225	0.578	0.197	0.17
4th	0.011	0.025	0.035	0.152	0.621	0.155	0.224	0.621	0.155	0.173
5th	0.002	0.016	0.018	0.03	0.157	0.777	0.223	0.777	0	0.176
Total							0.144	0.688	0.168	1
Natives										
1	0.758	0.13	0.053	0.03	0.019	0.01	0	0.758	0.242	0.083
1st	0.043	0.687	0.148	0.061	0.037	0.022	0.043	0.687	0.27	0.17

2nd	0.016	0.153	0.626	0.146	0.042	0.017	0.169	0.626	0.205	0.183
3rd	0.012	0.048	0.164	0.589	0.145	0.043	0.223	0.589	0.188	0.19
4th	0.01	0.025	0.035	0.164	0.616	0.15	0.234	0.616	0.15	0.189
5th	0.008	0.014	0.013	0.033	0.157	0.774	0.226	0.774	0	0.186
Total							0.16	0.674	0.167	1
Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The figures are rounded to the three decimal points.										
1- Unemployed or non-employed people.										

Table 7. Quintile Mobility Rates, Conditional Probability of Leaving Previous Year's Quintile for the period 1993-2004, by Immigrant Groups, Canada 1993-2004

Origin	Destination Quintile						Direction			
Quintile	1	1 st	2 nd	3 rd	4 th	5 th	Down	Stable	Up	Total
Immigrants (Black)										
1	0.496	0.458	0.016	~ 0	0.031	~ 0	0	0.496	0.504	0.084
1st	0.109	0.637	0.099	0.093	0.034	0.028	0.109	0.637	0.254	0.237
2nd	~ 0	0.103	0.802	0.046	0.024	0.026	0.103	0.802	0.095	0.255
3rd	~ 0	0.044	0.154	0.637	0.136	0.03	0.197	0.637	0.166	0.251
4th	0.02	0.007	0.05	0.327	0.404	0.191	0.405	0.404	0.191	0.118
5th	~ 0	0.055	0.022	0.017	0.325	0.583	0.417	0.583	0	0.055
Total							0.146	0.659	0.194	1
Immigrants (Asian and Oceanic)										
1	0.716	0.195	0.039	0.036	0.003	0.01	0	0.716	0.284	0.1
1st	0.04	0.8	0.089	0.04	0.022	0.008	0.04	0.8	0.16	0.277
2nd	0.016	0.153	0.674	0.089	0.035	0.033	0.169	0.674	0.157	0.163
3rd	0.014	0.058	0.133	0.589	0.169	0.038	0.204	0.589	0.207	0.164
4th	0.004	0.025	0.031	0.152	0.664	0.124	0.212	0.664	0.124	0.157
5th	~ 0	0.017	0.023	0.055	0.14	0.764	0.236	0.764	0	0.143
Total							0.128	0.723	0.149	1
Immigrants (Arab)										
1	0.642	0.181	0.029	0.149	~ 0	~ 0	0	0.642	0.358	0.327
1st	0.077	0.757	0.097	0.02	0.029	0.02	0.077	0.757	0.166	0.266
2nd	0.053	0.199	0.55	0.176	0.014	0.008	0.252	0.55	0.198	0.141
3rd	0.065	0.128	0.195	0.4	0.156	0.057	0.387	0.4	0.213	0.152
4th	0.108	0.103	0.032	0.283	0.389	0.084	0.527	0.389	0.084	0.06
5th	~ 0	~ 0	0.021	~ 0	0.12	0.859	0.141	0.859	0	0.054

