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Immigrant-Native Differences in Earnings Mobility Processes: Evidence from Canadian and Danish Data

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Abstract

This study compares the earnings mobility between immigrants and natives within and between Denmark and Canada. Both countries have different labour market conditions and immigration history which leads to an interesting comparison of earning mobility processes. The paper employs a dynamic multinomial logit model with discrete factor approximation for the specification of unobserved individual heterogeneity. The model takes into account the effect of the endogenous initial conditions problem and unobserved heterogeneity to separate structural and spurious state dependence. The results show that immigrants-native differences in earnings mobility, structural state dependence, and segmentation of earnings distribution are relatively more prominent in Denmark compared to Canada.

JEL Codes: C33, C35, J15, J38, J61,

Keywords: Earnings Mobility Process, Immigrants and Natives, Spurious and Structural State Dependence, Quartile Mobility Rates, Discrete Factor Approximation

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1 Introduction

Immigrants from less developed countries are over-represented in the lower part of the income distribution in both Denmark and Canada. The study by Blume and Verner (2007) for Denmark has shown that first generation immigrants, especially those from the less developed countries, were highly over-represented among the receivers of public income transfers during the period 1984-1999, while immigrants from developed countries are moderately over represented. For Canada, a recent study by Ostrousky (2008) on the dynamics of immigrants' earnings inequality reveals that the economic fortunes of immigrants in recent years have declined. The over representation of immigrants in the lower part of earning distribution can be due to short run reasons, for example, it takes time to learn local language and to obtain country specific skills. However, after obtaining these skills the immigrants should move up in the income ladders. So it will be interesting to compare the mobility of immigrants with natives in the earnings distribution. As far as we know, there is no study that makes this comparison.

Denmark and Canada have very different immigration histories. Denmark was characterized by high labour demand at the end of the 1960s, which triggered labour immigration, mainly from Turkey, Pakistan and Yugoslavia. From that time until 1973, Denmark had a steady inflow of labour immigrants. After 1973, immigration in Denmark is dominated by non-labour immigrants (for example family reunification, refugees). On the other hand, Canada has a very long history of skilled immigration. In 1967, Canada introduced a point system based on the personal characteristics of the applicant to facilitate the immigration process for skilled immigrants. Recently, the Danish government has also introduced the same immigration policies as the Canadian immigration system for skilled workers[1]. So it is of great interest to compare the earnings mobility of immigrants and natives between two countries with different immigration histories.

Measuring earnings dynamics could be very interesting for policy makers and researchers. For example, the optimal design of unemployment insurance, social assistance, and other income support

[1] For more information on new immigration policies in Denmark visit www.newindenmark.dk. For more information on immigration policies on Canada visit www.cic.gc.ca

programs depend on a good understanding of earnings dynamics and the distribution of earnings in a longer-term perspective. In particular, if a large number of individuals have shorter low earnings or unemployment spells, then this problem can be addressed with various types of unemployment insurance. On the other hand, if smaller numbers of individuals have longer spells then long term structural solutions are required (skill enhancement programs). Similarly, labour market programs, specifically related to human capital development, can be designed and evaluated more accurately with a better understanding of the earnings mobility. For example, if we observe that earnings tend to rise for individuals who stay longer in the labour market, then policies should aim to get people started in the labour market[2].

Various studies have been carried out to compare the earnings mobility of the United States and other European countries (see for example, Burkhauser et. al. (1997), Grodner (2000), Aaberge et.al. (2002) Deding (2002)). To our knowledge no study compares Canada's labour earnings mobility with other countries. This is the first study that compares the earnings mobility of Canada with a Scandinavian welfare state, of which Denmark is an example. This comparison will be very interesting since the Danish labour market is very different from most other countries in many aspects. For example, Denmark has the highest female labour force participation rate in the world, the highest replacement ratio of unemployment benefits for low-wage earners, relatively widespread eligibility for unemployment benefit (for more details, see (Eriksson and Westergård-Nielsen, 2007)).

Given the discussion above, our main objective in this paper is to answer the following questions:

1. What are the determinants of the transitions into and out of any earnings quartiles?
2. What are the differences in upward and downward mobility between immigrants and natives in the two countries?
3. What are the proportions of spurious and structural state dependence in earnings mobility processes?

In this paper, we estimate and analyze a dynamic multinomial logit model with random effects conditional on observable variables affecting earnings mobility process and controlling for both

[2] The policy discussion is derived from Finnie (1997).

unobserved individual heterogeneity and endogenous initial conditions problem. We use a method of Maximum Likelihood Estimation (MLE) with factor analytic schemes for unobserved individual heterogeneity and Wooldridge's specification approach to the initial conditions problem. We confine our analysis to estimate Quartile Mobility Rates (QMR), proportions of structural and spurious state dependence, and type specific transition matrices for immigrants and natives in both countries.

The raw data show that immigrants in Denmark are observed more in the lower parts of the earnings distribution, while comparable natives are evenly distributed. On the contrary, immigrants in Canada have very similar earning distribution and observed characteristics compared to Canadian natives. Moreover, upward mobility is higher than downward mobility for immigrants in both countries. The estimation results show that the extent of state dependence (mobility) is overestimated (underestimated) if the model does not control for endogenous initial condition and unobserved heterogeneity. For identification purposes, we used state zero as a reference state[3]. Almost all state dependence parameters are positive and statistically significant, indicating transition towards state zero is less probable. Immigrants in Denmark have very high structural state dependence in unemployment compared to natives. Unlike in Denmark, immigrants and natives in Canada have very similar pattern of structural and spurious state dependence. The unobserved type specific transition matrices show that each type has a different transitions pattern. As a result, the long-run stationary earning distribution is segmented on the basis of unobserved types.

The paper is organized in the following way. Section 2 explains structural and spurious state dependence. Section 3 reviews the literature on earnings mobility. Section 4 gives background information about the immigration history of Denmark and Canada. The data is described in section 5. Section 6 presents an empirical specification of the dynamic model. We discuss the empirical results in section 7 and conclude in section 8.

[3] In total we have 5 states including state zero. The state zero is defined as unemployed or non-employed.

2 Structural and Spurious State Dependence

Any persistence in (or transition into and out of) the lowest, middle, and uppermost parts of the earnings distribution can be a product of some measured and unmeasured variables. Exploring the main reasons for observed persistence[4] is essential to properly estimate the parameters of interest in dynamic framework models.

According to Heckman (1981a), individuals may differ in certain unobserved variables that influence their probability of experiencing the event but are not influenced by the experience of it. Heckman (1981a, p. 115) argues that, "if these differences are not properly controlled, previous experience may appear to be a determinant of future experience solely because it is a proxy for temporally persistent unobservables that determine choices." Improper treatment of unobserved variables gives rise to a conditional relationship between future and past experience that is termed as spurious state dependence. Distinguishing between unobserved individual heterogeneity and structural state dependence is crucial in dynamic analysis frameworks and economic policies.

The effectiveness of public policy depends on the proportion of structural and spurious state dependence. Consider a policy change which has the effect of temporally moving non-employed workers into the employment state. If there is a positive structural state dependence in employment, the policy intervention will cause a persistent increase in employment. Consequently, the intervention is likely to reduce the number of individuals who are dependent on benefits (unemployed) or live on a low income (Prowse, 2005). In this case, changes in benefit rules or introducing labour market training programs are also more likely to meet their objectives (Hansen et al. 2006). On the other hand, if the observed serial persistence in unemployment is due to permanent unobserved heterogeneity, then the policy stated above is less likely to have an affect.

According to Brodaty (2007), public policies should act on both dimensions (structural and spurious) of the earnings mobility process to reduce income inequality. For example, human capital policies can be

[4] Observed persistence is due to unobserved individual heterogeneity, structural state dependence, and other observable covariates.

implemented to improve the unobserved heterogeneity of the individuals who are unemployed or attracted towards the lower part of the earnings distribution. Contrarily, it could be desirable to act on structural state dependence in order to make it more mobile, but this requires for it to give an economic meaning to state dependence in earnings mobility.

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. Dynamic discrete choice models that assume the initial conditions to be exogenous effectively ignore serial dependence attributable to unobserved individual heterogeneity and therefore lead to upwardly biased estimates of structural state dependence (Heckman, 1981a, Chay and Hyslop, 2000).

3 Literature Review

A considerable literature exists on earnings mobility, especially for the United States. A nice theoretical and empirical review is presented in Atkinson et al. (1992). Some studies compare the intergenerational earnings mobility between immigrants, but as far as we know, no study compares earning mobility between immigrants and natives. However, quite a number of studies compare earning mobility across countries. In this section, we will review and compare some important and recent studies of the United States, Denmark, and Canada.

3.1 Studies for The United States

Burkhauser et. al. (1997) have compared the labour earnings mobility and inequality of prime-age men and women in the United States and Germany during the growth years of the 1980s. The data for the U.S is the Panel Study of Income Dynamics (PSID) (1982-1988), whereas, for Germany, it is the German Socio-Economic Panel (GSOEP) (1984-1988). Despite major differences in the labour market institutions between the two countries, the descriptive statistics shows a surprisingly similar pattern of quartile-to-quartile mobility. Moreover, the study shows no difference in downward mobility and slightly higher upward mobility in Germany than in the United States over the period studied. The labour earnings dynamics are modeled by an Auto Regressive Moving Averages (ARMA (1, 1)) specification using the logarithm of labour earnings. The empirical results show some differences in the dynamic earnings path. However, the end result is the similarities of the earnings mobility for the two countries. The study has merits calculating and comparing earnings mobility and inequality between the U.S. and Germany using a dynamic analysis framework; however the empirical methodology is purely statistical, in a sense that it does not impose any structure on the earnings profiles and does not control for any observed explanatory variables.

Grodner (2000) extends Burkhauser et. al.'s (1997) study to identify the determinants of moving up and down in the earnings distribution for Germany and the United States. The study uses a binomial probit model for the years 1985-1987 using the same data as that used by Burkhauser et. al. (1997). The results show that higher education has both protective and prospective effects but with higher magnitudes for Germany. In this paper, Grodner modified Burkhauser' approach to control for the observed characteristics, however, the study analyzes earnings mobility only in the short run, which is not sufficient to explain long-run dynamics.

In another study for the United State Buchinsky and Jennifer (1999), using National Longitudinal Survey of Youth *(NLSY)* (1979-1991), present empirical measures of earnings mobility based on hourly wages and annual earnings distribution. The model is non-parametric. They decompose summary measures of mobility into within and between group components. They find that within-group mobility is predominant and it increases most rapidly when the time horizon is extended, thereby it reduces wage inequality by 12% to 26%. Further, they discuss within-group mobility among earnings quartiles, using year to year estimates of transition probabilities. They find that mobility declines over time, especially at the bottom end of the wage and earnings distribution.

The most recent study by Brodaty (2007) on the dynamics of American earnings reveals that state dependence in the earnings mobility process is statistically significant and its magnitude is upward biased if individual unobserved heterogeneity is not considered. For every quartile except the first, it creates more stability than mobility and it favors upward movements rather than downwards movements. Conditional on the unobserved characteristics, each individual is attracted towards a specific quartile, which makes the quartile distribution very segmented. Moreover, men, white, and the more educated are attracted towards the upper part of the distribution, while women, non-white, and the less educated tend towards the lower. The main contribution of this paper is that it controls for state dependence variables in quintile mobility and calculates and compares type specific transition matrices which can be a good reference for any studies on earnings dynamics.

3.2 Studies for Denmark

Bingley and Westergård-Nielsen (1997) identify some of the determinants of individual's wage mobility rates over time. Specifically, they look at decile transition matrices for the period 1980-1990 to discuss mobility of individuals in the wage distribution. They estimate upward and downward mobility rates using a simple probit model. Their model takes attrition and decile of origin into account. They compared the results of probit model with the switching regression models to simulate the effects of wage mobility of different variables. They find that education and experience are important factors determining an individuals' position in the wage distribution. Moreover, unemployment is the single most important obstacle to upward mobility. The empirical model disregards the state dependence.

Aaberge et.al. (2002) measure and compare the earnings mobility of Scandinavian countries with the United States over the period of 1980-1990. Instead of a transition matrix approach, the study uses a modified version of this suggested by Shorrocks (1978). Mobility is measured as the relative reduction in the weighted average of single year inequality. The measure incorporates the close relationship between income inequality and mobility. The results suggest that the pattern of mobility turns out to be very similar in all the countries[5]. However, the paper does not distinguish between up-ward and down-ward mobility rates and only looks at overall mobility rates for the countries.

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[5] The pattern is similar in the sense that the proportionate reduction in inequality from increasing the accounting time of income is much the same. Aaberge et.al measure the mobility as follows:

$$M = 1 - \frac{G}{\sum_{t=1}^{T} (\mu_t / \mu) G_t}$$

Where M is the crude measure of mobility, G is the Gini Coefficient, and μ_t is the mean of the T-year distribution of income

Deding (2002) compares the mobility rates out of low wage employment in Denmark, Germany and the United States. The study compares the mobility rates both at the aggregate level and by applying a micro-econometric framework. At the aggregate level, she constructs transition matrices for three countries, considering three different states, i.e., no wage, low wage, and high wage. Deding finds that individuals in the low wage group differ a lot between the countries. Moreover, the level of mobility is higher in Denmark than in Germany, whereas the United States appears rather immobile in the short run, but mobility increases in the long run. In order to see the effect of different explanatory variables, she models the probability of being low paid in 1993, conditional on low pay in 1992. She finds similar results for the three countries in the short run but these results differ in the long run. The empirical model disregards the dynamic behaviors of individuals over time.

3.3 Studies for Canada

For Canada, some studies have analyzed earnings mobility and redistribution of income since the 1990s. A study by Finnie (1997) analyzes earning mobility of Canadians over the period of 1982-1992. Using the Longitudinal Administrative Database *(LAD)* from Revenue Canada tax files, this paper examines how individuals' earnings mobility varies with the time period considered and starting position in the earnings distribution, as well as by age and sex. Finnie finds higher stability in the upper parts of earnings distribution. Moreover, he finds higher upward mobility than downward, especially over longer periods of time and particularly for younger workers. The lower end of the earnings distribution is frequently filled with new entrants. Long-run upward-mobility rates are higher than short-ones. Finnie expands his analysis to a comparison of earnings mobility among different age groups and sexes, as well as different business cycle-effects. From his results it seems that younger males tend to be less stable (more mobile) than older ones, particularly in an upward direction. Whereas, women are normally less likely to move up and less likely to stay at the top. Earnings mobility also varies with business cycle changes and across different age-sex groups. Women in their prime working years are actually more likely to move up through the earnings distribution in the later years, right through the recessionary part of the 1990s. Similarly, older men experience a moderate increase in their rates of earnings growth; and upward mobility declines substantially amongst the youngest groups of men and women (under 25), especially for those who are at the lowest earnings levels to begin with. The paper does a thorough investigation on earnings dynamics of individuals over time. However, it lacks a formal econometrics analysis of quartile mobility.

