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Regulated occupations, immigration, and labour mobility in Canada, 1994-2005

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This study provides an overview of inter-provincial and inter-industry labour mobility in Canada during the period 1994-2005. It illustrates the relative importance of these two types of mobility in the Canadian economy and specifies a bivariate probit model to jointly examine inter-provincial and inter-industry mobility. Regulations significantly reduce both the probability of inter-industry mobility for regulated professions and the probability of inter-provincial migration for apprentice trades. Although recent immigrants have a greater inter-industry labour mobility rate, they are less likely to change industry or province when we control for skill mismatch. Regression results show that inter-provincial migration is relatively insensitive to increases in wages or after-tax family incomes, while wage differentials have a much larger effect on inter-industry mobility.

JEL classification: C25, J62, J24

Cette étude porte sur la mobilité interprovinciale et intersectorielle de la main d'œuvre au Canada de 1994 à 2005, visant à démontrer l'importance relative que revêtent ces types de mouvement pour l'économie canadienne et évalue au moyen d'un modèle probit bivarié la mobilité interprovinciale et intersectorielle combinée. Pour ce qui est de la réglementation des professions, elle réduit considérablement la probabilité que la main d'œuvre réglementée change de secteur d'activité et la probabilité que la main d'œuvre des métiers avec stage d'apprentissage migre dans une autre province. Bien que les immigrants récents aient un taux de mobilité interindustriel plus élevé, on trouve qu'ils sont moins enclins à changer de secteur d'activité ou de province lorsque l'on contrôle pour le non-appariement emploi – éducation. L'analyse de régression révèle que l'augmentation du salaire ou du revenu familial après impôts a peu d'incidence sur la migration interprovinciale, alors que l'écart salarial influe grandement sur la mobilité intersectorielle.

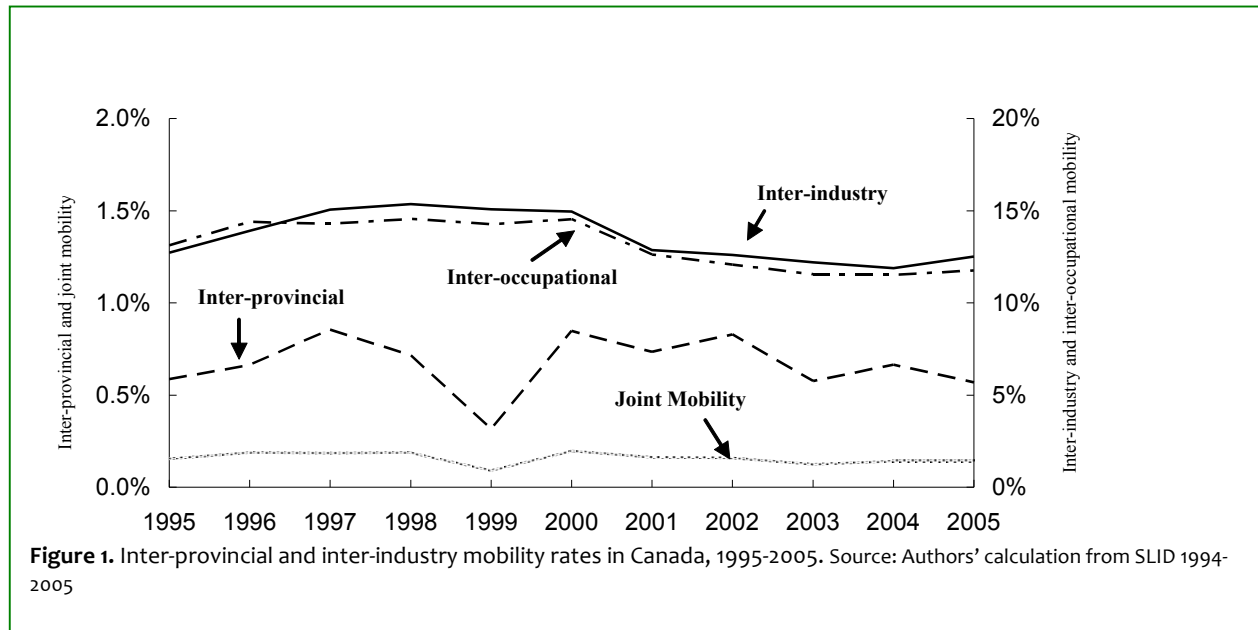
Canada is a geographically large and economically diverse nation. Vast differences in industrial structure and economic performance across the nation imply constant adjustment in the labour market and the reallocation of workers from areas of lower demand to those of higher demand. For example, in Alberta the recent oil price boom led to labour shortages and to corresponding wage increases. This in

turn encouraged workers from other provinces to move to Alberta for better employment. Conversely, in Ontario and Québec, recent restructuring in the manufacturing sector led to employment declines and wage adjustments, thus forcing workers to move to different industries for jobs and possibly to migrate to other provinces. If we think of Canada as a well-integrated labour market, inter-

provincial and inter-industry mobility means the labour market can respond quickly and efficiently to changes in the demand for workers.

However, there are three respects in which Canada might fall short of being a well-integrated labour market: two of which are central to this paper. In Canada, what are the barriers to free movement of labour that restrict efficiency in the national labour market?