Total							0.135	0.659	0.206	1
Immigrants (Latin American)										
1	0.721	0.219	0.047	0.013	~ 0	~ 0	0	0.721	0.279	0.217
1 st	0.093	0.737	0.087	0.064	0.019	~ 0	0.093	0.737	0.17	0.38
2 nd	0.029	0.2	0.621	0.15	~ 0	~ 0	0.229	0.621	0.15	0.205
3 rd	0.024	0.062	0.309	0.487	0.105	0.013	0.395	0.487	0.118	0.106
4 th	~ 0	0.11	~ 0	~ 0	0.89	~ 0	0.11	0.89	0	0.085
5 th	~ 0	~ 0	~ 0	~ 0	0.026	0.974	0.026	0.974	0	0.007
Total							0.1	0.73	0.176	1
Immigrants (Others)										
1	0.771	0.122	0.056	0.007	0.02	0.024	0	0.771	0.229	0.064
1 st	0.049	0.631	0.169	0.075	0.051	0.025	0.049	0.631	0.32	0.153
2 nd	0.019	0.139	0.616	0.153	0.041	0.031	0.158	0.616	0.226	0.169
3 rd	0.009	0.047	0.159	0.594	0.121	0.07	0.215	0.594	0.191	0.171
4 th	0.011	0.022	0.037	0.128	0.624	0.178	0.198	0.624	0.178	0.206
5 th	0.0025	0.016	0.016	0.022	0.161	0.783	0.217	0.783	0	0.236
Total							0.156	0.673	0.171	1

Table8. Dynamic Multinomial Logit Model of Hourly Wage Quintiles, Immigrants, No Control on Endogenous Initial Conditions and Unobserved Heterogeneity

Description		1 st Quintile	2 nd Quintile	3 rd Quintile	4 th Quintile	5 th Quintile
State Dependence	1 st Quintile	4.3316** (0.2463)	3.7536** (0.3465)	3.6933** (0.4744)	4.7688** (0.8372)	3.2712** (0.7023)
	2 nd Quintile	3.9628** (0.3911)	6.4710** (0.4416)	5.8122** (0.5412)	5.4302** (0.9027)	4.9375** (0.7388)
	3 rd Quintile	3.0473** (0.4887)	5.3870** (0.5077)	7.5493** (0.5798)	7.5244** (0.9029)	5.7728** (0.7595)
	4 th Quintile	3.1626** (0.5655)	4.3289** (0.6021)	6.4073** (0.6444)	9.4254** (0.9344)	7.4804** (0.7857)
	5 th Quintile	4.3017** (1.1169)	5.2301** (1.1417)	6.3443** (1.1625)	9.7572** (1.3336)	10.6411** (1.2215)
Observed Covariates	Educated	-0.4461* (0.2438)	-0.2396 (0.2663)	0.1603 (0.2853)	0.2616 (0.3008)	1.1332** (0.3457)
	Age at Arrival	-0.0804**	-0.1033**	-0.0795**	-0.0803**	-0.0632**

		(0.0170)	(0.0187)	(0.0195)	(0.0204)	(0.0214)
	Black	0.4347 (0.4846)	0.9126* (0.4958)	0.6738 (0.5138)	0.0179 (0.5550)	-0.3245 (0.6131)
	South East Asian and Oceanic	0.4486* (0.2713)	0.1004 (0.2861)	0.0230 (0.2953)	-0.0973 (0.3039)	-0.3030 (0.3137)
	North African & West Asian (Arab)	-0.5107 (0.3709)	-1.1606** (0.4151)	- 1.2417** (0.4443)	-1.3221** (0.4868)	-1.3584** (0.5386)
	Latin American	-0.5672 (0.4610)	-0.5562 (0.4969)	-0.7908 (0.5448)	-0.8885 (0.6098)	-2.4995** (1.0953)
	Married	0.4654* (0.2507)	0.7395** (0.2697)	0.8537** (0.2804)	0.4787* (0.2873)	0.8925** (0.3077)
	Less Experienced	- 0.9560** (0.4506)	-1.3632** (0.4824)	-1.1023** (0.4884)	-0.9073* (0.5029)	-0.6423 (0.5227)
	More Experienced	-0.8125** (0.3821)	-0.9937 (0.4025)	-0.8050** (0.4050)	-0.8128** (0.4142)	-0.8314* (0.4291)
	Years Since Immigration	-0.1103** (0.0224)	-0.1296** (0.0247)	-0.0886** (0.0256)	-0.0943** (0.0266)	-0.0746** (0.0278)
	Unemployment Rate	-0.0032 (0.0743)	0.0013 (0.0794)	-0.0094 (0.0814)	-0.0544 (0.0833)	-0.0209 (0.0867)
Intercept		3.0022**	2.7769*	0.2351	-0.3989	-2.0129
Number of Individuals		756		Log-Likelihood	-3674.552721	
				Information Criteria	AIC	7519.1
Number of Observations		4536			BIC	7912.5
Note: The estimation results are based on annually observation of immigrants aged 25 to 55. The figures are weighted with longitudinal data provided by Statistics Canada in <i>SLID</i> . The numbers inside the parentheses are the standard errors. The asterisked figures are statistically significant at the 0.05 or 0.001 level, and * indicates significance at the 0.10 level).						