One study by Beach and Finnie (2001) using longitudinal income tax-based data examines the cyclical pattern of changes in the earnings distribution and earnings mobility by sex and age groups over the period 1982 to 1996. Beach and Finnie analyze the effects of business cycles on short-run transition probability matrices for men and women across different age groups and for the two periods of peak (1988-89) and through (1991-92). Their results show that higher unemployment rates decrease the average net probability of moving up significantly more for men than for women. Beach and Finnie also find that younger workers (20 to 34 yrs old) of both genders are more sensitive to business-cycle effects than prime and older workers (35 to 64 yrs old). Moreover, the higher unemployment rate increases polarization rates across all age and sex groups. Men have the highest cyclical sensitivity of the earnings at the lower end of the distribution. For females the greatest cyclical sensitivity occurs in the upper end of the earnings distribution. The paper looks only at one-year transition matrices and does not calculate the long-run mobility rates for the period studied. This paper also lacks a formal econometrics assessment of mobility rates.

4. History of the Immigration process in Denmark and Canada

As mentioned earlier, Denmark and Canada have different immigration histories. Denmark has a relatively short history of immigration, whereas a formal immigration policy in Canada started in 1947.

Until the 1950s, Denmark was a country of net emigration. Denmark was characterized by high labour demand at the end of the 1960s, which triggered labour immigration, mainly from Turkey, Pakistan and Yugoslavia. From that time until 1973, Denmark had a steady inflow of labour immigrants. Then a ban was introduced for labour market-oriented immigration from *non-European Economic Area* (EEA) nationals. Immigration continued afterward, but mainly through family reunification. Since 1979, Denmark has accepted refugees on an annual basis for humanitarian migration. In the early 1990s, the number of war refugees and asylum seekers increased from former Yugoslavia and other countries. The peak in asylum seeking was reached in 1992-1993 at the same time as the peak in the country's unemployment rate (see Liebig (2007) for more details).

Like most other European countries, Denmark needs more immigrants in the labour market due to aging and lower population growth. Unlike the immigration policies in Canada, Australia, and other developed countries, there was no selective skilled immigration process in Denmark to facilitate skilled immigrants into the economy. Most immigrants in Denmark came through family reunification, as refugees, and asylum seekers, especially from non-western countries. Danish immigration policy is now moving towards skilled immigration. This major structural change partly is taking place with the introduction of new green card and job card schemes and partly because of the reduction of family and refugee immigrants[6]. For example, in 2002 Green Card Scheme, like the Canadian skilled immigration system, was introduced for professionals of various fields to come and search for a job in Denmark. They are initially given a work permit for three years. Furthermore, the government has introduced laws to reduce forced marriages, which has reduced the number of family class immigrants.

Unlike the immigration laws of Denmark, immigration laws in Canada went through major changes many years ago[7]. In 1967, Canada introduced a point system based on the personal characteristics of the applicant to facilitate the immigration process for skilled immigrants. In 1992, the family class of immigrants was reduced and the government was committed to a stable net inflow of 1 per cent of the current population. In 2002, the immigration act of 1976 was replaced to attract young bilingual and educated workers. For example, more points were allocated to applicants with trade certificates, bilingual skills (French and English), and greater weight was placed on the first two years of experience. There are three main categories of immigrants in Canada, i.e., independent immigrants (immigrated on the basis of skills, capital and labour market abilities), family class (through family reunification), and refugees. About 56.1 per cent of the immigrants, who arrived in 2005, were skilled workers. According to Canada's Immigration Program (October 2004), Canada has the highest per capita immigration rate in the world.

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[6] The details about these changes can be seen in table A1 in the Appendix.

[7] This information is based on a presentation by Geneviève Bouchard in her Workshop on German and European Migration and Immigration Policy from a Transatlantic Perspective: Challenge for the 21st Century.
Website: http://www.irpp.org/miscpubs/archive/$bouchard_immig.pdf

5. Data

To distinguish between true and spurious state dependence and to control for unobserved individual heterogeneity, longitudinal data with a large cross-sectional sample size is required. Our analysis is based on two longitudinal data sets taken from Denmark and Canada. For Denmark, we use the Administrative Registered Data supplied by Statistics Denmark to Labour Market Dynamic Growth (LMDG). The data contains labour market and demographic information for all immigrants and natives aged 15 to 70 for the years 1980 to 2003. The information about income and demographic variables are accurate since they originated from the income-tax registers of the government.

For Canada, we use levels of Statistics Canada's Survey of Labour and Income Dynamics *(SLID)*. SLID has three complete and one incomplete longitudinal data panels. Each complete panel covers six years for almost 15,000 households, which is a suitable source of data for this research. In SLID, the focus extends from static measures to the whole range of transitions, durations, and repeat occurrences of people's financial and work situations. Income information in SLID is taken from the Longitudinal Administrative Data (LAD) and therefore is accurate. A relatively large sample size of micro data is required as it is more representative of the total population in the survey. We use annual data from the first three panels of SLID. 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 final sample for Canada consists of 12 years ranging from 1993 to 2004. All estimation results and descriptive statistics outputs for Canada are weighted by longitudinal weight variables provided by Statistics Canada. For Denmark, a random sample of 40,000 individuals per year (1994-2003) is drawn from the data.

Gross annual income (before tax) is used to rank individuals in the earning distribution. This income does not include child or housing benefits from the state. The same concept of income is used in both Denmark and Canada. The data is restricted to men aged 25 to 55. The reason for this restriction is that men are less likely to be affected by secular increase in school attendance or labour market participation than women in the same age group. Moreover, men in this age group are more likely to have full-time jobs[8]. To control for business cycle effects, the dynamic model includes aggregate unemployment rates taken from Statistics Denmark and CANSIM II (Table 282-0055)[9]. In addition to the aggregate unemployment rate, the models also control for level of education, marital status, age, levels of work experience, and country of origin[10].

For education, we use a dummy variable indicating if a person has at least a high-school degree at the time of entry into the panel[11]. Marital status is defined if a person is legally married or lives with a registered partner. Since people in different age groups have different earnings profiles (Beach and Finnie, 2001), we prefer to divide age into three groups, i.e., prime (25-35), middle (36-45), and older (46-55). Similarly, for experience, we have sets of dummy variables for people with no more than 8, between 8 and 16, and more then 16 years of experience[12]. To control for the country of origin, immigrants are divided in two main groups, i.e., immigrants from developed countries and those from the less developed countries[13]. The same data restrictions are applied to both Denmark and Canada.

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[8] In this paper, self-employed workers are dropped from the sample. We only look at men who are paid-employed in their main jobs.

[9] CANSIM is Statistics Canada's key socioeconomic database.

[10] Years since immigration might be a significant factor in persistence of or transition into (and outof) any earnings quartiles. Unfortunately, The Danish administrative data set provides no information about immigrants' years of arrival. Further, estimation results in Esmaeilzadeh (2009) show that years since immigration is not a significant factor in wage mobility process in Canada. To have two models, comparable for Canada and Denmark (and the fact that this variable might have no (or low) significant effect for Canadian immigrants) we ignored the effect of this variable in our estimation.

[11] To compare two countries with different educational system, we use a dummy variable for education instead of years of schooling. We also treated education as a time-invariant variable because there is small variation in education among individuals in this selected age group.

[12] People with lower experience, are expected to have lower earnings profile; moreover, experience more than 16 years is recorded as 16 in Danish data, so we use dummy variables for experience, instead of years of experience.

[13] The List of developed countries includes high-income OECD countries plus the following relatively smaller countries: Hong Kong, Israel, Singapore, Taiwan, Andorra, Bermuda, Faroe Islands, Liechtenstein, and San Marino (World Development Indicators, 2008).

5.1 Descriptive Statistics

In this section, we compare immigrants' and natives' mean characteristics, earnings quartiles (persistence and transitions), and transition matrices within and between Denmark and Canada.

There are five mutually exclusive states that an individual can take (one of them) each year i.e. state zero representing unemployed or non-employed and four states representing quartile earnings distribution. Table 2 provides information on earnings[14] quartiles and mean characteristics of immigrants and natives in Denmark and Canada. Immigrants in Denmark are over represented in state zero and one compared to their Canadian counterparts. About 14.8 and 37 per cent of immigrants in Denmark are in state zero and one respectively. The equivalent figures for Canadian immigrants are 7.8% and 26.8%. Natives in both Denmark and Canada are evenly distributed in the earning distribution.

First, we compare the mean characteristics of Danish and Canadian immigrants. Table 2 shows that 68.1 per cent of Danish immigrants have at least high-school degrees. For Canadian immigrants the percentage is 80.3. The proportion of married people is much higher for Canadian immigrants. About 82.5 per cent of Canadian immigrants are married or registered partners, while the Danish equivalent figure is 66.7%. The percentage of immigrants from developed countries is higher in Canada (48.5%) than in Denmark (31.7%). The reason is that the immigration policy in Canada, before 1962, gave higher priority to immigrants from European countries[15]. The proportion of immigrants in prime and middle ages is higher in Denmark than in Canada.

Second, we compare mean characteristics of natives in two countries. Overall, natives in the two countries have very similar patterns of observed characteristics, however, compared to Canada, natives in Denmark have a lower percentage of married or registered partners.

One of the objectives of this paper is to study the factors affecting transitional rates into and out of the four earnings quartiles and quartile zero (accounting to unemployed and non-employed people). To do

[14] Earnings are adjusted by Consumer Price Index (CPI).
[15] In the 1950s, 84.6 per cent of all Canadian immigrants were European by birth. The government of Canada abandoned this policy in 1962.

this, we calculated the mean characteristics of different persistence and transition states among immigrants and natives for both countries. Tables A2 and A3 in the appendix provide this information. Persistence in this table refers to individuals' staying in the same quartile one year later, whereas

Table 2: Mean Characteristics of Male by Immigrants and Natives, Denmark and Canada

	Variables	Denmark		Canada	
		Immigrants	Natives	Immigrants	Natives
Quartiles Dummies	People not working (Quartile Zero)[1]	0.148	0.036	0.078	0.080
	People with Earnings in First Quartile	0.370	0.235	0.268	0.207
	People with Earnings in Second Quartile	0.195	0.241	0.223	0.236
	People with Earnings in Third Quartile	0.146	0.243	0.183	0.244
	People with Earnings in Forth Quartile	0.140	0.243	0.249	0.232
Observed Characteristics	Educated[2]	0.681	0.760	0.803	0.770
	Married[3]	0.667	0.697	0.825	0.759
	Origin (Developed Countries)[4]	0.317	-	0.485	-
	Age between 25 – 35	0.306	0.303	0.238	0.265
	Age between 35 - 45	0.465	0.455	0.416	0.468
	Age between 45 - 55	0.229	0.242	0.349	0.266
	Experience less then 8 years	0.430	0.079	0.199	0.091
	Experience between 8 to 16 years	0.381	0.396	0.312	0.247
	Experience more then 16 years	0.189	0.525	0.491	0.661
	Aggregate Unemployment Rate	7.36	7.36	8.30	8.30
Number of Observations		13110	386890	4236	31338
Number of Individuals		1311	38689	706	5223

Data Source: For Denmark, Registered Administrative Datasets, 1994-2003, supplied by Statistics Denmark to Labor Market Dynamic Growth (LMDG). For Canada, Survey of Labor and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures for Canada are weighted with longitudinal weight variables provided by Statistics Canada. The figures are rounded to three decimal points

1- This excludes the people who are retired, getting education or on leaves.

2- Having at least 14 years of formal education.

3- Married or Registered Partner

4- If an immigrant was born in any High-Income countries i.e. OECD countries or Hong Kong, Israel, Singapore, Taiwan, Andorra, Bermuda, Faroe Islands, Liechtenstein, and San Marino (World Development Indicators, 2008)

transition refers to individuals' movement from the origin state to any other destinations in the distribution. Looking at these tables, we observe that individuals in any persistence in (or transitions into and out of) any earnings quartiles have different mean characteristics. For example, it appears that the proportion of individuals with a high-school degree is positively correlated with persistence in the higher quartiles. This is true for immigrants and natives, but with different magnitudes. The same pattern is true for the proportion of married people. Further, immigrants from developed countries are more observed in higher quartiles. On the other hand, natives and immigrants have the higher proportion of prime age group in the lower quartiles. These examples show that observed characteristics, reported in Tables A2 and A3, might be significant factors determining differences between immigrants and natives in probability of being in any earnings quartiles.

Mobility and stability in the raw data is examined through transition matrices. A transition matrix is constructed as follows: First, working immigrants and working natives are ranked together according to their earnings for each year. On the basis of these ranks each individual belongs to one of the four quartiles. The people who are not working are directly assigned to quartile zero. The same procedure is applied for each year. The transition is recorded by an indicator variable $t^{i}_{o,d}$, which equals 1 if an individual *"i"* moves from the origin quartile *"o"* to the destination quartile *"d"*. If *"d"* is equal to *"o"* then it is recorded as stability. For the whole sample, the transition probabilities and stabilities are calculated by the following formula (for more details, see Burkhauser, et. al. (1997))

$$P_{o,d} = \sum_{i=1}^{N} t^{i}_{o,d} \Big/ N \qquad (1)$$

Where N is the total number of individual in the origin quartile[16].

Table 3 shows transition matrices of immigrants and natives for both countries. This table reveals several interesting relationships and patterns among immigrants and natives. We also examine the issue of state dependence in the raw data. The diagonal of these matrices represents the probability of staying in the same quartile, whereas off-diagonal elements represent the probability of moving to another quartile one year later. Elements on the diagonals of each matrix give strong evidence of state dependence in the raw data.

The full transition matrices show that the vast majority of movements reach adjacent quartiles for both immigrants and natives in the two countries. For example, for immigrants in Denmark, the probability

[16] For the Canadian data, this probability is weighted by longitudinal weight variables provided by Statistics Canada.