First, Canada is a federal system wherein each province plays a substantial role in its own regional economy. According to Gunderson (1994), barriers to labour mobility between provinces, arise because of the regulation and licensing of professions and trades, preferential hiring and procurement practices, language difference and public transfer payments such as Employment Insurance (EI). Regulated professions and apprenticeable trades are the two main types of regulated occupations in Canada. People working in regulated professions usually must have a university or college education and practical experience and complete a licensure examination: e.g., physicians, nurses, and lawyers. Apprenticeable trades usually require training under a licensed supervisor, specialized college education and completion of a certification examination: e.g., mechanics, plumbers, and welders. These occupational regulations usually limit a worker's freedom to practice an occupation in another province or industry. How? Provinces and industries may have distinct requirements for their regulated professionals. Workers are certified by a professional organization or regulatory agency in their home province. This certification may not be recognized in another province or industry. An individual who is licensed in one province or industry may have to re-apply for a license to work elsewhere. According to Sobkow (2001), over 20 per cent of Canadians work in regulated occupations. Gunderson (1994) and Sobkow (2001) provide an exhaustive overview of existing barriers on labour mobility, such as regulations, but do not provide or review any empirical evidence about their relative impact on labour



mobility. Curiously, in the empirical literature on labour mobility, the effects of institutional barriers are usually neglected. One purpose of this paper is to explore the effect of occupational regulation on worker mobility.

Second, Canada has had a relatively high level of immigration from abroad. Integration of immigrants into the national economy is a lengthy and imperfect process. Employers often use credentials to assess job applicants. Credentials increase the efficiency of the labour market by providing a simple way of matching candidates and jobs. In general, workers with higher-level credentials earn higher wages and they are more likely to be employed in higher-skilled occupations. However, this is not always true for immigrants, especially for more highly skilled recent immigrants because their credentials were obtained in other countries and may not be recognized by Canadian employers. According to information from the Foreign Credential Program (FCP) operated by Human Resources and Skills Development Canada (HRSDC), only half of skilled immigrants are targeted by systemic FCP intervention. FCP aims to improve the overall efficiency of the labour market and reduce the barriers to labour market integration. Otherwise, those whose credentials are not recognized may have to work in lower-

skilled occupations. This creates skill mismatch and may spur these over-qualified workers to move or to change industry more frequently in an effort to rematch occupations with their skills. A second purpose of this paper is to explore the effect of immigrant status on worker mobility, especially in light of occupational regulation.

Third, although Canada has two official languages, some Canadians are not proficient in both. Although there are Francophone communities outside the province of Québec and Anglophone communities inside Québec, it is primarily migration into or out of Québec that is seen to be potentially slow to respond to labour market conditions. This paper does not focus on the role of language proficiency. However, we do include language proficiency as a predictor of mobility.

The objectives of this paper are twofold.

First, using the Survey of Labour and Income Dynamics (SLID) from 1994 to 2005, we review stylized facts that characterize inter-provincial and inter-industry labour mobility and put a special emphasis on mobility patterns among immigrants and regulated occupations. Several questions motivate this review. Consistent with labour market adjustment, did mobility

differ substantially among provinces and industries during the period of 1994 to 2005? Did recent immigrants have the highest inter-industry mobility and did were their mobility patterns different from those of established immigrants and native-born Canadians? What is the role of skill mismatch here? Did recent immigrants with a skill match have a lower mobility rate than corresponding established immigrants and native-born Canadians? Were recent immigrants more mobile because they are more likely to have a skill mismatch?

Second, we estimate a bivariate probit model to quantify the effect of the key determining factors (wage differentials, regulation impact, immigrant status and personal characteristics etc.) on individual decisions with respect to changing the province of residence or industry of employment. Several questions motivate this modeling. How sensitive is inter-provincial migration to differences in wage or after-tax family income? How sensitive is inter-industry mobility to differences in wage? After controlling for skill mismatch, how likely are recent and established immigrants to change industry or province? Do regulatory barriers significantly reduce both the probability of inter-industry mobility for regulated professions and the

Table 1. Interprovincial mobility, 1995-2005.

Province	1995-2000		2001-2005	
	Annual average		Annual average	
	Inflow	Outflow	Inflow	Outflow
Alberta	31,947 (1.70)	21,024 (1.12)	28,366 (1.49)	19,547 (1.02)
British Columbia	24,819 (0.90)	22,228 (0.81)	21,531 (0.84)	21,647 (0.84)
Manitoba	6,302 (0.85)	7,987 (1.09)	4,278 (0.61)	7,443 (1.07)
New Brunswick	6,306 (1.17)	7,742 (1.44)	6,852 (1.44)	6,533 (1.37)
Newfoundland	3,783 (0.94)	7,974 (1.98)	4,048 (1.14)	4,155 (1.17)
Nova Scotia	6,947 (1.01)	7,914 (1.15)	10,603 (1.73)	8,412 (1.37)
Ontario	33,391 (0.43)	28,100 (0.37)	32,018 (0.45)	32,484 (0.45)
Prince Edward Island	1,648 (1.65)	1,431 (1.43)	1,121 (1.26)	1,011 (1.14)
Québec	9,178 (0.17)	17,832 (0.33)	12,739 (0.28)	17,673 (0.38)
Saskatchewan	7,527 (1.12)	9,615 (1.43)	7,242 (1.21)	9,892 (1.66)
Total	131,848	131,848	128,798	128,798

Note: Figures in parentheses are percentages.