Table9. Dynamic Multinomial Logit Model of Hourly Wage Quintiles, Natives, No Control on Endogenous Initial Conditions and Unobserved Heterogeneity

Description	1 st Quintile	2 nd Quintile	3 rd Quintile	4 th Quintile	5 th Quintile
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State Dependence	1 st Quintile	4.6287** (0.6886)	3.9536** (0.4188)	3.7133** (0.4667)	3.2887** (0.4187)	4.4505** (0.4187)
	2 nd Quintile	4.0531** (0.1262)	6.4432** (0.1437)	5.8405** (0.1896)	4.4936** (0.1838)	5.4899** (0.4362)
	3 rd Quintile	3.1205** (0.1557)	5.5316** (0.1634)	7.6577** (0.1884)	6.2626** (0.1884)	6.9155** (0.4350)
	4 th Quintile	2.3163** (0.1597)	3.5681** (0.1674)	6.1082** (0.1838)	7.4216** (0.1838)	7.9342** (0.4188)
	5 th Quintile	2.2716** (0.3828)	2.9785** (0.3174)	4.4939** (0.3188)	6.4593** (0.3188)	9.9805** (0.4385)
Observed Covariates	Educated	0.5277**	0.8726**	1.1329**	1.4075**	2.1252**
	Married	0.4003**	0.6883**	0.7603**	0.9435**	1.0039**
	Unemployment Rate	0.2487**	0.2654**	0.2725**	0.2619**	0.2613
	Less Experienced	-0.6382**	-1.0471**	- 0.9936**	-1.1595	-1.0572**
	More Experienced	-0.0653	-0.1663*	-0.3609**	-0.3959	-0.2552
Intercept		-4.1909**	-5.5013**	-6.5844**	-6.8093**	-9.4980**
Number of Individuals		7919		Log-Likelihood	-38911.8737	
Number of Observation		47514		Information Criteria	AIC	77933.7
					BIC	78317.5
Note: The estimation results are based on annually observation of natives aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The numbers inside the parentheses are the standard errors. The asterisked figures are statistically significant (** indicates significance at the 0.05 or 0.001 level, and * indicates significance at the 0.10 level).						

Table10. Dynamic Multinomial Logit Model of Hourly Wage Quintiles, Immigrants, Control on Endogenous Initial Conditions and Unobserved Heterogeneity