Table 3: Quartile Mobility Rates, Conditional Probability of Leaving Previous Years Quartile by Immigrants and Natives*

Denmark

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Immigrants								
Q_0	**0.554**	0.383	0.034	0.018	0.009	0	**0.554**	0.444
Q_1	0.096	**0.726**	0.135	0.035	0.008	0.096	**0.726**	0.178
Q_2	0.036	0.195	**0.592**	0.164	0.013	0.231	**0.592**	0.177
Q_3	0.019	0.049	0.199	**0.612**	0.121	0.267	**0.612**	0.121
Q_4	0.018	0.012	0.022	0.094	**0.853**	0.146	**0.853**	0
Total	**0.152**	**0.371**	**0.192**	**0.145**	**0.140**	**0.141**	**0.674**	**0.185**
Natives								
Q_0	**0.406**	0.440	0.083	0.045	0.025	0	**0.406**	0.593
Q_1	0.047	**0.738**	0.176	0.032	0.006	0.047	**0.738**	0.214
Q_2	0.014	0.160	**0.639**	0.173	0.014	0.174	**0.639**	0.187
Q_3	0.010	0.027	0.163	**0.675**	0.125	0.200	**0.675**	0.125
Q_4	0.009	0.007	0.013	0.108	**0.863**	0.137	**0.863**	0
Total	**0.035**	**0.236**	**0.242**	**0.243**	**0.244**	**0.138**	**0.715**	**0.147**

Canada

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Immigrants								
Q_0	**0.848**	0.125	0.026	0.006	0	0	**0.848**	0.157
Q_1	0.030	**0.840**	0.104	0.019	0.007	0.030	**0.840**	0.130
Q_2	0.007	0.121	**0.734**	0.125	0.013	0.128	**0.734**	0.138
Q_3	0.003	0.011	0.148	**0.707**	0.129	0.162	**0.707**	0.129
Q_4	0	0.003	0.014	0.099	**0.883**	0.116	**0.883**	0
Total	**0.079**	**0.268**	**0.223**	**0.179**	**0.249**	**0.095**	**0.804**	**0.101**
Natives								
Q_0	**0.930**	0.043	0.012	0.008	0.006	0	**0.930**	0.069
Q_1	0.016	**0.843**	0.124	0.012	0.005	0.016	**0.843**	0.141
Q_2	0.005	0.106	**0.748**	0.131	0.009	0.111	**0.748**	0.140
Q_3	0.005	0.012	0.127	**0.725**	0.131	0.144	**0.725**	0.131
Q_4	0.003	0.002	0.007	0.138	**0.849**	0.150	**0.849**	0
Total	**0.080**	**0.207**	**0.236**	**0.244**	**0.232**	**0.099**	**0.800**	**0.100**

***Average transition rate in the sample for all years**

of moving up to quartile two from quartile one is 13.5% higher than that of moving from quartile one to four, which is 0.8%. The equivalent figures for natives are 17.6% and 0.6%. There is a negative correlation between the initial quartile with upward mobility for immigrants and natives in Denmark. Thus the quartile and its lag are not independent, and being in one quartile one year increases the probability of being in the same quartile the year after (state dependence). Our findings confirm the finding of Brodaty (2007).

The probability of moving down to the next quartile from any of the earning quartiles is statistically higher for Danish immigrants compared to Danish natives. The one exception to this is the transition from quartile 4 to quartile 3. Whereas the probability of moving up in the next quartile from any of the earning quartile is higher for Danish natives than Danish immigrants. The difference is statistically significant for transition from quartile zero to one and from quartile one to two. For example, the probability of moving up from quartile one to quartile two is 13.5% for immigrants, whereas the equivalent figure for natives is 17.6%. Exactly the same pattern is true for Canadian immigrants and natives.

Aggregated or overall upward mobility (weighted average of all upward transitions) is higher than overall downward mobility (weighted average of all downward transitions) for both immigrants and natives in the two countries. For example, overall upward mobility for Danish immigrants is 18.5% which is statistically higher than the downward mobility which is 14.1%. The comparison between Danish immigrants and natives show that Danish immigrants have statistically higher upward mobility (18.5%) compared to the over upward mobility of Danish natives (14.7%). This is quite consistent with the fact that immigrants start low but gradually move up in the income ladder. Overall downward mobility is also higher for Danish immigrants compared to Danish natives but it is not statistically significant. Immigrants in Canada also have higher upward and downward mobility compared to natives in Canada but these differences are not statistically significant.

To check for differences in earnings dynamics among immigrants with different origin, we calculated transition matrices for immigrants from developed and less-developed countries for both Denmark and Canada (Table A4 in the appendix). The important thing that we note in the table is that immigrants of less developed countries in both Denmark and Canada are relatively more observed in state zero, one and two. For example, the respective percentages for immigrants from less developed countries in Denmark are 17, 39.8, and 20.3, whereas the equivalent figures for immigrants from developed countries are 11.5, 31.3 and 16.6.

6. Model and Empirical Specification

To analyze any movements into and out of any earnings quartiles, we choose a dynamic unordered multinomial logit model. We analyze the dynamic structure of the model as a first-order Markov process. Let assume that individual *i* belongs to alternative *q* at time *t*. We suppose that utility V_{iqt}^{*} is the sum of a deterministic component, U_{iqt}, that depends on regressors and unknown parameters, and an unobserved random component, ε_{iqt}:

$$V_{iqt}^{*} = U_{iqt} + \varepsilon_{iqt} \qquad (4.1)$$

This is called an Additive Random-Utility Model (ARUM). We observe the outcome $Y_{it} = q$ if alternative *q* has the highest utility of the alternatives. It follows that:

$$\Pr(Y_{it} = q) = \Pr(V_{iqt}^{*} > V_{iqt}^{*}) = \Pr(V_{iqt}^{*} > V_{iqt}^{*} \leq 0), \forall j \qquad (4.2)$$

and given (4.1),

$$\Pr(Y_{it} = q) = \Pr(\varepsilon_{ijt} - \varepsilon_{iqt} \leq U_{iqt} - U_{ijt}) \qquad (4.3)$$

Now assume that individuals indexed by *i (i = 1, 2,…,N)* belong to any of the following five mutually exclusive and exhaustive boundaries (alternatives) of earnings percentiles of q at time *t (t = 1, 2,...,T)* as below:

- $q_t = 0\,[0]$ (Unemployed or non-employed)
- $q_t = 1\,(0,25]$ (Individuals with earnings in the range from minimum observed value to the 25th percentile)
- $q_t = 2\,(25,50]$ (Individuals with earnings between the 25th and 50th percentile)
- $q_t = 3\,(50,75]$ (Individuals with earnings between the 50th and 75th percentile)
- $q_t = 3\,(75,100]$ (Individuals with earnings between the 50th and 75th percentile)

Let the value, for individual *i,* of belonging to quartile *q* at time $t\left(V_{iqt}^{*}\right)$ be specified as:

$$V_{iqt}^{*} = X_{it}\beta_q + Z_{it}\gamma_q + D_i\delta_q + \varepsilon_{iqt} \tag{4.4}$$

where,

$$\varepsilon_{iqt} = \mu_{iq} + \upsilon_{iqt} \tag{4.5}$$

X_{it} is a vector of observed variables, including age groups, marital status, experience groups, and the aggregate unemployment rate. Z_{it} is a vector of dummy variables indicating the previous earnings quartile occupied by the individual *i* (time state dependence). For Canadian immigrants, we dropped observations in extreme transitions, for example, from quartiles three and four to one, similarly from quartiles one and two to four. This is due to the fact that there are few moves in these transitions, which make it difficult to get the parameter estimates. For the usual identification purpose, we take quartile zero as the reference quartile. D_i is a vector of time-invariant variables, including dummies for education and country of origin (developed or less developed).

The assumption regarding the error term, ε_{iqt}, can be summarized as follows: ε_{iqt} is composed of two terms: v_{iqt} and μ_{iq}. Where v_{iqt} is assumed to be serially uncorrelated and follows a Type I extreme value distribution. μ_{iq} is an unobserved, individual specific factor and independent of X_{it} and D_i, 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 (Heckman, 1981b). Following Chamberlain (1984), the consistency of the maximum likelihood estimator requires that $T \to \infty$. Most household panel data sets contain 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 to be 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, we consider the distribution of the unobserved effects, μ_{iq}, conditional on Z_{i1} and the mean values of exogenous time-varying variables over time $\overline{X}_i$. Z_{i1} is a vector of initial earnings quartiles[17]. μ_{iq} can be written as:

$$\mu_{iq} = \overline{X}_i \lambda_q + Z_{i1} \rho_q + v_{iq} \tag{4.6}$$

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

$$V_{iqt}^* = X_{it} \beta_q + Z_{it} \lambda_q + D_i \delta_q + \overline{X}_i \lambda_q + Z_{i1} \rho_q + v_{iq} + \upsilon_{iqt} \tag{4.7}$$

Following Mroz (1999), we assume that the probability distribution of μ_{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:

$$P\left(v_{iq} = v_q^m\right) = \pi_m, m = 1,2,\ldots,M \tag{4.8}$$

where, each

$$\pi_m \geq 0 \tag{4.9}$$

π_m is the probability that the unobserved factor takes on the values of v_{iq}^m. To be specific, there are m types of individuals and each individual, *i,* at any quartiles of *q* is endowed with a set of unobserved characteristics, v_{iq}^m.

To estimate simultaneously the parameters $\beta_q, \gamma_q, \delta_q, \left(v_{iq}^1,\ldots,v_{iq}^m\right)$, and $(p_1,\ldots,p_m)$ we use a logistic transformation as:

$$\pi_m = \frac{\exp(p_m)}{\sum_{m=1}^{M} \exp(p_j)} \tag{4.10}$$

where,

$$0 < \pi_m < 1 \tag{4.11}$$

and

[17] As mentioned earlier in this paper, for the usual identification purpose, quartile zero has been taken as the reference group.

$$\sum_{m=1}^{M} \pi_m = 1 \qquad (4.12)$$

To select the number of support points, we calculate the value of the AIC (Akaike Information Criteria) and the *BIC* (Bayesian Information Criteria)[18] 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 quartile states $q_1,...,q_T$ given all observed and unobserved effects can be written as:

$$L_i(v_i) = \prod_{t=2}^{T} P_{it}(q_t / v_i) \qquad (4.13)$$

Where v_i is a vector of v_{iq} for $q_t = 0,1,...,4$.

$q_t = q$ if $V_{iqt}^* > V_{ilt}^*$ for $q \neq l$. This results in a five-state multinomial logit with the random effects as:

$$P_{it}(q_t = q/v_i) = \frac{\exp\left(X_{it}\beta_q + Z_{it}\gamma_q + D_i\delta_j + \overline{X}_i\lambda_q + Z_{i1}\rho_q + v_{iq}\right)}{\sum_{j=0}^{4}\exp\left(X_{it}\beta_j + Z_{it}\gamma_j + D_i\delta_j + \overline{X}_i\lambda_j + Z_{i1}\rho_j + v_{iq}\right)} \qquad (4.14)$$

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

$$\log L_i = \log \sum \pi_m L_i\left(v_i^m\right) \qquad (4.15)$$

and therefore we have

$$L_{TN} = \prod_{t=2}^{T} \prod_{i=1}^{N} \sum_{m=1}^{M} \pi_m P_{it}(q_t = q/v_i) \qquad (4.16)$$

---

[18] AIC and BIC are measures of goodness of fit. In fact, they show how well the model fits the data. AIC penalizes free parameters less strongly than does BIC:

AIC : **-2*f + 2*npar**

BIC : **-2*f + log(n)*npar**

where

f is the value of the objective function, **n** is the number of individuals, and **npar** is the number of parameters.

7. Empirical Results

In this section, we report estimation results from maximizing[19] the likelihood function[20] of the multinomial logit model controlling for the endogenous initial conditions problem and unobserved heterogeneity. To show the efficiency of the model specification, as well as to distinguish between spurious and structural state dependence, we estimate the model when there is no control for the endogenous initial conditions problem and unobserved heterogeneity factors.

We experimented with different support points to find the best fitted models. We stopped adding more support points when either AIC or BIC stopped decreasing. The results are presented in Tables A5-A8 in the appendix. For both Canada and Denmark, we found that models with three and four[21] support points (unobserved types) for immigrants and natives respectively fit the data quite well.

As expected, assuming that the initial conditions are exogenous while ignoring unobserved factors generates inflated estimates of the degree of state dependence. 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 dependence parameters. Comparison of parameter estimates of the state dependence variables (the γ_q's) in the models with and without controlling on these factors confirms the argument (Table 4). This is in line with many other studies on dynamic analysis frameworks of discrete choice modeling, see for example, Brodaty (2007), Stewart (2007), Hansen et. al. (2006), and Henley (2004).

In order to get the identification in the multinomial logit model, we need to drop one equation (or state), so in this paper we used unemployment as our reference state. The models presented in this paper have a non-linear nature; the magnitudes of the coefficient estimates provide little information

[19] We tried with many different starting values to get the converged estimates of the parameters and to avoid multiple local optima.
[20] The likelihood function for Canadian data is weighted with weight variables provided by statistics Canada.
[21] The model with five support points for Danish natives did not converge. Hence, we stopped adding more support points after four support points.

Table 4: Estimated Coefficients of State Dependence with and without Control on Endogenous Initial condition and Unobserved heterogeneity.

	Without Control				With Control			
Danish Immigrants								
	Q_1	**Q_2**	**Q_3**	**Q_4**	**Q_1**	**Q_2**	**Q_3**	**Q_4**
$Q_{1(t-1)}$	**2.263** (0.077)**	**3.221** (0.189)**	**2.608** (0.288)**	**1.613** (0.469)**	**1.558** (0.098)**	**2.788** (0.208) **	**2.597** (0.330) **	**1.015** (0.489) **
$Q_{2(t-1)}$	**1.912** (0.164)**	**5.759** (0.230)**	**5.252** (0.311)**	**1.879** (0.680)**	**1.399** (0.190) **	**4.562** (0.259) **	**4.697** (0.352) **	**1.408** (0.771)
$Q_{3(t-1)}$	**0.868** (0.292)**	**5.188** (0.310)**	**7.426** (0.365)**	**6.507** (0.481)**	**1.001** (0.350) **	**4.681** (0.372) **	**7.093** (0.418) **	**6.333** (0.483) **
$Q_{4(t-1)}$	**-0.611** (0.412)**	**2.408** (0.420)**	**5.100** (0.391)**	**8.663** (0.483)**	**-0.509** (0.485)	**2.779** (0.452) **	**5.094** (0.428) **	**7.535** (0.464) **
Danish Natives								
$Q_{1(t-1)}$	**2.408** (0.031) **	**3.062** (0.057) **	**2.026** (0.090) **	**0.472** (0.121) **	**1.588** (0.039)**	**2.356** (0.065)**	**1.930** (0.093)**	**0.856** (0.134)**
$Q_{2(t-1)}$	**2.216** (0.051) **	**5.836** (0.069) **	**5.537** (0.096) **	**2.856** (0.116) **	**1.343** (0.060)**	**4.120** (0.079)**	**4.347** (0.100)**	**2.698** (0.128)**
$Q_{3(t-1)}$	**0.653** (0.077) **	**5.094** (0.086)v	**7.774** (0.107) **	**6.440** (0.119) **	**0.489** (0.082)**	**3.717** (0.093)**	**6.036** (0.110)**	**5.320** (0.131)**
$Q_{4(t-1)}$	**-1.299** (0.091) **	**1.526** (0.091) **	**5.486** (0.103) **	**8.150** (0.113) **	**-1.102** (0.110)**	**1.292** (0.109)**	**4.180** (0.116)**	**5.999** (0.130)**
Canadian Immigrants								
$Q_{1(t-1)}$	**5.144** (0.284)**	**5.268** (0.601)**	**4.085** (0.853)**	-	**2.740** (0.450)**	**2.909** (0.789)**	**2.915** (1.066)**	-
$Q_{2(t-1)}$	**4.975** (0.614)**	**8.983** (0.798)**	**7.976** (0.977)**	-	**1.161** (0.790)**	**3.337** (0.930)**	**4.127** (1.217)**	-
$Q_{3(t-1)}$	-	**10.092** (2.579)**	**12.349** (2.626)**	**13.433** (4.000)**	-	**7.737** (6.853)	**10.316** (6.888)*	**19.141** (8.365)**
$Q_{4(t-1)}$	-	**8.363** (3.677)**	**11.271** (3.712)**	**16.447** (4.563)**	-	**5.665** (11.533)	**10.115** (11.544)	**20.946** (12.271)*
Canadian Natives								
$Q_{1(t-1)}$	**6.581** (0.163)**	**5.893** (0.256)**	**4.241** (0.375)**	**2.991** (0.376)**	**3.713** (0.239)**	**3.556** (0.299)**	**2.472** (0.373)**	**1.393** (0.549)**
$Q_{2(t-1)}$	**5.967** (0.253)**	**9.116** (0.314)**	**8.155** (0.400)**	**5.083** (0.389)**	**3.519** (0.296)**	**5.497** (0.345)**	**4.846** (0.385)**	**2.958** (0.502)**
$Q_{3(t-1)}$	**3.725** (0.280)**	**7.373** (0.318)**	**9.902** (0.398)**	**7.816** (0.367)**	**2.649** (0.347)**	**4.895** (0.371)**	**6.387** (0.395)**	**5.150** (0.460)**
$Q_{4(t-1)}$	**2.351** (0.408)**	**4.653** (0.382)**	**8.519** (0.425)**	**9.953** (0.391)**	**1.894** (0.538)**	**3.858** (0.500)**	**6.139** (0.481)**	**6.500** (0.480)**

Note: Figures inside the parentheses are the Standard errors.
** Parameter estimate is significant at 5 % level of significance.
* Parameter estimate is significant at 10% level of significance.

about the size of the effects of the observable covariates. Therefore, our attention in this study focuses on the estimated transition probabilities, downward and upward mobility rates, proportion of spurious and structural state dependence, and type specific transition matrices. However, we found that all state dependence parameters and their initial values are statistically significant. For example, almost all coefficients in Table 4 are positive and statistically significant; indicating that transition towards the unemployment state is less probable. The detailed estimation results are reported in Tables A9-A16 in the appendix.