Source: Authors' calculation from SLID 1994-2005.

probability of inter-provincial migration for apprentice trades?

Overview of the literature

According to neoclassical economic theory (Sjaastad 1962), individuals treat mobility as a rational cost-benefit analysis. The empirical literature largely recognizes that a worker tends to change from industry *o* to industry *d* if the expected wage gain associated with the change exceeds the cost of changing. Similarly, an individual will change province of residence if the expected gain in wage/income is higher than the moving cost. Following Borjas (1990), the expected returns to mobility, *E*, can be expressed as

$$(1) E = \int_0^T (Y_d[t] - Y_o[t]) e^{-rt} dt - C$$

where:

- Y_o expected wages at origin;
- Y_d expected wages at destination;
- r discount rate;
- t future date;
- T planning horizon; and
- C cost of mobility.

The first part of right-hand side represents the benefits, while the second part is the cost of mobility. The basic assumption is that an individual will change industry and/or move to another province if $E > 0$.

In Canada, inter-provincial labour mobility has been extensively studied at both aggregate and individual levels. Studies on basic patterns of inter-provincial mobility and of the earning effects associated with inter-provincial migration include Finnie (1999a, 1999b), Robinson & Tomes (1982), Osberg, Gordon, & Line (1994), Lin (1995, 1996) and Vachon & Vaillancourt (1998). These studies examined the personal characteristics of movers and stayers associated with migration and generally conclude that inter-provincial mobility rates differ by age group, immigrant status, income level, and between the recipients and non-recipients of EI benefits.

On the determinants of labour mobility, Finnie (2004) estimates a logit model of inter-provincial migration using the Longitudinal Administrative Databank (LAD) between 1982

and 1995 and finds that inter-provincial mobility is negatively related to the home province's population size—reflecting local economic conditions and labour market scale effects—and negatively related to age, marriage, and the presence of children in the family. Labour mobility is also found to be positively related to the provincial unemployment rate, the receipt of unemployment insurance, having no market income and the receipt of social assistance. Robinson & Tomes (1982), Osberg, Gordon, & Lin (1994) and Lin (1995) also examine the determinants of inter-provincial labour mobility and find that the probability of inter-provincial migration depends positively on wage differentials, while personal characteristics and labour market attributes also play important roles.

In the United States, Davies, Greenwood, & Li (2001) use a conditional logit approach to estimate a model of interstate migration from 1986 to 1996 using annual migration data. They present marginal effects on the probability of moving due to interstate differences in unemployment rate and per capita income, as well as the distance between origin and destination.

Compared with inter-provincial mobility, there is much less literature on inter-industry labour mobility in Canada and US. Osberg (1991) investigates "short period" inter-industry mobility based on the Labour Force Survey from 1980 to 1986, and finds a negative relationship between the unemployment rate and inter-industry mobility. In one of the few studies to investigate both inter-provincial and inter-industry mobility, Osberg, Gordon, & Lin (1994) argues that inter-regional migration and inter-industry labour mobility decisions are simultaneously determined.

The approach of this paper is to look at the decisions of workers to supply labour into various provinces and industries and to ignore determinants of the demand for labour by firm. A few others have worked on simultaneous estimation of demand curve and supply curve in labour mar-

Table 2. Inter-industry mobility, 1995-2005.

Industry	1995-2000		2001-2005	
	Inflow	Outflow	Inflow	Outflow
Agriculture	51,578 (12.8)	61,761 (15.4)	30,391 (9.9)	38,824 (12.6)
Resources	47,091 (16.2)	49,825 (17.1)	38,321 (15.1)	30,691 (12.1)
Utilities	8,548 (8.1)	8,402 (8.0)	13,324 (14.1)	9,369 (9.9)
Construction	109,837 (14.6)	110,861 (14.7)	96,205 (12.9)	82,652 (11.1)
Manufacturing	209,032 (12.1)	183,318 (10.6)	140,532 (8.5)	176,208 (10.7)
Trade	288,501 (15.1)	317,034 (16.6)	245,071 (13.4)	275,566 (15.0)
Transportation	80,013 (14.0)	66,426 (11.6)	69,809 (12.2)	54,313 (9.5)
Finance	93,940 (12.8)	76,518 (10.4)	68,741 (10.2)	59,771 (8.9)
Professional Scientific	124,647 (18.4)	101,363 (15.0)	105,304 (13.1)	89,931 (11.2)
Business and Support	118,514 (28.5)	113,840 (27.3)	110,942 (23.2)	105,321 (22.1)
Educational services	95,039 (11.1)	84,232 (9.8)	89,880 (10.6)	66,639 (7.8)
Health care	122,828 (10.2)	100,766 (8.4)	114,129 (8.8)	81,396 (6.3)
Information, culture and recreation	115,548 (20.4)	118,648 (21.0)	106,091 (17.9)	117,353 (19.8)
Accommodation and food	138,215 (17.0)	186,088 (22.9)	121,160 (15.6)	174,367 (22.5)
Other services	101,668 (17.2)	116,272 (19.7)	82,644 (15.6)	80,247 (15.1)
Public administration	97,462 (12.7)	107,107 (14.0)	73,923 (10.8)	63,820 (9.3)
Total	1,802,463	1,802,463	1,506,468	1,506,468

Note: Figures in parentheses are percentages.