Description		1 st Quintile	2 nd Quintile	3 rd Quintile	4 th Quintile	5 th Quintile
State Dependence	1 st Quintile	3.6439** (0.2924)	2.7514** (0.4057)	3.1714** (0.5705)	4.9116** (1.2178)	3.3685** (1.0437)
	2 nd Quintile	3.3351** (0.4666)	5.2455** (0.5173)	4.7572** (0.6478)	5.4179** (1.2750)	4.8404** (1.0730)
	3 rd Quintile	2.7886** (0.6011)	4.3417** (0.6287)	6.4854** (0.7222)	7.1047** (1.2960)	5.5214** (1.1099)
	4 th Quintile	2.8617** (0.6768)	3.3319 (0.7247)	5.0449** (0.7773)	7.8173** (1.3077)	6.3989** (1.1351)
	5 th Quintile	4.9667** (2.4648)	5.4599 (2.4760)	6.5139** (2.4892)	9.7452** (2.7154)	10.0784** (2.5985)
Observed Covariates	Educated	-0.6703**	-0.5578*	-0.1551	0.0184	0.8647**
	Age at Arrival	-0.0613**	-0.0867**	-0.0743**	-0.0668*	-0.0492**
	Black	0.4923	1.1582	1.0703*	0.7401	0.3452
	South East Asian and Oceanic	0.6636**	0.3517	0.2391	0.1661	-0.1672
	North African & West Asian (Arab)	-0.1015	-0.8747*	-0.9796*	-0.7127	-0.8642
	Latin American	-0.2831	-0.1396	-0.2654	-0.1492	-2.7455
	Married	1.4635**	0.0450	1.1106	0.4017	1.3840
	Less Experienced	-2.1200	-2.6949*	-1.0399	-0.2302	-1.6902
	More Experienced	-2.6164**	-2.9275**	-2.0834*	-1.0047	-2.4169**
	Years Since Immigration	-0.0539	0.0713	0.2838	0.1491	0.1642
	Unemployment Rate	0.0609	0.0701	0.0467	0.0645	0.1368
Intercept (type 1)		0.4780	-0.8507	-3.3518*	-7.3939**	-8.7481**
Intercept (type 2)		1.6302	3.0800*	2.4025	0.1033	-2.9273
Intercept (type 3)		0.3123	0.9123	8.6055	1.7967	6.0411
Probability mass (Type 1)		84.2 %				
Probability mass (Type 2)		14.2 %				
Number of Individuals		756		Log-likelihood	-3488.277499	
Number of Observation		4536		Information Criteria	AIC	7260.6
					BIC	7917.7
Note: The estimation results are based on annually observation of immigrants aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The numbers inside the parentheses are the standard errors. The asterisked figures are statistically significant (** indicates significance at the 0.05 or 0.001 level, and * indicates significance at the 0.10 level).						

Table11. Dynamic Multinomial Logit Model of Hourly Wage Quintiles, Natives, Control on Endogenous Initial Conditions and Unobserved Heterogeneity

Description		1 st Quintile	2 nd Quintile	3 rd Quintile	4 th Quintile	5 th Quintile
State Dependence	1 st Quintile	2.5242** (0.1348)	2.1056** (0.1604)	2.8513** (0.200)	2.9811** (0.2369)	2.8784** (0.3472)
	2 nd Quintile	2.4756** (0.1711)	4.0645** (0.2049)	4.4496** (0.2275)	3.8525** (0.2621)	4.0307** (0.3562)
	3 rd Quintile	2.5482** (0.1928)	4.1236** (0.2154)	6.2795** (0.2329)	5.3501** (0.2487)	5.2209** (0.3432)
	4 th Quintile	1.9884** (0.2125)	2.8652** (0.2409)	4.9686** (0.2330)	5.8687** (0.2394)	5.1585** (0.3368)
	5 th Quintile	1.6790** (0.2829)	2.4981** (0.2886)	4.2055** (0.2811)	4.6730** (0.2883)	5.8789** (0.3726)
Observed Covariates	Educated	0.4228** (0.2552)	0.6963** (0.2602)	1.0578** (0.2624)	1.4477** (0.2531)	2.2498** (0.2825)
	Married	0.6162** (0.2552)	0.6751** (0.2602)	0.7221** (0.2624)	0.6150** (0.2531)	0.9880** (0.2825)
	Unemployment Rate	0.2487** (0.2552)	0.2760** (0.2602)	0.2930** (0.2624)	0.3066** (0.2531)	0.3346** (0.2825)
	Less Experienced	-0.7723** (0.3525)	-0.6707* (0.3408)	-0.6253* (0.3468)	-0.8250** (0.3506)	-0.6209 (0.3833)
	More Experienced	-0.3624 (0.3648)	-0.2584 (0.3608)	-0.3011 (0.3468)	-0.2250 (0.3506)	0.0163 (0.3833)
Intercept (type 1)		-6.6669**	-7.5745**	-7.6075**	-8.8642**	-13.3125**
Intercept (type 2)		-2.5305**	-3.2794**	-5.6367**	-7.9108**	-12.7701**
Intercept (type 3)		-3.3240**	-6.2822**	-7.8219**	-8.6075**	-11.0881**
Intercept (type 4)		-6.1921**	-7.4864**	-7.2561**	-6.3234**	-8.2915**
Probability Mass (type 1)		0.342				
Probability Mass (type 2)		0.187				
Probability Mass (type 3)		0.315				
Number of Individuals		7919		Log-Likelihood	-36875.02477	
Number of Observations		47514		Information Criteria	AIC	73976
					BIC	74764.5
Note: The estimation results are based on annually observation of Natives aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID. The numbers inside the parentheses are the standard						