7.1 Structural Transitional Matrices

Table 5 and 6 report estimated conditional probabilities of leaving previous year's quartile with control for endogenous initial conditions problem and unobserved heterogeneity factors. Table A17 and A18 in the Appendix report the estimated conditional probabilities without controlling for the initial condition and unobserved heterogeneity[22].

As expected, when controls for these factors are incorporated in the model, there is a reduction in estimated stability rates and an increase in the transition probabilities for all earnings quartiles. This 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 (2007) 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 analyzing transitions into and out of social assistance in Canada. Arulampalam et.al (1998) also found the same results for modeling the unemployment incidence of British men.

Table 5 reports transition matrices for Danish immigrants and natives after controlling for spurious effects, so this table can be interpreted as the structural part of the transition probabilities. Compared to Table A17 (transition matrices without controlling for initial conditions and unobserved heterogeneity), structural stability rates in table 5 are lower. For example, the stability rate in state zero for immigrants decreased from 48.6% (in Table A17) to 43.3% (in Table 5), a decline of about 10%. This reduction is due to the serial correlation of unobserved characteristics with initial observations of state dependence variables.

[22] We have used bootstrap method to test the statistical difference between two probabilities.

Table 5: Structural Transition Matrix for Danish Immigrants and Natives, Estimated Conditional Probabilities of Leaving Previous Year's Quartile.
(Control for Endogenous Initial Conditions and Unobserved Heterogeneity)

Immigrants								
Origin Quartile	**Destination Quartile**					**Direction**		
	Q_0	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Down**	**Stable**	**Up**
Q_0	**0.433**	0.490	0.045	0.017	0.011	0.000	**0.433**	0.567
Q_1	0.139	**0.626**	0.164	0.060	0.011	0.139	**0.626**	0.235
Q_2	0.078	0.304	**0.405**	0.206	0.007	0.382	**0.405**	0.213
Q_3	0.028	0.074	0.155	**0.597**	0.147	0.256	**0.597**	0.147
Q_4	0.053	0.037	0.062	0.162	**0.687**	0.313	**0.687**	0.000
Distribution	**0.100**	**0.378**	**0.199**	**0.176**	**0.147**	**0.220**	**0.566**	**0.214**
Natives								
	Q_0	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Down**	**Stable**	**Up**
Q_0	**0.153**	0.517	0.170	0.080	0.081	0.000	**0.153**	0.847
Q_1	0.037	**0.501**	0.308	0.105	0.049	0.037	**0.501**	0.462
Q_2	0.015	0.161	**0.507**	0.257	0.061	0.175	**0.507**	0.318
Q_3	0.010	0.060	0.232	**0.542**	0.157	0.302	**0.542**	0.157
Q_4	0.041	0.062	0.104	0.327	**0.466**	0.534	**0.466**	0.000
Distribution	**0.024**	**0.225**	**0.269**	**0.253**	**0.229**	**0.254**	**0.496**	**0.249**

Structural stability rates for immigrants in Table 5 are higher in the lower and upper quartiles (quartiles one and four) compared to the middle quartiles (quartiles two and three). For example, the stability rates in quartiles one and four are 62.6 % and 68.7% respectively, whereas the equivalent figures in quartiles two and three are 40.5% and 59.7%. This is in line with Brodaty (2007), who explain that individuals who are in the lowest quartile today could face a deterioration of their human capital (skills and abilities) that would make their rise more difficult in the future. Unlike stability rate for immigrants, the structural stability rate for natives is higher in the middle two quartiles. Another important observation about this table is that immigrants have higher stability rates in state zero compared to natives. The higher persistence of immigrants in state zero is consistent with the fact that

Table 6: Structural Transition Matrix for Canadian Immigrants and Natives, Estimated Conditional Probabilities of Leaving Previous Year's Quartile
(Control for Endogenous Initial Conditions and Unobserved Heterogeneity)

	Immigrants							
Origin Quartile	**Destination Quartile**					**Direction**		
	Q_0	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Down**	**Stable**	**Up**
Q_0	**0.158**	0.382	0.375	0.085	0.000	0.000	**0.158**	0.842
Q_1	0.034	**0.424**	0.439	0.102	0.000	0.034	**0.424**	0.541
Q_2	0.047	0.197	**0.509**	0.248	0.000	0.243	**0.509**	0.248
Q_3	0.000	0.000	0.211	**0.491**	0.298	0.211	**0.491**	0.298
Q_4	0.000	0.000	0.041	0.414	**0.545**	0.456	**0.545**	0.000
Distribution	**0.044**	**0.234**	**0.235**	**0.216**	**0.271**	**0.234**	**0.479**	**0.286**
	Natives							
	Q_0	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Down**	**Stable**	**Up**
Q_0	**0.223**	0.263	0.200	0.153	0.161	0.000	**0.223**	0.777
Q_1	0.082	**0.400**	0.292	0.122	0.104	0.082	**0.400**	0.518
Q_2	0.070	0.181	**0.415**	0.224	0.110	0.250	**0.415**	0.335
Q_3	0.065	0.119	0.219	**0.426**	0.171	0.403	**0.426**	0.171
Q_4	0.068	0.105	0.132	0.407	**0.289**	0.711	**0.289**	0.000
Distribution	**0.074**	**0.224**	**0.242**	**0.252**	**0.207**	**0.328**	**0.374**	**0.298**

immigrants in Denmark have a higher tendency to stay unemployed (or non-employed) possibly due to the higher unemployment or welfare benefits relative to a low wage (Pedersen and Smith, 2002).

The probability of moving up into the next quartile from any of the earning quartiles is higher for natives compared to immigrants. We also note that all movements for both immigrants and natives have the higher probabilities of reaching the adjacent quartiles. For example, for natives the probability of moving from quartile one to quartile two is 30.8% higher than that of a transition from one to three, which is 10.5%. Overall upward mobility is higher for natives compared to immigrants. This result is opposite what we find in the raw data. It means that after controlling for observed and unobserved effects, Danish natives have overall higher upward mobility. Downward mobility is also lower for immigrants compared to natives in Denmark.

Table 6 reports the transition matrices for Canadian immigrants and natives after controlling for unobserved heterogeneity factors and endogenous initial conditions problem. The structural state dependence is lower in any earnings quartiles including state zero, compared to the equivalent figures in Table A18 (estimated transition without controlling the effects). Structural state dependence in state zero is 15.8% for immigrants and 22.3% for natives, much lower than equivalent figures in Table A18, which are 73.4% and 84.8%. There are relatively lower proportions of structural effects in all quartiles compared to the equivalent figures we found for Denmark.

Like the structural stability rates for Danish natives, the structural stability rates for Canadian natives are lower in the upper and lower quartiles than in the middle part. One reason for this pattern is the higher upward and downward movements in quartile one and four. Workers in the middle of the distribution appear to have relatively stable earnings and hence more persistence. Overall stability rates are slightly higher for immigrants than for natives in every quartile.

The overall upward mobility rate for Canadian immigrants (28.6%) is higher than the downward mobility rate (23.4%). Natives have a higher downward mobility rate (32.8%) than the upward mobility rate (29.8%). Immigrants in any earnings quartile have more chances to move up to the next quartiles, compared to the natives. For example, the probability of moving up from quartile one to quartile two for immigrants is 43.9% whereas the equivalent figure for natives is 29.2%.

The above discussion about transitional matrices can be summarized as follows:

- Natives in both countries have slightly higher upward and downward mobility compared to immigrants in the respective country.
- Natives in both countries have higher stability in the middle parts (quartiles two and three) compared to lower and upper parts (quartiles one and four) of the earnings distribution, which is opposite what we found in the observed transition matrices for the two countries.
- The probability of moving up into the next quartile from any of the earning quartile is higher for Danes compared to immigrants in Denmark. The opposite is true for Canadian natives and immigrants.
- Canadian Immigrants and Natives have a higher proportion of spurious effects compared to Danish immigrants and natives.

7.2 Structural and Spurious Effects

Distinction between structural and spurious effects is crucial for economic policy making. Therefore, to find the proportion of structural effects in the observed persistence, we decompose stability rates into two parts, i.e., structural and spurious. Structural effects are the ratio of state dependence probabilities with and without controlling for unobserved effects. Table 7 reports the percentage of structural and spurious state dependence.

Table 7: Percentage of Structural and Spurious State Dependence in Earnings Quartiles

		Not Working		Q_1		Q_2		Q_3		Q_4	
		Structural	Spurious	Structural	Spurious	Structural	Spurious	Structural	Spurious	Structural	Spurious
Denmark	Immigrants	**89.1**	10.9	**84.0**	16.0	**66.6**	33.4	**89.5**	10.5	**78.7**	21.3
	Natives	**58.8**	41.2	**65.4**	34.6	**75.8**	24.2	**76.2**	23.8	**53.0**	47.0
Canada	Immigrants	**21.5**	78.5	**50.5**	49.5	**69.6**	30.4	**68.8**	31.2	**61.6**	38.4
	Natives	**26.3**	73.7	**48.1**	51.9	**55.4**	44.6	**58.3**	41.7	**34.6**	65.4

As seen in Table 7, in Denmark structural state dependence for immigrants is quite high compared to natives in every earnings quartile except quartile two. Immigrants and natives in Canada have a very low structural state dependence in quartile zero compared to their Danish counterparts. The difference is higher among immigrants. For example, structural state dependence for Danish immigrants in quartile zero is 89.1%, whereas the equivalent figure for Canadians is 21.5%. Sources of spurious state dependence are due to some unobserved heterogeneity factors that are different between immigrants and native in both countries. Some portions of these spurious effects can be due to the labour market preferences, labour market discrimination, cultural attitudes, abilities, and market demand for labour which are not observed in the data. Policies such as changing benefit rules or introducing labour market programs for unemployed immigrants in Denmark can be more effective in pushing immigrants to the earnings distribution or encouraging them to work.

Differences between Canadian immigrants and natives in structural state dependence in the lower parts of the earnings distribution are not that high, compared to the Danish immigrants and natives. This distinction is more prominent in the upper most parts of the earnings quartiles in which Canadian immigrants have a dramatically higher proportion of structural state dependence. This indicates that Canadian immigrants in the uppermost part of the earnings quartiles might be more affected by economic policy reforms.

In Denmark, we note that the immigrant-native differences in proportion of structural and spurious state dependence are more prominent in the state of unemployment and lower part of the earning distribution. One reason for such differences can be that immigrants in Denmark mostly immigration for the reasons other than working. In order to reduce these differences, the Danish government should continue facilitating skilled immigrants to the labour market, which will reduce the proportion of non-skilled immigrants in Denmark.

7.3 Unobserved Types

In our estimation results, we found that there are three and four unobserved types for immigrants and natives respectively for both countries. To analyze how immigrants and natives behave on the basis of their unobserved types, we constructed type-specific transition matrices, with the help of estimated parameters, for immigrants and natives for both Denmark and Canada. These matrices are reported in tables A19 to A22 in the Appendix. Individuals with different unobserved characteristics might have different tendencies to be at the specific part of the earnings distribution. As an example, a type two Canadian native has the highest probability to stay or to move into quartile two. The probability of staying in or moving into quartile two is 53.3%, 61.2%, 77.8%, 54.1% and 42% if an individual is initially in state zero, one, two three or four respectively. As a result, the earnings distribution can be highly segmented in the long-run.

To observe more precisely the zones individuals are attracted to in a stationary equilibrium, it is useful to find quartile stationary distribution of each type. This distribution helps us understand the segmentation of earnings distribution on the basis of unobserved heterogeneity factors. These stationary distributions are reported in Table 8 for immigrants and natives in both countries. We can

Table 8: Quartile Stationary Distribution, by Unobserved Types

		Quartile Distribution				
	Types	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**
Canadian Natives	**1**	0.086	**0.289**	0.189	0.199	0.237
	2	0.050	0.153	**0.464**	0.198	0.136
	3	0.090	0.121	0.243	**0.461**	0.084
	4	0.066	0.184	0.117	0.209	**0.425**
Danish Natives	**1**	0.027	**0.389**	0.220	0.111	0.253
	2	0.016	0.173	**0.408**	0.290	0.113
	3	0.058	0.216	0.183	**0.329**	0.214
	4	0.009	0.109	0.226	0.290	**0.366**
Canadian Immigrants	**1**	0.058	**0.262**	0.166	0.189	**0.326**
	2	0.035	0.138	**0.452**	0.140	0.235
	3	0.031	0.318	0.062	**0.460**	0.129
Danish Immigrants	**1**	0.085	**0.500**	0.100	0.125	0.192
	2	0.076	0.312	**0.326**	0.186	0.100
	3	**0.255**	0.144	0.166	**0.269**	0.166

see that each unobserved type has a specific long run stationary equilibrium[23]. For example, the stationary equilibriums of Canadian natives with type one, two, three, and type four are in quartiles one, two, three, and four respectively. The highest probability mass for type one, two, three and four is 28.9%, 46.4%, 46.1% and 42.5% in quartile one, two, three and four respectively. By looking at the stationary distribution of Danish immigrants, we observe that a type three individual has a relatively higher probability (25.5%) of staying unemployed, compared to type one and two (8.5%, and 7.6% respectively).