Source: Authors' calculation from SLID 1994-2005.

kets. In the U.S., Plane (1989) uses a shift-share approach to analyze the relationship between sectoral change in employment and interstate migration patterns during the 1970s, a period where a strong pattern of core-to-periphery net out-migration arose. He finds that sectoral employment shifts associated with migration pattern changes for the 1970s are very different than for the 1950s and 1960s. However, changing competitiveness for jobs in manufacturing and other traditional sectors cannot account for the acceleration in interstate movement during the 1970s and 1980s. He concludes that the approach used is too macro to shed light on the chang-

es occurring in the distribution of jobs by sector and that there is a need for further detailed studies of the job-inducing influences of migration itself. Greenwood & Hunt (1984) and Greenwood, Hunt & McDowell (1986) examine the magnitude of the linkages between employment change and interstate migration in the U.S. They find that the migrant-attractive power of new jobs was greater in the 1970s in the Metropolitan area in the West and South than in the Northeast and Midwest. These relationships also differ over the economic cycle. The migrant-attractive power of another job rises during national upswings and falls during downswings. Moreover, during na-

tional expansions migrants have a less direct impact on area employment.

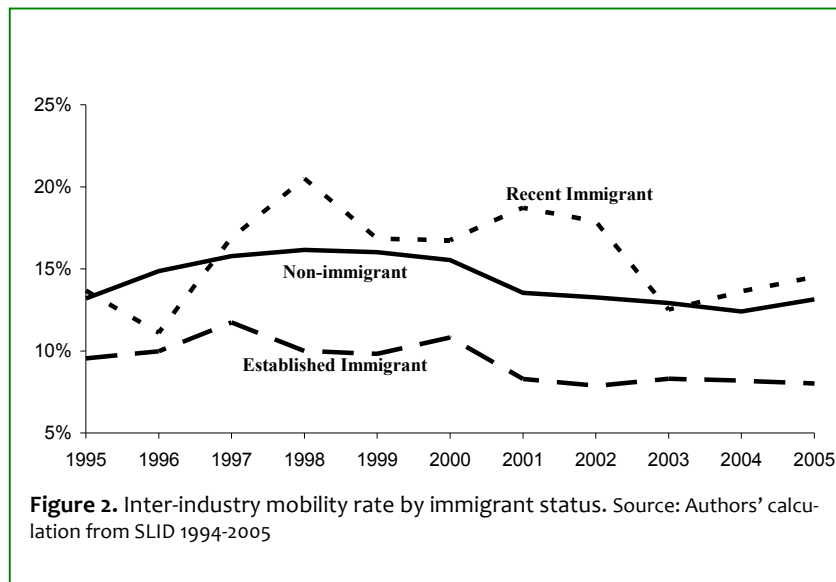
The stylized facts

The sample used for the stylized facts analysis is restricted to paid workers in Canada, aged 15 or older and living in the ten provinces. We define an individual as an inter-provincial mover if his/her province of residence at the end of current reference year is different from the end of previous year. Similarly, an individual is considered to switch industry if their North American Industry Classification System (NAICS) code of main job at the end of current reference year is different from the end of previous year: based on a 16-industry classification. The industries are listed in Table 2.

Data source and definitions

The data used in the analysis are drawn from the Survey of Labour and Income Dynamics (SLID) from 1994 to 2005. SLID is a household survey that provides longitudinal follow-up on Canadian families and individuals' demographic background, income, education level, labour market activities and financial situation. SLID also collects information on workers by occupation at the four-digit level and with employer's industry code. This allows us to classify individuals by education and skill level, identify those with a skill mismatch and those who work in regulated occupations. According to the NOC code obtained from each individual's current job, all workers in the sample are assigned a skill level in each given year. At the four-digit level, every one of 520 occupations can be reclassified within four skill levels (A0, B, C and D):

- A0 Management and occupations usually requiring university education;
- B Occupations usually requiring college education or apprenticeship training;
- C Occupations requiring secondary school or occupation-specific training;



D Occupations requiring only on-the-job training.

Here, skill level is a job characteristic, while education is a characteristic of the individual.

An overview of mobility

In Figure 1, we present data on inter-provincial and inter-industry mobility in Canada from 1994 through 2005 drawn from SLID. How do SLID data compare with other available data on mobility? SLID shares the same sample design as the Labour Force Survey (LFS) and thus yields comparable aggregate estimates on labour market indicators. SLID estimates of inter-provincial mobility are also in line with the estimates from the Labour Market Activity Survey (LMAS), but systematically lower than the estimates from the Longitudinal Administrative Data (LAD).¹

We define inter-provincial mobility rate as the percentage of residents whose province of residence at the end of current reference year is different from the end of previous year. We interpret Figure 1 to show that inter-provincial mobility rates remained relatively flat between 1994 and 2005, while the rate of inter-industry mobility increased substantially between 1995 and 2000, dropped sharply in 2001 and 2002, and remained flat thereafter. The sharp drop of the inter-provincial mobility rate in 1999 may

be caused by small sample size. On average, about 15% of Canadian workers annually changed industry during the 1994-2005 periods. The results in this paper may not be fully representative because the time period covered does not include any recession and mobility patterns may differ somewhat between periods of economic expansions and recessions. Over the same period, inter-provincial mobility and joint inter-provincial and inter-industry mobility rates were much lower, 0.7% and 0.17% annually on average, respectively. This result suggests that about 25% of inter-provincial movers also change industry. However, among inter-industry movers, less than 2% also change province of residence.