errors. The asterisked figures are statistically significant (** indicates significance at the 0.05 or 0.001 level, and * indicates significance at the 0.10 level).

Table12. Discrete Factor Model (DFM) Specification for Immigrants, Information Criteria (AIC and BIC), Number of Parameters, and Value of Objective Function

Model Specification (Immigrants)			AIC	BIC	Number of Parameters	Value of Objective Function
Controls for Unobserved Heterogeneity	Controls for Endogenous Initial Conditions	Number of support points				
No	No	1	7519.1	7912.5	85	-3674.55
No	Yes	1	7328.1	7929.8	130	-3534.06
Yes	Yes	2	7292	7921.5	136	-3510.02
Yes	Yes	3	7260.6	7917.7	142	-3488.27
Yes	Yes	4	7257.5	7942.5*	148	-3480.76
Note: The figures are obtained on the estimation results presented in Tables 8 and 10.						

Table13. Discrete Factor Model (DFM) Specification for Natives, Information Criteria (AIC and BIC), Number of parameters, and Value of Objective Function

Model Specification (Natives)			AIC	BIC	Number of Parameters	Value of Objective Function
Controls for Unobserved Heterogeneity	Controls for Endogenous Initial Conditions	Number of support points				
No	No	1	77933.7	78317.5	55	-38911.87
No	Yes	1	75451.3	76114.1	95	-37630.63
Yes	Yes	2	74613.6	75318.2	101	-37205.77
Yes	Yes	3	74262.2	75008.7	107	-37024.076
Yes	Yes	4	73976.0	74764.5	113	-36875.02
Yes	Yes	5	73811.1	74641.4¹	119	-36786.55

Table18. Proportion of Structural and Spurious State Dependence in Hourly Wage Quintiles by Immigrants and Natives, Canada 1993-2004

	Non-employment & unemployment		1 st Quintile		2 nd Quintile		3 rd Quintile		4 th Quintile		5 th Quintile	
	Structural	Spurious	Structural	Spurious	Structural	Spurious	Structural	Spurious	Structural	Spurious	Structural	Spurious
Immigrant	63.11	36.89	68.34	31.66	83.71	16.29	87.89	12.11	61.22	38.78	75.07	24.95
Native	56.66	43.40	46.18	53.82	57.08	42.92	71.55	28.45	65.57	35.43	34.23	65.77

Note: Calculations are based on the estimation results presented in Tables 8, 9, 10, and 11.

Table 19. Estimated Exit-Entry Rates by Immigrants and Natives, No Control on Endogenous Initial Conditions and Unobserved Heterogeneity, Canada 1993-2004

	Non-employment & unemployment		1 st Quintile		2 nd Quintile		3 rd Quintile		4 th Quintile		5 th Quintile	
	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry
Immigrant	0.279	0.052	0.343	0.085	0.386	0.095	0.397	0.095	0.363	0.088	0.270	0.065
Native	0.318	0.067	0.307	0.092	0.357	0.105	0.399	0.106	0.379	0.109	0.255	0.045

Note: Calculations are based on the estimation results presented in Tables 8 and 9.

	Non-employment & unemployment		1 st Quintile		2 nd Quintile		3 rd Quintile		4 th Quintile		5 th Quintile	
	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry
Immigrant	0.545	0.048	0.551	0.105	0.486	0.126	0.470	0.125	0.610	0.095	0.452	0.113
Native	0.614	0.068	0.680	0.141	0.633	0.163	0.570	0.123	0.599	0.132	0.745	0.099

Note: Calculations are based on the estimation results presented in Tables 10 and 11.