Finally, Table A23 in the appendix shows the predicted and observed distributions of earnings quartiles. The predicted distributions are calculated for each year for Denmark and Canada. Overall, the

[23] Equilibrium in a sense that a specific type has the highest mass at a specific quartile.

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 modeling is a likelihood ratio test. This measure is defined as $1-\left[LL\left(\hat{\beta}\right)/LL(0)\right]$, where $LL\left(\hat{\beta}\right)$ is the value of 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 A23 reports the likelihood ratio indices for the final models.

8. Summary and Conclusions

This paper analyzes transitions into and out of any of the four earnings quartiles, and quartile zero (accounting for unemployment and non-employment state). We analyze 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 heterogeneity factors, we use administrative registered data for Denmark (1994-2003) and longitudinal levels of SLID data for Canada (1993-2004). The model is a dynamic multinomial logit model with discrete factor approximation for the specification of unobserved individual heterogeneity and Wooldridge's approach for controlling initial conditions problem. To avoid the effect of secular increase in labour market participation or school attendance, the data is restricted to males aged 25 to 55 years old. For Denmark, a random sample of 40,000 individuals is used for the analysis. For Canada all estimation results and descriptive statistics are weighted with the weight variables provided by Statistics Canada.

The observed data shows that immigrants in Denmark are more observed in the lower parts of the earnings distribution, while natives are evenly distributed. In Canada, immigrants are more observed in the lower and upper parts of the earnings distribution; while natives are more attracted to the middle quartiles. Comparison of natives in the two countries reveals that natives in Denmark are less likely to be unemployed (or non-employed). However, the earnings distribution for natives is similar in both countries. Observed transitional matrices show that immigrants in Canada have higher stability in any earnings quartiles than their Danish counterparts. Upward mobility is higher than downward mobility for immigrants in both countries, but with higher magnitude for Danish immigrants.

Estimation results show that models with three and four support points fit the data well for immigrants and natives respectively in both countries. For identification, state zero is used as a reference group. All state dependence parameters are positive and statistically significant; indicating that transition towards the quartile zero is less probable. Not all observed persistence in earnings quartiles is structural. Some portion of this persistence stems from unobserved heterogeneity factors and spurious effects. Ignoring unobserved effects and endogenous initial conditions problem overestimate the degree of state dependence and underestimate mobility. Our estimation results confirm this argument. Structural state dependence for Danish immigrants is quite high compared to natives in every quartile except quartile two. Differences in structural state dependence between immigrants and natives in Canada are not that high, in comparison with the differences in Denmark. Unlike immigrants in Canada, immigrants in Denmark have quite high structural state dependence in any of the earnings quartiles except quartile 2.

Our results show that immigrants in Denmark have a very high proportion of structural state dependence (89.1%) in quartile zero (unemployed or non-employed) compared to natives (58.8%). In this case, as suggested by Hansen et. al. (2006), changes in benefit rules or introducing labour market training programs are more likely to meet their objectives. As mentioned earlier, immigration in Denmark is dominated by the family class or refugees, especially from non-western countries. As a result, these immigrants are less skilled compared to Danish natives. Therefore, immigrants have fewer prospects of getting employed compared to natives.

Sources of spurious state dependence are due to some unobserved heterogeneity factors that are different between immigrants and natives in either country. Some portions of these spurious effects can be due to the labour market preferences, labour market discrimination, cultural attitudes, and abilities which are not observed in the data. Our results show that immigrant-native differences in proportion of structural and spurious state dependence, as well as upward and downward mobility rates are more prominent in Denmark than in Canada. One reason for such differences can be that immigrants in Denmark mostly come for non-work related reasons. The current Danish government policy to increase skilled immigrants will help to reduce differences between immigrants and natives.

In Canada, the huge portion of observed persistence in the state of being unemployed (or non-employed) is because of the factors which are not observed. Labour market policies which improve unobserved heterogeneity factors may lead unemployed people into employment. Sources of spurious effects can be different between immigrants and natives and can be difficult to be identified. For immigrants, some portion of this effect can be caused by lack of information on behalf of employers (statistical discrimination), language skills. Canadian immigrants have a higher structural state dependence in the uppermost part of the earnings quartiles compared to natives. This makes immigrants be more affected by economic policy reforms.

To improve overall mobility, active labour market programs such as on-job training, apprenticeships, education, labour market information, mobility, and credential recognition could enable individual to move from low-wage jobs into higher paying jobs. This is in contrast to passive income maintenance programs like unemployment insurance, which discourage such mobility and encourage people to stay unemployed (Gunderson, 2007). The effectiveness of these policies is not addressed in this paper, but is of great interest for future research.

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Appendix

Table A1: Classification of Danish Immigrants By Purpose of Entry (Economic , Refugee and Family Class)

		1999	2000	2001	2002	2003	2004	2005
Western countries	**Quota refugees**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
	Other refugees	**10**	**6**	**14**	**9**	**1**	**2**	**1**
	Family reunification to refugees	**31**	**20**	**26**	**8**	**6**	**3**	**5**
	Family reunification to others	**882**	**763**	**818**	**621**	**382**	**419**	**376**
	Wageearner and independent businessmen (occupation and studies)	86	86	76	187	251	236	217
	Persons from the new EU Member States (occupation and studies)	0	0	0	0	0	368	497
	Job-card scheme (occupation and studies)	0	0	0	25	49	37	41
	Education (occupation and studies)	1491	1555	1853	1945	2241	1753	1529
	Interns (occupation and studies)	513	788	795	789	587	415	396
	Au pair (occupation and studies)	299	450	423	384	340	268	206
	Other cases on occupation and studies	778	867	832	740	696	617	605
	Employed persons (EC/EEA)	1753	1722	1596	1416	1345	1316	1607
	Education (EC/EEA)	1487	1593	1592	1858	1980	2706	3257
	Other EC/EEA residence certificates	784	902	927	943	985	1013	1141
	Unknown	5857	5531	5718	5903	5835	7026	8532
Non-western countries	**Quota refugees**	**278**	**473**	**443**	**351**	**464**	**371**	**468**
	Other refugees	**1916**	**2905**	**3859**	**2172**	**1406**	**943**	**592**
	Family reunification to refugees	**1988**	**2746**	**3294**	**2717**	**1744**	**1012**	**485**
	Family reunification to others	**3689**	**3929**	**4023**	**3431**	**1955**	**1933**	**1910**
	Wageearner and independent businessmen (occupation and studies)	129	105	70	100	161	245	245
	Persons from the new EU Member States (occupation and studies)	0	0	0	0	0	0	2
	Job-card scheme (occupation and studies)	0	0	0	28	62	150	240
	Education (occupation and studies)	1149	1216	1102	1706	2636	2055	2428
	Interns (occupation and studies)	174	257	352	503	474	583	1020
	Au pair (occupation and studies)	100	164	202	294	380	645	748
	Other cases on occupation and studies	1185	1311	1578	1254	1130	1272	1324
	Employed persons (EC/EEA)	8	3	7	3	9	6	4
	Education (EC/EEA)	0	1	0	1	4	1	1
	Other EC/EEA residence certificates	105	121	112	103	94	104	106
	Unknown	2188	2133	2247	1546	993	813	605
All Immigrants	Economic class	1976	1917	1749	1760	1878	2359	2853
	Family class and Refugees	8801	10856	12514	9383	6056	4832	4006
	Total	10777	12773	14263	11143	7934	7191	6859
	Percentage of Economic Class	**18,3**	**15,0**	**12,3**	**15,8**	**23,7**	**32,8**	**41,6**
Non- Western Immigrants	Economic class	129	105	70	128	223	395	487
	Family class and Refugees	7871	10053	11619	8671	5569	4259	3455
	Total	8000	10158	11689	8799	5792	4654	3942
	Percentage of Economic Class	**1,6**	**1,0**	**0,6**	**1,5**	**3,9**	**8,5**	**12,4**

Sources: For Denmark, Statistics Denmark, website www.dst.dk

Table A2: Mean Characteristics for Males by Persistence in Earnings Quartiles, Immigrants and Natives

Denmark

Observed Characteristics	Immigrants Persistence in Quartiles					Natives Persistence in Quartiles				
	Q_0[1]	Q_1	Q_2	Q_3	Q_4	Q_0	Q_1	Q_2	Q_3	Q_4
Educated[2]	0.617	0.622	0.674	0.786	0.914	0.580	0.608	0.738	0.827	0.906
Married[3]	0.591	0.636	0.709	0.739	0.741	0.398	0.574	0.692	0.761	0.831
Origin (Developed)[4]	0.269	0.284	0.288	0.399	0.585	-	-	-	-	-
Age (25 – 35)	0.449	0.333	0.250	0.239	0.169	0.378	0.349	0.328	0.288	0.230
Age (35 – 45)	0.395	0.466	0.504	0.494	0.485	0.410	0.417	0.456	0.467	0.510
Age (45 – 55)	0.156	0.200	0.245	0.267	0.347	0.212	0.235	0.216	0.245	0.259
Experience < 8 years	0.842	0.533	0.235	0.216	0.193	0.474	0.123	0.041	0.044	0.048
Experience 8 -16 years	0.140	0.374	0.445	0.463	0.455	0.413	0.435	0.403	0.368	0.391
Experience >16 years	0.018	0.093	0.319	0.321	0.352	0.114	0.441	0.555	0.588	0.561
Number of Observations	998	2482	1338	1046	1391	4976	47180	53824	57191	72363

Canada

Observed Characteristics	Immigrants Persistence in Quartiles					Natives Persistence in Quartiles				
	Q_0[1]	Q_1	Q_2	Q_3	Q_4	Q_0	Q_1	Q_2	Q_3	Q_4
Educated[2]	0.814	0.710	0.708	0.875	0.916	0.330	0.652	0.795	0.850	0.927
Married[3]	0.661	0.751	0.885	0.830	0.889	0.391	0.643	0.783	0.842	0.872
Origin (Developed)[4]	0.340	0.333	0.405	0.594	0.678	-	-	-	-	-
Age (25 – 35)	0.339	0.335	0.259	0.222	0.148	0.244	0.387	0.301	0.263	0.181
Age (35 – 45)	0.210	0.420	0.444	0.418	0.405	0.372	0.421	0.489	0.469	0.532
Age (45 – 55)	0.451	0.245	0.297	0.360	0.447	0.284	0.192	0.210	0.268	0.287
Experience < 8 years	0.628	0.323	0.150	0.125	0.104	0.483	0.094	0.072	0.062	0.038
Experience 8 -16 years	0.196	0.339	0.393	0.264	0.260	0.184	0.324	0.261	0.252	0.215
Experience >16 years	0.176	0.338	0.457	0.611	0.636	0.333	0.582	0.667	0.686	0.747
Number of Observations	133	708	627	511	822	1775	5076	4775	4717	4623

Data Source: For Denmark, Registered Administrative Datasets, 1994-2003, supplied by Statistics Denmark to Labour Market Dynamic Growth (LMDG). For Canada, Survey of Labour and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures for Canada are weighted with longitudinal weight variables provided by Statistics Canada. The figures are rounded to three decimal points.

1- This excludes the people who are retired, getting education or on leaves.
2- Having at least 14 years of formal education.
3- Married or Registered Partner
4- If an immigrant was born in any High-Income countries i.e. OECD countries or Hong Kong, Israel, Singapore, Taiwan, Andorra, Bermuda, Faroe Islands, Liechtenstein, and San Marino (World Development Indicators, 2008)

Table A3: Mean Characteristics by Transition into and out of the Earnings Quartiles, Immigrants and Natives

Denmark

Observed Characteristics	Immigrants						Natives					
	Lowest Part of the Earnings Distribution		Middle of the Earnings Distribution		Uppermost Part of the Earnings Distribution		Lowest Part of the Earnings Distribution		Middle of the Earnings Distribution		Uppermost Part of the Earnings Distribution	
	0 To 1	1 To 0	1 To 2	2 To 1	3 To 4	4 To 3	0 To 1	1 To 0	1 To 2	2 To 1	3 To 4	4 To 3
Educated[2]	0.568	0.547	0.644	0.637	0.766	0.755	0.596	0.568	0.681	0.654	0.857	0.821
Married[3]	0.607	0.573	0.666	0.655	0.699	0.666	0.406	0.435	0.602	0.658	0.756	0.760
Origin (Developed)[4]	0.317	0.197	0.232	0.238	0.398	0.403	-	-	-	-	-	-
Age (25 – 35)	0.483	0.457	0.413	0.338	0.320	0.182	0.435	0.392	0.446	0.378	0.394	0.295
Age (35 – 45)	0.400	0.403	0.434	0.458	0.461	0.528	0.386	0.398	0.397	0.429	0.440	0.477
Age (45 – 55)	0.117	0.140	0.153	0.204	0.218	0.289	0.179	0.210	0.156	0.193	0.167	0.228
Experience < 8 years	0.798	0.744	0.524	0.401	0.364	0.233	0.378	0.296	0.132	0.063	0.098	0.056
Experience 8 -16 years	0.176	0.230	0.380	0.440	0.427	0.434	0.469	0.496	0.471	0.479	0.450	0.412
Experience >16 years	0.024	0.026	0.097	0.159	0.209	0.333	0.153	0.208	0.397	0.458	0.452	0.532
Number of Observations	690	422	590	441	206	159	5404	3850	14474	13437	10625	8837

Canada

Observed Characteristics	Immigrants						Natives					
	Lowest Part of the Earnings Distribution		Middle of the Earnings Distribution		Uppermost Part of the Earnings Distribution		Lowest Part of the Earnings Distribution		Middle of the Earnings Distribution		Uppermost Part of the Earnings Distribution	
	0 To 1	1 To 0	1 To 2	2 To 1	3 To 4	4 To 3	0 To 1	1 To 0	1 To 2	2 To 1	3 To 4	4 To 3
Educated[2]	0.713	0.724	0.756	0.774	0.908	0.903	0.570	0.580	0.746	0.701	0.884	0.862
Married[3]	0.694	0.575	0.840	0.793	0.825	0.849	0.671	0.713	0.696	0.725	0.828	0.828
Origin (Developed)[4]	0.383	0.503	0.389	0.402	0.477	0.518	-	-	-	-	-	-
Age (25 – 35)	0.341	0.457	0.472	0.398	0.324	0.202	0.480	0.458	0.457	0.361	0.353	0.235
Age (35 – 45)	0.391	0.329	0.387	0.433	0.313	0.376	0.299	0.290	0.388	0.392	0.486	0.484
Age (45 – 55)	0.268	0.214	0.141	0.169	0.363	0.422	0.221	0.252	0.155	0.247	0.161	0.281
Experience < 8 years	0.588	0.401	0.258	0.182	0.278	0.166	0.192	0.089	0.097	0.054	0.076	0.033
Experience 8 -16 years	0.221	0.165	0.399	0.408	0.229	0.252	0.359	0.426	0.333	0.291	0.326	0.270
Experience >16 years	0.191	0.434	0.343	0.411	0.493	0.582	0.488	0.485	0.568	0.655	0.598	0.697
Number of observations	25	23	78	95	96	102	94	99	527	683	787	792

Data Source: For Denmark, Registered Administrative Datasets, 1994-2003, supplied by Statistics Denmark to Labor Market Dynamic Growth (LMDG). For Canada, Survey of Labor and Income Dynamics (SLID), 1993-2004, based on a sample of males aged 25 to 55. The figures for Canada are weighted with longitudinal weight variables provided by Statistics Canada. The figures are rounded to three decimal points.