We present inter-provincial mobility patterns in Table 1. In general, inter-provincial migration decreased slightly from 1995-2000 to 2001-2005, but some provinces experienced considerable changes in net flow of migration.

Table 2 summarizes mobility across industries between 1995 and 2005. Two industries (information, culture, and recreation; accommodation and food) experienced the highest mobility rates, about 20%. Two others (manufacturing; trade) register the highest numbers of industrial movers. Workers in the education and health care industries are the least mobile. A large proportion of workers in these two industries are regulated.

Mobility by immigrant status

Because sample size is too small, we cannot study inter-provincial mobility for immigrants. Figure 2 shows inter-industry mobility rates by immigrant status. Immigrants who have been in Canada for five years or less are defined as “recent immigrants”, while immigrants in Canada for six years or more are “established immigrants”. According to the data, recent and established immigrants follow strikingly different mobility patterns. Compared to native-born Canadians and established immigrants, recent immigrants register the highest inter-industry mobility rate (15.7%), which is almost twice the rate of established immigrants (9%).

However, this cross-tabulation result does not control for other factors that might explain this behavioural difference. Table 3 shows that 79% of recent immigrants aged 25-69 have a post-secondary degree, while at the same time nearly half of them work in low-skilled occupations (skill level C or D), which implies that about 40% of recent immigrants have a skill mismatch. In comparison, 69% of established immigrants and 68% of native born Canadians have a postsecondary degree but only 33% of established immigrants have a skill mismatch, suggesting that only about 20% of these two groups are over-qualified, half as much as recent immigrants.

After controlling for skill mismatch among recent and established immigrants (see Table 4), we find that on average both recent immigrant and native born workers who are over-qualified record about a 14% mobility rate, 30% higher than the mobility rates for established immigrants. On the other hand, when the education level matches the skill level, recent immigrants have the lowest inter-industry mobility rate, 6.29% compared with 6.5% for established immigrants and 8.1% for non-immigrants. This finding strongly suggests that the difference in mobility rates among immigrants is more influenced by the skill mismatch than by the immigrant status.

Table 3. Proportion of workers who have a postsecondary degree and a skill mismatch.

	Postsecondary degree	Skill mismatch*
Recent immigrants	79%	49%
Established immigrants	69%	33%
Native born Canadians	68%	33%

Note * Percentage of individuals aged 25-69 with postsecondary degree who are working in skill level C and D occupations.

Source Authors' calculation from SLID 1994-2005

Table 4: Mobility rates by immigrant status when controlling for skill mismatch.

	Skill mismatch	Skill match
Recent immigrants	15%	6%
Established immigrants	10%	7%
Native born Canadians	14%	8%

Source Authors' calculation from SLID 1994-2005.

Table 5: Mobility rates by regulation status

	Inter-provincial mobility		Inter-industry mobility	
	1995-2000	2001-2005	1995-2000	2001-2005
Regulated professions	0.63%	0.59%	6.9%	4.9%
Apprenticeable trades	0.72%	0.67%	16.5%	13.5%
Non-regulated	0.67%	0.68%	14.7%	12.9%

Source: Authors' calculation from SLID 1994-2005

Mobility and regulations barriers

As seen in Table 5, workers in regulated professions have significantly lower inter-industry mobility rates and slightly lower inter-provincial mobility rates than non-regulated workers. There is, however, no difference between the mobility rate of workers in apprenticeable trades and non-regulated workers at the aggregated level. This suggests that regulated professions may have a more negative effect on inter-industry mobility than inter-provincial mobility, while the effect of the apprenticeable trades on inter-industry mobility is unclear.

Bivariate probit Model

For each individual, while considering inter-provincial or inter-industry labour mobility choices, he/she can choose among four options to maximize E : (1) stay in the same province and the same industry; (2) move to a different industry without changing province;

(3) move to a different industry and a different province; (4) move to a different province without changing industry. Due to the constraints of small sample size for inter-provincial movers, we follow Osberg, Gordon & Lin (1994) and combine (3) and (4) as one single option: move to another province. We define the dependent variables as follows:

PM 1 if an individual's province of residence differs in two adjacent years, 0 otherwise;

IM 1 if an individual's industry of work differs in two adjacent years and the individual does not change province of residence, 0 otherwise.