Year	1 st		2 nd		3 rd		4 th		5 th	
	Quintile		Quintile		Quintile		Quintile		Quintile	
	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted
1994	0.223	0.221	0.183	0.153	0.142	0.189	0.183	0.206	0.150	0.159
1995	0.237	0.200	0.125	0.167	0.190	0.189	0.187	0.216	0.156	0.159
1996	0.251	0.191	0.178	0.149	0.145	0.229	0.157	0.205	0.175	0.162
1997	0.228	0.205	0.186	0.156	0.164	0.204	0.149	0.194	0.173	0.180
1998	0.210	0.181	0.206	0.149	0.190	0.230	0.157	0.200	0.150	0.181
1999	0.187	0.168	0.164	0.152	0.178	0.216	0.204	0.224	0.196	0.195
2000	0.184	0.179	0.184	0.143	0.143	0.197	0.222	0.222	0.203	0.196
2001	0.188	0.163	0.146	0.145	0.195	0.216	0.187	0.227	0.247	0.204
2002	0.164	0.168	0.147	0.152	0.150	0.216	0.173	0.224	0.277	0.195
2003	0.149	0.158	0.127	0.134	0.177	0.231	0.216	0.239	0.236	0.196
2004	0.140	0.135	0.121	0.141	0.187	0.250	0.217	0.227	0.237	0.209

Note: Predicted values are calculated based on the estimation results presented in Table 10.

Table 22. Predicted and observed distribution of Hourly Wage Quintiles, Natives 1993-2004

Year	1 st Quintile		2 nd Quintile		3 rd Quintile		4 th Quintile		5 st Quintile	
	Observed	Predicted	Observed	Predicted	Predicted	Observed	Predicted	Observed	Observed	Predicted
1994	0.168	0.207	0.215	0.187	0.221	0.203	0.192	0.174	0.146	0.154
1995	0.179	0.197	0.207	0.198	0.222	0.196	0.192	0.193	0.148	0.146
1996	0.202	0.198	0.180	0.185	0.208	0.210	0.183	0.196	0.148	0.142
1997	0.185	0.206	0.191	0.190	0.193	0.193	0.202	0.180	0.149	0.166
1998	0.191	0.193	0.195	0.192	0.192	0.205	0.187	0.186	0.155	0.162
1999	0.144	0.174	0.169	0.198	0.190	0.204	0.197	0.195	0.213	0.177
2000	0.145	0.147	0.166	0.174	0.182	0.207	0.200	0.221	0.227	0.209
2001	0.148	0.145	0.178	0.177	0.172	0.202	0.197	0.226	0.232	0.203
2002	0.126	0.131	0.159	0.150	0.170	0.198	0.218	0.237	0.259	0.240
2003	0.130	0.128	0.158	0.155	0.171	0.203	0.210	0.227	0.265	0.240
2004	0.132	0.122	0.150	0.149	0.181	0.206	0.198	0.244	0.268	0.229

Note: Predicted values are calculated based on the estimation results presented in Table 12.

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Figure 1. Trends in Gini Coefficients¹, Market, Total, and After-Tax Income, Canada 1993-2004

Note: Source: Statistics Canada, CANSIM Table 202-0705

1-The most widely used index on income inequality. It ranges from zero to one, with zero representing complete equality and one complete inequality.

Figure 2. Wage Distribution by Immigrants and Natives, Canada 1993-2004

Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 65. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID.

Figure 3. Wage Distribution by Different Minority Groups of Immigrants and Natives, Canada 1993-2004

Figure 4. Wage Distribution by Different Minority Groups of Immigrants and Natives, Canada 1993-2004, Continued

Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of immigrants aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID.

Figure 5. Predicted Vs. Observed Probability of the Hourly Wage Quintiles, Immigrants, Canada 1993-2004

Note: Source: Survey of Labour and Income Dynamics (*SLID*), 1993-2004, based on a sample of immigrants aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in *SLID*.

Figure 6: Immigrants

Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of immigrants aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID.

Figure 7: Natives

Note: Source: Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of immigrants aged 25 to 55. The figures are weighted with longitudinal weight variables provided by Statistics Canada in SLID.