1- Quartile zero excludes the people who are retired, getting education or on leaves.

2- Having at least 14 years of formal education.

3- Married or Registered Partner

4- If an immigrant was born in any High-Income countries i.e. OECD countries or Hong Kong, Israel, Singapore, Taiwan, Andorra, Bermuda, Faroe Islands, Liechtenstein, and San Marino (World Development Indicators, 2008)

Table A4: Quartile Mobility Rates, Conditional Probability of Leaving Previous Years Quartile by Country (Origin Developed and Less Developed Countries)

Denmark

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Country of Origin (Developed)								
Q_0	**0.625**	0.301	0.042	0.016	0.016	0.000	**0.625**	0.375
Q_1	0.071	**0.770**	0.117	0.030	0.012	0.071	**0.770**	0.159
Q_2	0.032	0.169	**0.619**	0.166	0.014	0.201	**0.619**	0.180
Q_3	0.013	0.036	0.125	**0.690**	0.135	0.175	**0.690**	0.135
Q_4	0.015	0.009	0.012	0.068	**0.895**	0.105	**0.895**	0.000
Distribution	**0.115**	**0.313**	**0.166**	**0.162**	**0.244**	**0.111**	**0.745**	**0.144**
Country of Origin (Less Developed)								
Q_0	**0.532**	0.409	0.032	0.019	0.007	0.000	**0.532**	0.468
Q_1	0.106	**0.710**	0.141	0.037	0.006	0.106	**0.710**	0.184
Q_2	0.038	0.205	**0.582**	0.163	0.012	0.243	**0.582**	0.175
Q_3	0.023	0.055	0.240	**0.569**	0.112	0.318	**0.569**	0.112
Q_4	0.022	0.017	0.035	0.127	**0.799**	0.201	**0.799**	0.000
Distribution	**0.170**	**0.398**	**0.203**	**0.137**	**0.092**	**0.155**	**0.641**	**0.204**

Canada

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Country of Origin (Developed)								
Q_0	**0.817**	0.136	0.030	0.018	0	0	**0.817**	0.184
Q_1	0.044	**0.803**	0.114	0.035	0.004	0.044	**0.803**	0.153
Q_2	0.007	0.114	**0.699**	0.159	0.020	0.121	**0.699**	0.179
Q_3	0.002	0.014	0.158	**0.720**	0.106	0.894	**0.720**	0.106
Q_4	0	~0	0.009	0.079	**0.912**	~0.088	**0.912**	0
Distribution	**0.058**	**0.194**	**0.196**	**0.215**	**0.338**	0.100	0.802	0.098
Country of Origin (Less Developed)								
Q_0	**0.858**	0.118	0.023	0	0	0	**0.858**	0.141
Q_1	0.023	**0.860**	0.098	0.010	0.009	0.023	**0.860**	0.117
Q_2	0.007	0.126	**0.759**	0.100	0.008	0.133	**0.759**	0.108
Q_3	0.005	0.007	0.138	**0.689**	0.162	0.148	**0.689**	0.162
Q_4	0	0.009	0.022	0.140	**0.829**	0.171	**0.829**	0
Distribution	**0.100**	**0.34**	**0.249**	**0.145**	**0.166**	**0.091**	**0.805**	**0.104**

Table A5: Discrete Factor Model (DFM) Specification for Danish Immigrants, Information Criteria (AIC and BIC), Number of Parameters, and Value of Objective Function

Model Specification			AIC	BIC	Number of Parameters	Value of Objective Function
Control for Unobserved Heterogeneity	**Control for Endogenous Initial Condition**	**Number of Support Points**				
No	No	1	20715.1	20984.4	52	-10305.5
No	Yes	1	20459.4	20915.1	88	-10141.6
Yes	Yes	2	20274.2	20755.8	93	-10044.1
Yes	**Yes**	**3**	**20174.3**	**20681.8**	**98**	**-9989.1**
Yes	Yes	4	20167.9	20701.3	103	-9980.9

Table A6: Discrete Factor Model (DFM) Specification for Danish Natives, Information Criteria (AIC and BIC), Number of Parameters, and Value of Objective Function

Model Specification			AIC	BIC	Number of Parameters	Value of Objective Function
Control for Unobserved Heterogeneity	**Control for Endogenous Initial Condition**	**Number of Support Points**				
No	No	1	556897.7	557308.7	48	-278400.8
No	Yes	1	546534.8	547219.9	80	-273187.4
Yes	Yes	2	538787.6	539549.7	89	-269304.8
Yes	Yes	3	535851.4	536656.3	94	-267831.7
Yes	**Yes**	**4**	**534330.5**	**535178.3**	**99**	**-267066.2**

Table A7: Discrete Factor Model (DFM) Specification for Canadian Immigrants, Information Criteria (AIC and BIC), Number of Parameters, and Value of Objective Function

Model Specification			AIC	BIC	Number of Parameters	Value of Objective Function
Control for Unobserved Heterogeneity	Control for Endogenous Initial Condition	Number of Support Points				
No	No	1	4717.6	4936.5	48	-2310.8
No	Yes	1	4539.2	4922.2	84	-2185.6
Yes	Yes	2	4485.4	4891.2	89	-2153.7
Yes	**Yes**	**3**	**4459.5**	**4888.1**	**94**	**-2135.7**
Yes	Yes	4	4459.9*	4911.3*	99	-2130.9

Table A8: Discrete Factor Model (DFM) Specification for Canadian Natives, Information Criteria (AIC and BIC), Number of Parameters, and Value of Objective Function

Model Specification			AIC	BIC	Number of Parameters	Value of Objective Function
Control for Unobserved Heterogeneity	Control for Endogenous Initial Condition	Number of Support Points				
No	No	1	33239.0	33553.9	48	-16571.5
No	Yes	1	31745.8	32296.9	84	-15788.9
Yes	Yes	2	31385.3	31969.2	89	-15603.6
Yes	Yes	3	31192.8	31809.5	94	-15502.4
Yes	**Yes**	**4**	**31010.5**	**31660.5**	**99**	**-15406.2**
Yes	Yes	5	31048.4*	31730.7*	104	-15399.9

Table A9: Dynamic Multinomial Logit Model of Earnings Quartiles for Danish Immigrants, *(No Control for Endogenous Initial Conditions and Unobserved Heterogeneity)*

		Estimated Equations			
Explanatory Variables		Q_1	Q_2	Q_3	Q_4
State Dependence	$Q_{1(t-1)}$	**2.263** (0.077)**	**3.221** (0.189)**	**2.608** (0.288)**	**1.613** (0.469)**
	$Q_{2(t-1)}$	**1.912** (0.164)**	**5.759** (0.230)**	**5.252** (0.311)**	**1.879** (0.680)**
	$Q_{3(t-1)}$	**0.868** (0.292)**	**5.188** (0.310)**	**7.426** (0.365)**	**6.507** (0.481)**
	$Q_{4(t-1)}$	**-0.611** (0.412)**	**2.408** (0.420)**	**5.100** (0.391)**	**8.663** (0.483)**
Observed Covariates	**Educated**	**0.124** (0.076)	**0.344** (0.092)**	**0.625** (0.122)**	**1.016** (0.200)**
	Married	**-0.015** (0.076)	**0.055** (0.098)	**0.161** (0.118)	**0.114** (0.167)
	Origin (Developed)	**-0.029** (0.087)	**-0.123** (0.109)	**0.116** (0.124)	**0.588** (0.159)**
	Age (25 – 35)	**0.482** (0.112)**	**0.846** (0.146)**	**1.001** (0.174)**	**1.057** (0.247)**
	Age (35 – 45)	**0.327** (0.101)**	**0.646** (0.126)**	**0.706** (0.145)**	**0.632** (0.190)**
	Experience < 8 years	**-1.146** (0.185)**	**-2.105** (0.198)**	**-1.968** (0.217)**	**-1.438** (0.275)**
	Experience >16 years	**-0.394** (0.186)**	**-1.101** (0.195)**	**-0.944** (0.206)**	**-0.823** (0.239)**
	Unemployment Rate	**-0.135** (0.021)**	**-0.115** (0.027)**	**-0.067** (0.124)**	**-0.054** (0.045)**
	Intercept	**1.230** (0.240)**	**-1.417** (0.325)**	**-3.151** (0.414)**	**-4.893** (0.588)
	Number of Observation	**13110**	**Log Likelihood**		**-10305.56**
	Number of Individuals	**1311**	**AIC**		**20715.1**
	Number of Parameters	**48**	**BIC**		**20984.4**

Note: Figures inside the parentheses are the Standard errors.
** Parameter estimate is significant at 5 % level of significance.
* Parameter estimate is significant at 10% level of significance.

Table A10: Dynamic Multinomial Logit Model of Earnings Quartiles for Danish Immigrants, *(Control for Endogenous Initial Conditions and Unobserved Heterogeneity)*

Explanatory Variables			Estimated Equations Q_1	Q_2	Q_3	Q_4
State Dependence		$Q_{1(t-1)}$	**1.558** (0.098)**	**2.788** (0.208) **	**2.597** (0.330) **	**1.015** (0.489) **
		$Q_{2(t-1)}$	**1.399** (0.190) **	**4.562** (0.259) **	**4.697** (0.352) **	**1.408** (0.771)
		$Q_{3(t-1)}$	**1.001** (0.350) **	**4.681** (0.372) **	**7.093** (0.418) **	**6.333** (0.483) **
		$Q_{4(t-1)}$	**-0.509** (0.485)	**2.779** (0.452) **	**5.094** (0.428) **	**7.535** (0.464) **
Observed Covariates		**Educated**	**0.187** (0.096) **	**0.380** (0.128) **	**0.619** (0.137) **	**1.115** (0.233) **
		Age (25 – 35)	**0.235** (0.262)	**0.475** (0.326)	**0.446** (0.371) **	**0.511** (0.515)
		Age (35 – 45)	**0.227** (0.184)	**0.625** (0.225) **	**0.726** (0.251) **	**0.806** (0.329) **
		Married	**-0.130** (0.155)	**-0.258** (0.204)	**-0.339** (0.241)	**-0.376** (0.361)
		Experience >16 years	**0.457** (0.360)	**0.523** (0.372)	**0.406** (0.391)	**0.535** (0.449)
		Experience < 8 years	**0.766** (0.408)	**0.746** (0.438)	**0.649** (0.473)	**0.814** (0.585)
		Unemployment Rate	**-0.281** (0.029) **	**-0.322** (0.038) **	**-0.244** (0.045) **	**-0.192** (0.062) **
		Origin (Developed)	**0.277** (0.123) **	**0.005** (0.149)	**0.352** (0.149) **	**0.948** (0.202) **
Pr 1	**0.418**	**Type 1**	**3.825** (0.450) **	**0.121** (0.540)	**-1.987** (0.662) **	**-3.675** (0.848) **
Pr 2	**0.456**	**Type 2**	**3.615** (0.450) **	**2.200** (0.535) **	**-0.894** (0.616)	**-5.153** (0.895) **
Pr 3	**0.126**	**Type 3**	**1.179** (0.463) **	**-0.164** (0.547)	**-1.572** (0.581) **	**-4.301** (0.783) **
Number of Observation			**13110**		**Log Likelihood**	**-9989.16**
Number of Individuals			**1311**		**AIC**	**20174.3**
Number of Parameters			**98**		**BIC**	**20681.8**

Note: Figures inside the parentheses are the Standard errors.
** Parameter estimate is significant at 5 % level of significance.
* Parameter estimate is significant at 10% level of significance.

Table A11: Dynamic Multinomial Logit Model of Earnings Quartiles for Danish Natives,
(No Control for Endogenous Initial Conditions and Unobserved Heterogeneity)

Explanatory Variables		**Estimated Equations**			
		Q_1	**Q_2**	**Q_3**	**Q_4**
State Dependence	**$Q_{1(t-1)}$**	**2.408** (0.031) **	**3.062** (0.057) **	**2.026** (0.090) **	**0.472** (0.121) **
	$Q_{2(t-1)}$	**2.216** (0.051) **	**5.836** (0.069) **	**5.537** (0.096) **	**2.856** (0.116) **
	$Q_{3(t-1)}$	**0.653** (0.077) **	**5.094** (0.086)v	**7.774** (0.107) **	**6.440** (0.119) **
	$Q_{4(t-1)}$	**-1.299** (0.091) **	**1.526** (0.091) **	**5.486** (0.103) **	**8.150** (0.113) **
Observed Covariates	**Educated[2]**	**0.155** (0.027) **	**0.502** (0.029) **	**0.831** (0.031) **	**1.289** (0.037) **
	Age (25 – 35)	**0.923** (0.039) **	**1.261**** (0.042)	**1.356** (0.045) **	**1.383** (0.050) **
	Age (35 – 45)	**0.402** (0.034) **	**0.566** (0.036) **	**0.599** (0.038) **	**0.697** (0.040) **
	Married[3]	**0.416** (0.030) **	**0.586** (0.031) **	**0.709** (0.032) **	**0.853** (0.035) **
	Experience >16 years	**-1.028** (0.037) **	**-1.301** (0.038) **	**-1.270** (0.040) **	**-0.998** (0.043) **
	Experience < 8 years	**-1.880** (0.044) **	**-2.362** (0.050) **	**-1.742** (0.056) **	**-1.035** (0.066) **
	Unemployment Rate	**0.022** (0.008) **	**0.053** (0.009) **	**0.045** (0.009) **	**0.031** (0.010) **
	Intercept	**0.509** (0.066) **	**-2.246** (0.084) **	**-3.742** (0.109) **	**-4.796** (0.125) **
Number of Observation		**386890**	**Log Likelihood**		**-278400.8**
Number of Individuals		**38689**	**AIC**		**556897.7**
Number of Parameters		**48**	**BIC**		**557308.7**

Note: Figures inside the parentheses are the Standard errors.
** Parameter estimate is significant at 5 % level of significance.
* Parameter estimate is significant at 10% level of significance.