The expected return to each option listed above for individuals depends positively on their wage differentials between origin and destination industry/province. We estimate a set of wage equations to predict the expected wage for inter-provincial mov-

ers, inter-industry movers and stayers, and then calculate expected wage differentials as explanatory variables in the bivariate probit model. Considering that inter-provincial mobility can either involve individual or family behaviours, it is more likely to be a family joint decision rather than just a personal decision, as the members of the same family usually move together. So, when the family calculates the expected return to mobility, Y_o and Y_d should be measured by the expected family after-tax income in origin and destination province. Fortunately, SLID collects data on the dynamics of income that a typical family or individual experiences over time and the longitudinal dimension allows us to extract each individual's wage and family income on a year-over-year basis. Therefore, for inter-provincial movers, we also calculate the expected family after-tax income in origin and destination province as an alternative measure of the net financial benefits.

If workers have full information about sectoral and regional future labour conditions, the expected wage of movers and stayers also serves as an indicator about expanding or declining industries and regions. For example, a shift in industrial structure, such as an oil price boom would favour the oil and gas industry and raise the demand for workers in this sector and in oil producing regions. The same argument can be made about negative shifts and declining industries. Therefore, an increase in the wage differential between expanding and declining industries would normally follow the shift in industrial structure and encourage workers to move from the declining to the expanding firms.

Turning to mobility cost, the literature suggests that job tenure and union membership are important labour characteristics associated with moving cost. The seniority of job tenure may be job/employer specific and may provide protection against layoff (Osberg 1991), and individuals are likely to lose seniority when they change job. Therefore, job tenure is likely to reduce the probability of moving.

Table 6. Expected wages for inter-provincial, inter-industry movers and stayers; dependent variable is hourly wage.

<i>Variable</i>	<i>Industry movers</i>	<i>Provincial movers</i>	<i>Stayers</i>
Wage(t-1)	0.877 (0.020)***	0.885 (0.049)***	0.987 (0.003)***
Male	1.451 (0.247)***	1.219 (0.815)	0.690 (0.052)***
University	4.067 (0.383)***	2.587 (1.109)**	1.328 (0.085)***
Post secondary, college	1.290 (0.293)***	-0.091 (0.916)	0.212 (0.057)***
Skill AO	1.216 (0.468)***	2.684 (1.420)*	1.540 (0.100)***
Skill B	0.216 (0.357)	1.821 (1.344)	0.799 (0.091)***
Skill C	0.710 (0.299)**	1.980 (1.244)	0.401 (0.086)***
Recent immigrant	-0.140 (0.975)	7.364 (4.500)	-0.601 (0.262)**
Established immigrant	-0.046 (0.380)	-0.085 (1.683)	0.149 (0.080)*
Job tenure	-0.008 (0.007)	-0.005 (0.007)	0.000 (0.001)
Age	0.134 (0.082)*	-0.384 (0.299)	0.012 (0.019)
Age square	-0.002 (0.001)*	0.004 (0.004)	0.000 (0.000)
Number of observations	6153	489	43218

Note: Standard error in parenthesis: * indicates significant at 10 percent; ** significant at 5 percent; and *** significant at 1 percent.

For unionized workers, moving to another province or changing industry may mean the loss of job related benefits or entitlements. Compared to the United States, the proportion of Canadian employees covered by a collective bargaining agreement is more than double. (31.8 per cent in Canada compared to 13.8 per cent in the U.S. based on 2004 numbers).² According to Riddell (2001, 2004), differences in certification processes could explain differences in unionization rates between Canada and U.S. There is also a significant difference in unionization rate across Canadian provinces and industries. In 2006, employees covered by collective agreements ranged from 40.9 per cent in the province of Québec to only 24.4 per cent in the province of Alberta. Unionization rate also varies quite significantly by industry as Utilities, Public Administration, Education, Health care and Transportation have the highest proportion of em-

ployees covered by a collective agreement (ranging between 71.2 per cent and 44.4 per cent in 2006).³ Accordingly, the degree of unionization is likely to influence both inter-industry and inter-provincial labour mobility.

As mentioned earlier, a large number of Canadian workers work in regulated occupations and different provinces and industries may have different requirements for their regulated professionals. When individuals switch industry of employment or province of residence, their licences or qualifications may not be recognized in the new industry/province and hence their investment in obtaining those licences might be lost. In this analysis, we add a dummy variable for regulation to capture this additional mobility cost for regulated workers.

Age and marital status may be other important factors related to mobility decisions. If we treat inter-

industry and inter-provincial mobility as a form of investment, older workers face a relatively shorter time period to realize their returns because they are closer to retirement than younger workers. Theoretically, the time horizon used in equation (1) explains why mobility declines with age. Further, compared with younger people, inter-provincial mobility cost may be higher for older workers because they may lose more social capital (social network, family ties etc). Accordingly, older workers are likely to be more reluctant to change industry or move to other provinces. Marital status is also included in the model since marriage implies that inter-provincial mobility is likely to involve moving an entire family and hence an increase in the cost of moving. Thus, marriage is also expected to have a negative impact on the decision to move.

EI may also influence labour mobility decisions. In theory, however, the net effect is unclear. On the one hand, since the EI program is regionally portable, it can be used to finance job searches and relocation in areas with better employment opportunities and thus promote labour mobility. On the other hand, the availability of EI benefits differs in each region and depends on how each region's unemployment rate compares with the national rate. Individuals who live in regions with higher unemployment rates can qualify for EI benefits faster and receive them for a longer period of time. This implies that EI is more generous in less prosperous areas and subsidizes seasonal workers. In this respect, it may reduce incentives to move. The empirical evidence is also inconclusive.⁴

In addition, inter-provincial and inter-industry mobility may be also influenced by personal and job characteristics, such as skill mismatch and mother tongue. In particular, the French speaking population in the province of Québec may be less inclined to move to other parts of Canada for language and cultural issues. A few studies, such as Lin (1995) and Finnie (2004) found that Francophones in Québec are less likely to move to another province.

Table 7. Expected incomes for inter-provincial and stayers; dependent variable is family income after tax.

Variable	Inter-provincial movers	Stayers
Income(t-1)	0.535 (0.052)***	0.875 (0.004)***
University	4.396 (4442)	3.952 (0.398)***
Post Secondary, college	1.629 (3.768)	0.723 (0.275)***
Skill AO	20.287 (5.691)***	3.504 (0.477)***
Skill B	11.966 (5.463)**	1.867 (0.426)**
Skill C	8.602 (5.310)*	0.701 (0.406)*
Recent immigrant	-11.310 (18.593)	0.371 (1.248)
Established immigrant	-8.385 (6.965)	2.042 (0.384)***
Job tenure	-0.005 (0.027)	0.003 (0.002)*
Age	0.933 (1.023)	0.489 (0.093)***
Age square	-0.010 (0.152)	-0.005 (0.001)***

Note: Standard errors in parentheses: * indicates significant at 10 percent; ** significant at 5 percent; and *** significant at 1 percent.

The model can be explicitly expressed as

$$(2a) \quad PM_i = f[\Delta Wage_i, Gender_i, Union_i, Regulation_i, Skill Mismatch_i, Age_i, Marriage_i, EI_i, Mother Tongue_i, Tenure_i, Immigrant_i, Attending University_i]$$

$$(2b) \quad IM_i = f[\Delta Wage_i, Gender_i, Union_i, Regulation_i, Skill Mismatch_i, Age_i, Marriage_i, EI_i, Mother Tongue_i, Tenure_i, Immigrant_i, Attending University_i]$$

Since inter-provincial mobility is likely to be a family decision and that inter-provincial tax difference may affect the decision to move, we specify another equation (a') by using $\Delta(\text{family after-tax income})$ as an alternative measure to replace $\Delta Wage$:

$$(2a') \quad PM_i = f[\Delta \text{AftertaxIncome}_i, Gender_i, Union_i, Regulation_i, Skill Mismatch_i, Age_i, Marriage_i, EI_i, Mother Tongue_i, Tenure_i, Immigrant_i, Year_i]$$

Expected wages and family after-tax incomes

We first estimate each individual's expected wage for all stayers, inter-provincial movers and inter-industry movers, based on their past wages and a set of personal characteristics. Individuals under age 25 are excluded from the sample in the estimation of the micro-econometric model because they are more weakly attached to the labour market. We also estimate expected family after-tax income for inter-provincial movers and stayers, and use the difference as an additional predictor of expected income. Since mobility is a self-selection process for each individual, wage estimates obtained from the sub-samples of inter-provincial, inter-industry movers and stayers may be biased due to selectivity problems (Heckman 1976). For example, we want to estimate the market wages individuals can achieve in the new position if they change industries, but we have access to wage observations for only those who already change industries. (The wage individu-

als may achieve in the new industries are unobservable for those stayers because they did not change industry). Since people who change industries are selected non-randomly from the population, estimating the determinants of wages from the subpopulation who change industries may introduce bias. Therefore, to correct for the selectivity problem, we adopt the extended Heckman-Lee estimation method (Tunali 1986).⁵ We also restrict our sample to individuals who report valid hourly wages during at least two consecutive years. We exclude those with unreasonable wage data, for example, hourly wage less than five dollar an hour.

Table 6 reports the major results of the estimated hourly wage equations obtained using the Heckman-Lee estimation method, while Table 7 presents the results for after-tax family income. As the results are similar using the alternative measures, we will discuss the findings for Table 6 only. Wages for stayers, inter-provincial and inter-industry movers strongly depend on wages in the previous year. Whether there is a change in industry or not, males are likely to receive larger wage increases in the next year than females. Also, more educated and skilled workers can expect a larger wage increase in the second year for stayers. Compared to Canadian native stayers, recent immigrant stayers are likely to receive smaller wage increases in the second year, while established immigrants may enjoy a larger increase in hourly wage. Using these results, we then calculate expected wage and after-tax family income differentials between movers and stayers and incorporate them into equations (2a)/(2a') and (2b) to estimate the bivariate probit model.

Estimated bivariate probit model

Table 8 summarizes the estimation results of the inter-industry and inter-provincial mobility equations using the SLID from 1994 to 2005. In the estimation process, individuals under age 25 are excluded from the sample because a significant proportion are likely not in their permanent working situation.

Table 8. Bivariate probit model of probability of inter-provincial, inter-industry mobility during 1994-2005.