Table A12: Dynamic Multinomial Logit Model of Earnings Quartiles for Danish Natives,
(Control for Endogenous Initial Conditions and Unobserved Heterogeneity)

Explanatory Variables			**Estimated Equations**			
			Q_1	**Q_2**	**Q_3**	**Q_4**
State Dependence		**$Q_{1(t-1)}$**	**1.588** (0.039)**	**2.356** (0.065)**	**1.930** (0.093)**	**0.856** (0.134)**
		$Q_{2(t-1)}$	**1.343** (0.060)**	**4.120** (0.079)**	**4.347** (0.100)**	**2.698** (0.128)**
		$Q_{3(t-1)}$	**0.489** (0.082)**	**3.717** (0.093)**	**6.036** (0.110)**	**5.320** (0.131)**
		$Q_{4(t-1)}$	**-1.102** (0.110)**	**1.292** (0.109)**	**4.180** (0.116)**	**5.999** (0.130)**
Observed Covariates		**Educated**	**0.059** (0.034)*	**0.554** (0.038)**	**1.032** (0.042)**	**1.577** (0.053)**
		Age (25 – 35)	**0.493** (0.088)**	**0.601** (0.093)**	**0.671** (0.098)**	**0.801** (0.108)**
		Age (35 – 45)	**0.283** (0.058)**	**0.498** (0.061)**	**0.650** (0.064)**	**0.944** (0.071)**
		Married	**0.289** (0.065)**	**0.353** (0.068)**	**0.408** (0.071)**	**0.488** (0.077)**
		Experience >16 years	**0.397** (0.060)**	**0.365** (0.062)**	**0.303** (0.065)**	**0.220** (0.702)**
		Experience < 8 years	**0.469** (0.096)**	**0.007** (0.105)	**-0.247** (0.114)**	**-0.662** (0.127)**
		Unemployment Rate	**-0.157** (0.011)**	**-0.144** (0.011)**	**-0.118** (0.012)**	**-0.076** (0.013)**
Pr 1	**0.262**	**Type 1**	**3.676** (0.126)**	**-0.538** (0.142)**	**-4.600** (0.167)**	**-7.634** (0.213)**
Pr 2	**0.252**	**Type 2**	**3.481** (0.132)**	**1.598** (0.149)**	**-2.050** (0.172)**	**-8.224** (0.215)**
Pr 3	**0.275**	**Type 3**	**1.877** (0.111)**	**-1.243** (0.132)**	**-3.211** (0.154)**	**-7.613** (0.195)**
Pr 4	**0.211**	**Type 4**	**3.236** (0.151)**	**1.771** (0.163)**	**0.210** (0.183)	**-2.163** (0.211)**
Number of Observation			**386890**		**Log Likelihood**	**-267066.2**
Number of Individuals			**38689**		**AIC**	**534330.5**
Parameters			**99**		**BIC**	**535178.3**

Note: Figures inside the parentheses are the Standard errors.
** Parameter estimate is significant at 5 % level of significance.
* Parameter estimate is significant at 10% level of significance.

Table A13: Dynamic Multinomial Logit Model of Earnings Quartiles for Canadian Immigrants, *(No Control for Endogenous Initial Conditions and Unobserved Heterogeneity)*

Explanatory Variables		Estimated Equations Q_1	Q_2	Q_3	Q_4
State Dependence	$Q_{1(t-1)}$	**5.144** (0.284)**	**5.268** (0.601)**	**4.085** (0.853)**	-
	$Q_{2(t-1)}$	**4.975** (0.614)**	**8.983** (0.798)**	**7.976** (0.977)**	-
	$Q_{3(t-1)}$	-	**10.092** (2.579)**	**12.349** (2.626)**	**13.433** (4.000)**
	$Q_{4(t-1)}$	-	**8.363** (3.677)**	**11.271** (3.712)**	**16.447** (4.563)**
Observed Covariates	**Educated**	**-0.256** (0.319)	**-0.124** (0.350)	**0.383** (0.390)	**0.705** (0.469)
	Married	**0.765** (0.330)**	**1.297** (0.376)**	**0.994** (0.414)**	**1.405** (0.475)**
	Origin (Developed)	**-0.239** (0.302)	**-0.125** (0.330)	**0.240** (0.355)	**0.493** (0.393)
	Age (25 – 35)	**0.949** (0.388)**	**0.968** (0.430)**	**0.978** (0.469)**	**1.059** (0.542)**
	Age (35 – 45)	**0.638** (0.316)**	**0.727** (0.350)**	**0.568** (0.378)**	**0.463** (0.417)
	Experience < 8 years	**0.911** (0.324)**	**1.093** (0.372)**	**0.780** (0.432)**	**-0.214** (0.527)**
	Experience >16 years	**1.697** (0.377)**	**1.947** (0.424)**	**1.845** (0.475)**	**1.104** (0.564)**
	Unemployment Rate	**0.119** (0.129)	**0.194** (0.143)	**0.098** (0.156)	**0.043** (0.172)
	Intercept	**-4.366** (1.281)**	**-7.987** (1.516)**	**-8.019** (1.708)**	**-10.482** (3.453)**
Number of Observation		**4236**	**Log Likelihood**		**-2310.8**
Number of Individuals		**706**	**AIC**		**4717.6**
Number of Parameters		**48**	**BIC**		**4936.5**

Note: Figures inside the parentheses are the Standard errors.
** Parameter estimate is significant at 5 % level of significance.
* Parameter estimate is significant at 10% level of significance.

Table A14: Dynamic Multinomial Logit Model of Earnings Quartiles for Canadian Immigrants, ***(Control for Endogenous Initial Conditions and Unobserved Heterogeneity)***

Explanatory Variables			Estimated Equations			
			Q_1	Q_2	Q_3	Q_4
State Dependence		$Q_{1(t-1)}$	**2.740** (0.450)**	**2.909** (0.789)**	**2.915** (1.066)**	-
		$Q_{2(t-1)}$	**1.161** (0.790)**	**3.337** (0.930)**	**4.127** (1.217)**	-
		$Q_{3(t-1)}$	-	**7.737** (6.853)**	**10.316** (6.888)**	**19.141** (8.365)**
		$Q_{4(t-1)}$	-	**5.665** (11.533)*	**10.115** (11.544)*	**20.946** (12.271)*
Observed Covariates		**Educated**	**-0.247** (0.384)	**-0.279** (0.452)	**0.351** (0.478)	**-0.090** (0.617)
		Age (25 – 35)	**0.479** (1.371)	**-0.036** (1.494)	**0.867** (1.590)	**0.050** (1.804)
		Age (35 – 45)	**0.137** (1.068)	**0.814** (1.145)	**0.625** (1.208)	**0.771** (1.325)
		Married	**-0.412** (1.569)	**-0.809** (1.699)	**-1.868** (1.784)	**-1.361** (1.881)
		8<Experience >16 years	**2.726** (0.734)**	**2.125** (0.805)**	**2.125** (0.894)**	**1.853** (1.063)**
		Experience > 16 years	**5.802** (0.965)**	**4.872** (1.075)**	**5.429** (1.172)**	**6.161** (1.452)**
		Unemployment Rate	**0.512** (0.173)**	**0.539** (0.190)**	**0.365** (0.201)**	**0.353** (0.227)**
		Origin (Developed)	**-0.298** (0.391)	**-0.507** (0.470)	**0.244** (0.461)	**0.503** (0.555)
Pr 1	**0.20**	**Type 1**	**-6.231** (1.738)**	**12.370** (2.106)**	**-8.308** (2.193)**	**-14.655** (3.669)**
Pr 2	**0.28**	**Type 2**	**-7.476** (1.813)**	**-8.735** (2.058)**	**-8.991** (2.235)**	**12.199** (3.653)**
Pr 3	**0.52**	**Type 3**	**-8.683** (1.763)**	**-13.206** (2.101)**	**11.123** (2.181)**	**12.570** (3.548)**
Number of Observation			**4236**		**Log Likelihood**	**-2135.8**
Number of Individuals			**706**		**AIC**	**4459.5**
Number of Parameters			**94**		**BIC**	**4888.1**

Note: Figures inside the parentheses are the Standard errors.

** Parameter estimate is significant at 5 % level of significance.

* Parameter estimate is significant at 10% level of significance.

Table A15: Dynamic Multinomial Logit Model of Earnings Quartiles for Canadian Natives, (*No Control for Endogenous Initial Conditions and Unobserved Heterogeneity)*

Explanatory Variables		Estimated Equations Q_1	Q_2	Q_3	Q_4
State Dependence	$Q_{1(t-1)}$	**6.581** (0.163)**	**5.893** (0.256)**	**4.241** (0.375)**	**2.991** (0.376)**
	$Q_{2(t-1)}$	**5.967** (0.253)**	**9.116** (0.314)**	**8.155** (0.400)**	**5.083** (0.389)**
	$Q_{3(t-1)}$	**3.725** (0.280)**	**7.373** (0.318)**	**9.902** (0.398)**	**7.816** (0.367)**
	$Q_{4(t-1)}$	**2.351** (0.408)**	**4.653** (0.382)**	**8.519** (0.425)**	**9.953** (0.391)**
Observed Covariates	**Educated**	**0.414** (0.135)**	**0.879** (0.139)**	**0.990** (0.146)**	**1.474** (0.159)**
	Married	**0.290** (0.141)**	**0.608** (0.145)**	**0.759** (0.151)**	**0.931** (0.161)**
	Age (25 – 35)	**1.788** (0.225)**	**2.043** (0.232)**	**2.048** (0.239)**	**2.062** (0.250)**
	Age (35 – 45)	**1.098** (0.161)**	**1.292** (0.165)**	**1.144** (0.168)**	**1.248** (0.174)**
	Experience < 8 years	**0.894** (0.208)**	**0.785** (0.222)**	**0.673** (0.236)**	**0.843** (0.260)**
	Experience >16 years	**1.869** (0.226)**	**1.984** (0.240)**	**1.767** (0.254)**	**1.778** (0.280)**
	Unemployment Rate	**-0.139** (0.062)**	**-0.083** (0.064)**	**-0.105** (0.065)**	**0.162** (0.068)**
	Intercept	**-4.242** (0.532)**	**-6.704** (0.588)**	**-7.270** (0.649)**	**7.101** (0.652)**
	Number of Observation	**31338**		**Log Likelihood**	**-16571.5**
	Number of Individuals	**5223**		**AIC**	**33239.0**
	Number of Parameters	**48**		**BIC**	**33553.9**

Note: Figures inside the parentheses are the Standard errors.
** Parameter estimate is significant at 5 % level of significance.
* Parameter estimate is significant at 10% level of significance.

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Table A16: Dynamic Multinomial Logit Model of Earnings Quartiles for Canadian Natives, *(Control for Endogenous Initial Conditions and Unobserved Heterogeneity)*

Explanatory Variables			Estimated Equations			
			Q_1	Q_2	Q_3	Q_4
State Dependence		$Q_{1(t-1)}$	**3.713** (0.239)**	**3.556** (0.299)**	**2.472** (0.373)**	**1.393** (0.549)**
		$Q_{2(t-1)}$	**3.519** (0.296)**	**5.497** (0.345)**	**4.846** (0.385)**	**2.958** (0.502)**
		$Q_{3(t-1)}$	**2.649** (0.347)**	**4.895** (0.371)**	**6.387** (0.395)**	**5.150** (0.460)**
		$Q_{4(t-1)}$	**1.894** (0.538)**	**3.858** (0.500)**	**6.139** (0.481)**	**6.500** (0.480)**
Observed Covariates		**Educated**	**0.177** (0.170)	**0.715** (0.174)**	**0.761** (0.174)**	**1.122** (0.215)**
		Age (25 – 35)	**0.082** (0.581)	**0.488** (0.588)	**0.268** (0.597)	**0.080** (0.623)
		Age (35 – 45)	**0.031** (0.404)	**0.215** (0.408)	**0.091** (0.411)	**0.054** (0.426)
		Married	**-0.070** (0.482)**	**-0.131** (0.493)**	**0.008** (0.509)**	**0.058** (0.542)**
		Experience >16 years	**0.395** (0.542)	**1.247** (0.547)**	**1.313** (0.566)**	**2.306** (0.619)**
		Experience < 8 years	**0.672** (0.743)	**1.837** (0.750)**	**1.551** (0.768)**	**2.438** (0.820)**
		Unemployment Rate	**-0.016** (0.072)	**0.034** (0.072)	**-0.007** (0.073)	**-0.079** (0.079)
Pr 1	**0.528**	**Type 1**	**-9.903** (2.006)**	**-15.344** (2.079)**	**-14.067** (2.128)**	**-14.903** (2.132)**
Pr 2	**0.183**	**Type 2**	**-3.257** (0.787)**	**-5.833** (0.829)**	**-6.364** (0.884)**	**-9.578** (1.485)**
Pr 3	**0.177**	**Type 3**	**-11.367** (2.047)**	**-14.000** (2.119)**	**-11.334** (2.156)**	**-15.796** (2.588)**
Pr 4	**0.528**	**Type 4**	**-9.903** (2.006)**	**-15.344** (2.079)**	**-14.067** (2.128)**	**-14.903** (2.132)**
		Number of Observation	**31338**		**Log Likelihood**	**-15406.23**
		Number of Individuals	**5223**		**AIC**	**31010.5**
		Number of Parameters	**99**		**BIC**	**31660.5**

Note: Figures inside the parentheses are the Standard errors.

** Parameter estimate is significant at 5 % level of significance.

* Parameter estimate is significant at 10% level of significance.

Table A17: Transition Matrix for Danish Immigrants and Natives, Estimated Conditional Probabilities of Leaving Previous Year's Quartile
(No Control for Endogenous Initial Conditions and Unobserved Heterogeneity)

Immigrants

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	**0.486**	0.459	0.034	0.015	0.006	0.000	**0.486**	0.514
Q_1	0.087	**0.745**	0.132	0.031	0.005	0.087	**0.745**	0.168
Q_2	0.035	0.197	**0.608**	0.158	0.003	0.232	**0.608**	0.161
Q_3	0.020	0.035	0.178	**0.667**	0.100	0.233	**0.667**	0.100
Q_4	0.023	0.011	0.015	0.077	**0.874**	0.126	**0.874**	0.000
Distribution	**0.078**	**0.367**	**0.242**	**0.164**	**0.149**	**0.145**	**0.698**	**0.157**

Natives

	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	**0.260**	0.622	0.077	0.025	0.016	0.000	**0.260**	0.740
Q_1	0.031	**0.767**	0.178	0.021	0.003	0.031	**0.767**	0.202
Q_2	0.008	0.153	**0.669**	0.163	0.007	0.162	**0.669**	0.170
Q_3	0.004	0.016	0.153	**0.711**	0.116	0.173	**0.711**	0.116
Q_4	0.006	0.004	0.007	0.105	**0.879**	0.121	**0.879**	0.000
Distribution	**0.023**	**0.246**	**0.245**	**0.242**	**0.244**	**0.119**	**0.745**	**0.136**

Table A18: Transition Matrix for Canadian Immigrants and Natives, Estimated Conditional Probabilities of Leaving Previous Year's Quartile
(No Control for Endogenous Initial Conditions and Unobserved Heterogeneity)

Immigrants								
Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	**0.734**	0.210	0.028	0.016	0.011	0.000	**0.734**	0.266
Q_1	0.025	**0.840**	0.116	0.019	0.000	0.025	**0.840**	0.135
Q_2	0.005	0.119	**0.731**	0.144	0.000	0.124	**0.731**	0.144
Q_3	0.003	0.000	0.157	**0.714**	0.126	0.160	**0.714**	0.126
Q_4	0.005	0.000	0.013	0.098	**0.884**	0.116	**0.884**	0.000
Distribution	**0.045**	**0.248**	**0.205**	**0.235**	**0.268**	**0.100**	**0.796**	**0.105**

Natives								
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	**0.848**	0.086	0.031	0.014	0.021	0.000	**0.848**	0.152
Q_1	0.017	**0.832**	0.134	0.012	0.005	0.017	**0.832**	0.151
Q_2	0.005	0.106	**0.749**	0.132	0.009	0.111	**0.749**	0.141
Q_3	0.005	0.011	0.129	**0.730**	0.125	0.145	**0.730**	0.125
Q_4	0.005	0.003	0.007	0.152	**0.834**	0.167	**0.834**	0.000
Distribution	**0.077**	**0.227**	**0.241**	**0.239**	**0.216**	**0.101**	**0.789**	**0.110**

Table A 19: Type Specific Estimated Transition Matrices for Canadian Natives

Type 1

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.487	**0.286**	0.079	0.051	0.098	0.000	**0.487**	0.513
Q_1	0.131	**0.575**	0.156	0.058	0.080	0.131	**0.575**	0.294
Q_2	0.095	**0.294**	0.328	0.156	0.128	0.389	**0.328**	0.284
Q_3	0.083	**0.206**	0.175	0.325	0.212	0.464	**0.325**	0.212
Q_4	0.088	**0.181**	0.101	0.284	0.347	0.653	**0.347**	0.000
Distribution	0.086	**0.289**	0.189	0.199	0.237	**0.358**	**0.417**	**0.225**

Type 2

	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.056	0.207	**0.533**	0.107	0.097	0.000	**0.056**	0.945
Q_1	0.008	0.297	**0.612**	0.058	0.025	0.008	**0.297**	0.695
Q_2	0.005	0.086	**0.778**	0.110	0.022	0.090	**0.778**	0.132
Q_3	0.005	0.051	**0.541**	0.331	0.073	0.596	**0.331**	0.073
Q_4	0.007	0.053	**0.420**	0.351	0.169	0.831	**0.169**	0.000
Distribution	0.050	0.153	**0.464**	0.198	0.136	**0.274**	**0.498**	**0.229**

Type 3

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.441	0.057	0.162	**0.305**	0.035	0.000	**0.441**	0.559
Q_1	0.128	0.170	0.331	**0.344**	0.028	0.128	**0.170**	0.703
Q_2	0.080	0.046	0.389	**0.468**	0.017	0.126	**0.389**	0.485
Q_3	0.070	0.017	0.141	**0.739**	0.033	0.227	**0.739**	0.033
Q_4	0.074	0.013	0.076	**0.733**	0.105	0.895	**0.105**	0.000
Distribution	0.090	0.121	0.243	**0.461**	0.084	**0.226**	**0.505**	**0.269**

Type 4

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.083	0.157	0.061	0.133	**0.566**	0.000	**0.083**	0.917
Q_1	0.057	0.258	0.136	0.160	**0.389**	0.057	**0.258**	0.685
Q_2	0.040	0.116	0.194	0.296	**0.354**	0.156	**0.194**	0.650
Q_3	0.019	0.028	0.042	0.379	**0.532**	0.089	**0.379**	0.532
Q_4	0.012	0.007	0.009	0.164	**0.808**	0.192	**0.808**	0.000
Distribution	0.066	0.184	0.117	0.209	**0.425**	**0.129**	**0.498**	**0.373**

Table A20: Type Specific Estimated Transition Matrices for Danish Natives

Type 1

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.134	**0.755**	0.066	0.011	0.034	0.000	**0.134**	0.866
Q_1	0.034	**0.791**	0.139	0.016	0.021	0.034	**0.791**	0.176
Q_2	0.022	**0.422**	0.414	0.081	0.061	0.444	**0.414**	0.142
Q_3	0.022	**0.235**	0.283	0.251	0.210	0.539	**0.251**	0.210
Q_4	0.071	**0.210**	0.107	0.118	0.494	0.506	**0.494**	0.000
Distribution	0.027	**0.389**	0.220	0.111	0.253	**0.299**	**0.555**	**0.146**

Type 2

	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.105	0.473	**0.328**	0.080	0.014	0.000	**0.105**	0.895
Q_1	0.021	0.389	**0.499**	0.085	0.006	0.021	**0.389**	0.591
Q_2	0.006	0.097	**0.696**	0.193	0.007	0.104	**0.696**	0.200
Q_3	0.005	0.042	**0.390**	0.531	0.032	0.437	**0.531**	0.032
Q_4	0.031	0.061	**0.250**	0.468	0.191	0.809	**0.191**	0.000
Distribution	0.016	0.173	**0.408**	0.290	0.113	**0.264**	**0.529**	**0.208**

Type 3

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.324	0.413	0.097	**0.102**	0.065	0.000	**0.324**	0.676
Q_1	0.100	0.482	0.211	**0.160**	0.047	0.100	**0.482**	0.417
Q_2	0.042	0.165	0.358	**0.380**	0.055	0.207	**0.358**	0.436
Q_3	0.025	0.048	0.126	**0.667**	0.134	0.199	**0.667**	0.134
Q_4	0.084	0.044	0.052	**0.397**	0.423	0.577	**0.423**	0.000
Distribution	0.058	0.216	0.183	**0.329**	0.214	**0.248**	**0.498**	**0.253**

Type 4

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.050	0.247	0.192	0.174	**0.338**	0.000	**0.050**	0.951
Q_1	0.010	0.211	0.325	0.221	**0.232**	0.010	**0.211**	0.779
Q_2	0.003	0.040	0.357	0.388	**0.212**	0.043	**0.357**	0.600
Q_3	0.001	0.007	0.086	0.536	**0.370**	0.094	**0.536**	0.370
Q_4	0.002	0.004	0.019	0.167	**0.808**	0.192	**0.808**	0.000
Distribution	0.009	0.109	0.226	0.290	**0.366**	**0.108**	**0.555**	**0.337**

Table A 21: Type Specific Estimated Transition Matrices for Canadian Immigrants

Type 1

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.295	**0.386**	0.250	0.069	0.000	0.000	**0.295**	0.705
Q_1	0.060	**0.471**	0.368	0.102	0.000	0.060	**0.471**	0.470
Q_2	0.079	0.221	0.444	0.255	0.000	0.300	**0.444**	0.255
Q_3	0.000	0.000	0.148	0.394	**0.459**	0.148	**0.394**	0.459
Q_4	0.000	0.000	0.023	0.234	**0.744**	0.256	**0.744**	0.000
Distribution	0.058	**0.262**	0.166	0.189	**0.326**	**0.177**	**0.531**	**0.293**

Type 2

	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.371	**0.492**	0.108	0.024	0.005	0.000	**0.371**	0.629
Q_1	0.103	**0.518**	**0.312**	0.064	0.004	0.103	**0.518**	0.380
Q_2	0.044	0.187	**0.597**	0.170	0.002	0.231	**0.597**	0.172
Q_3	0.016	0.052	**0.270**	**0.606**	0.055	0.338	**0.606**	0.055
Q_4	0.052	0.043	0.174	**0.292**	0.439	0.561	**0.439**	0.000
Distribution	0.035	0.138	**0.452**	0.140	0.235	**0.240**	**0.560**	**0.200**

Type 3

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.101	0.548	0.141	**0.210**	0.000	0.000	**0.101**	0.899
Q_1	0.015	0.570	0.166	**0.249**	0.000	0.015	**0.570**	0.415
Q_2	0.021	0.295	0.169	**0.515**	0.000	0.315	**0.169**	0.515
Q_3	0.000	0.000	0.054	**0.864**	0.082	0.054	**0.864**	0.082
Q_4	0.000	0.000	0.008	**0.780**	0.212	0.788	**0.212**	0.000
Distribution	0.031	0.318	0.062	**0.460**	0.129	**0.151**	**0.619**	**0.230**

Table A 22: Type Specific Estimated Transition Matrices for Danish Immigrants

Type 1

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.362	**0.595**	0.015	0.009	0.020	0.000	**0.362**	0.638
Q_1	0.121	**0.768**	0.061	0.031	0.019	0.121	**0.768**	0.111
Q_2	0.093	**0.517**	0.217	0.153	0.020	0.610	**0.217**	0.173
Q_3	0.031	**0.133**	0.082	0.425	0.330	0.245	**0.425**	0.330
Q_4	0.030	**0.035**	0.019	0.069	0.847	0.153	**0.847**	0.000
Distribution	0.085	**0.500**	0.100	0.125	0.192	**0.181**	**0.651**	**0.168**

Type 3

	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	0.371	**0.492**	0.108	0.024	0.005	0.000	**0.371**	0.629
Q_1	0.103	**0.518**	0.312	0.064	0.004	0.103	**0.518**	0.380
Q_2	0.044	0.187	**0.597**	0.170	0.002	0.231	**0.597**	0.172
Q_3	0.016	0.052	**0.270**	0.606	0.055	0.338	**0.606**	0.055
Q_4	0.052	0.043	**0.174**	0.292	0.439	0.561	**0.439**	0.000
Distribution	0.076	0.312	**0.326**	0.186	0.100	**0.226**	**0.541**	**0.232**

Type 2

Origin Quartile	Destination Quartile					Direction		
	Q_0	Q_1	Q_2	Q_3	Q_4	Down	Stable	Up
Q_0	**0.787**	0.128	0.033	0.032	0.021	0.000	**0.787**	0.214
Q_1	**0.414**	0.244	0.163	0.152	0.028	0.414	**0.244**	0.342
Q_2	**0.196**	0.088	0.299	**0.401**	0.017	0.284	**0.299**	0.418
Q_3	**0.037**	0.011	0.062	**0.679**	0.211	0.109	**0.679**	0.211
Q_4	**0.052**	0.004	0.021	0.163	0.760	0.240	**0.760**	0.000
Distribution	**0.255**	0.144	0.166	**0.269**	0.166	**0.176**	**0.594**	**0.230**

Table A23: Fit of the Model (Likelihood Ratio Index)

		LL (No Model)	LL (Full Model)	Likelihood Ratio Index
Denmark	**Immigrants**	-14639.21	-9989.16	0.318
	Natives	-455679.04	-267066.2	0.414
Canada	**Immigrants**	-5448.5	-2135.7	0.608
	Natives	-52829.6	-15406.2	0.708

Table A24 Yearly Observed and Predicted Probabilities

Danish Natives	**Observed**					**Predicted**				
Year	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**
1995	0.049	0.233	0.239	0.24	0.239	0.04	0.242	0.245	0.232	0.241
1996	0.039	0.234	0.242	0.242	0.242	0.032	0.238	0.255	0.237	0.238
1997	0.03	0.237	0.243	0.245	0.245	0.027	0.235	0.261	0.242	0.236
1998	0.026	0.238	0.244	0.246	0.246	0.022	0.233	0.266	0.245	0.234
1999	0.028	0.237	0.244	0.245	0.246	0.019	0.232	0.269	0.248	0.232
2000	0.025	0.239	0.244	0.246	0.246	0.019	0.231	0.27	0.25	0.23
2001	0.026	0.239	0.244	0.246	0.246	0.019	0.228	0.271	0.253	0.229
2002	0.034	0.237	0.241	0.244	0.244	0.02	0.227	0.271	0.254	0.229
2003	0.043	0.235	0.239	0.241	0.242	0.025	0.225	0.269	0.253	0.229
Danish Immigrants	**Observed**					**Predicted**				
Year	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**
1995	0.254	0.336	0.156	0.119	0.134	0.267	0.346	0.133	0.126	0.128
1996	0.202	0.376	0.153	0.134	0.135	0.213	0.37	0.146	0.136	0.135
1997	0.16	0.374	0.184	0.146	0.137	0.169	0.396	0.155	0.145	0.136
1998	0.108	0.399	0.198	0.156	0.14	0.123	0.408	0.177	0.156	0.137
1999	0.105	0.399	0.204	0.151	0.14	0.091	0.414	0.192	0.163	0.139
2000	0.087	0.38	0.218	0.164	0.151	0.087	0.415	0.198	0.161	0.14
2001	0.083	0.372	0.229	0.166	0.15	0.079	0.399	0.203	0.172	0.146
2002	0.082	0.367	0.242	0.16	0.15	0.08	0.391	0.207	0.175	0.148
2003	0.111	0.362	0.225	0.158	0.143	0.1	0.378	0.199	0.176	0.147
Canadian Natives	**Observed**					**Predicted**				
Year	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**
1994	0.051	0.218	0.258	0.260	0.214	0.060	0.231	0.256	0.265	0.214
1995	0.055	0.204	0.264	0.256	0.221	0.060	0.229	0.257	0.267	0.221
1996	0.081	0.215	0.247	0.240	0.218	0.060	0.226	0.256	0.270	0.218
1997	0.081	0.215	0.243	0.248	0.213	0.071	0.231	0.245	0.255	0.213
1998	0.084	0.207	0.238	0.251	0.220	0.071	0.231	0.245	0.256	0.220
1999	0.100	0.191	0.223	0.247	0.240	0.081	0.226	0.232	0.251	0.240
2000	0.087	0.209	0.223	0.229	0.253	0.082	0.229	0.228	0.252	0.253
2001	0.089	0.204	0.230	0.233	0.245	0.081	0.229	0.232	0.249	0.245
2002	0.077	0.204	0.223	0.241	0.256	0.081	0.226	0.232	0.251	0.256
2003	0.082	0.208	0.222	0.238	0.250	0.084	0.226	0.224	0.254	0.250
2004	0.078	0.203	0.221	0.246	0.252	0.081	0.227	0.229	0.251	0.252
Canadian Immigrants	**Observed**					**Predicted**				
Year	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**	**Q_0**	**Q_1**	**Q_2**	**Q_3**	**Q_4**
1994	0.092	0.235	0.252	0.129	0.292	0.061	0.264	0.205	0.184	0.285
1995	0.092	0.221	0.231	0.189	0.267	0.054	0.262	0.209	0.200	0.275
1996	0.077	0.293	0.223	0.180	0.227	0.056	0.252	0.217	0.203	0.273
1997	0.083	0.300	0.204	0.183	0.230	0.050	0.268	0.218	0.208	0.257
1998	0.072	0.277	0.218	0.192	0.241	0.051	0.265	0.208	0.221	0.254
1999	0.082	0.267	0.216	0.192	0.243	0.040	0.273	0.201	0.239	0.248
2000	0.076	0.253	0.223	0.203	0.245	0.052	0.240	0.206	0.241	0.262
2001	0.071	0.276	0.220	0.184	0.250	0.044	0.239	0.206	0.240	0.270
2002	0.069	0.257	0.229	0.176	0.269	0.044	0.229	0.221	0.223	0.283
2003	0.066	0.265	0.258	0.146	0.265	0.040	0.230	0.218	0.227	0.284
2004	0.068	0.276	0.216	0.204	0.236	0.035	0.241	0.217	0.227	0.281

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