Variable	Specification 1		Specification 2	
	Inter-provincial	Inter-industry	Inter-provincial	Inter-industry
Wage Differential	0.03 (0.03)	0.126 (0.02)***		0.110 (0.02)***
Income Differential (After Tax, Family)			0.006 (0.002)**	
Male	0.163 (0.06)**	0.012 (0.03)	0.163 (0.06)**	0.013 (0.03)
Regulated	0.090 (0.09)	-0.338 (0.07)***	0.077 (0.09)	-0.330 (0.07)***
Trade	-0.196 (0.07)***	0.035 (0.03)	-0.188 (0.07)***	0.035 (0.03)
Skill Mismatch		0.027 (0.04)		0.034 (0.04)
Age 35-44	-0.080 (0.08)	-0.073 (0.04)*	-0.105 (0.07)	-0.077 (0.03)**
Age 45+	-0.316 (0.11)***	-0.058 (0.04)	-0.326 (0.10)***	-0.064 (0.04)*
Recent immigrant	-0.706 (0.39)*	-0.372 (0.13)***	-0.358 (0.33)	-0.297 (0.10)***
Established immigrant	-0.365 (0.12)**	-0.094 (0.05)*	-0.291 (0.13)**	-0.058 (0.04)
EI Benefits	0.006 (0.08)	0.384 (0.03)***	0.004 (0.08)	0.384 (0.03)***
Union	-0.321 (0.09)***	-0.257 (0.04)***	-0.339 (0.05)***	-0.265 (0.04)***
Married	-0.031 (0.09)	-0.108 (0.04)**	-0.038 (0.09)	-0.124 (0.04)***
Job Tenure	-0.001 (0.00)***	-0.003 (0.00)***	-0.001 (0.00)***	-0.003 (0.00)***
Attending University	0.283 (0.11)**	0.242 (0.07)***	0.288 (0.08)***	0.309 (0.07)***
Francophone	-0.380 (0.08)***	-0.029 (0.04)	-0.417 (0.11)***	-0.030 (0.04)
Rho	0.079 (0.04)*		0.081 (0.04)*	
Number of observations	489	6153	489	6153
Log-likelihood	-1537.3	-8447.8	-1877.1	-8489.8

Note: Standard errors in parentheses; * indicates significant at 10 percent; ** significant at 5 percent; and *** significant at 1 percent.

Specification 1 uses the expected wage differential variable for both inter-industry and inter-provincial movers as the explanatory variable and specification 2 uses family after-tax income.

In specification 1, individual expected wage differentials are a positive and statistically significant determinant of inter-industry mobility, but not significant for inter-provincial mobility. However, as we can see in specification 2, while the effect of individual

inter-industry wage differentials is positive and statistically significant for inter-industry mobility, family after-tax income differentials also becomes statistically significant for inter-provincial mobility. This finding is consistent with the idea that inter-provincial mobility is more likely to be a family decision, and hence total family income rather than individual wage differentials is the appropriate measure of the benefits of moving. The results also support the view that relative wage differentials provide a signal that en-

courages workers to move from declining to expanding industries.

We find no evidence that recent immigrants are more mobile than native-born Canadians or established immigrants. In fact, the estimated coefficient on recent immigrants is negative for both types of mobility and statistically significant for inter-industry labour mobility, suggesting that when we control for skill mismatch, recent immigrants are less likely to move. Established immigrants are also found to be less mobile than native-born Canadians.

The results also suggest that regulations may reduce the probability of inter-industry mobility and inter-provincial mobility. Compared with non-regulated workers, regulations significantly reduce the probability of inter-industry mobility for regulated professions, and also have a significant negative impact on inter-provincial migration for apprentice trades. The effect of skill mismatch on the probability of changing industry is not statistically significant at the standard 95% confidence level, although the value of its coefficient is relatively large, suggesting there is possible multicollinearity between this variable and another explanatory variable. The effect of skill mismatch is also not statistically significant on the inter-provincial mobility equation, except when we exclude the wage differential variable from the equation (not shown in the table).

We have also calculated the marginal effects for the statistically significant variables and present them in Table 9.⁶ The marginal effect of the wage differentials on the decision to change industry is relatively large. For example, a \$1 increase in the hourly wage differential raises the probability of an individual changing industry by more than one percentage point. However, inter-provincial migration is relatively insensitive to financial incentives, as a \$1000 increase in family after-tax income only contributes marginally to the probability to move to another province. This is an important finding as it stresses that the cost of moving to another province is signifi-

Table 9. Marginal effects of significant variables

Variable	Percentage change in probability of	
	Inter-provincial mobility	Inter-industry mobility
Wage differential (\$1 per hour difference)	--	1.5
After Tax Income Differential (\$1000 per year difference)	0.01	--
Recent Immigrant	-0.27	-1.6
Established Immigrant	-0.28	-0.4
EI Benefits	-0.02	3.3
Job Tenure (1 month difference)	-0.01	-0.04
Regulated	--	-2.0
Trade	-0.18	--
Age 35-44	-0.2	-0.5
Age 45+	-0.3	-0.6
Union	-0.3	-2.6
Francophone	-0.4	-0.3

cantly greater than the cost of changing industry and therefore it requires a much higher expected income gain to generate an incentive to move. As indicated in Section 3, the joint mobility rate is very small, around 0.7 per cent, and among inter-industry movers less than 2% also change province of residence. Therefore, since most inter-industry movers remain in the same province, and possibly also in the same city or region, the cost of inter-industry mobility is far less than the cost of changing province.

The probability for recent immigrants of changing industry is 1.6 percentage point lower than that for non-immigrants, while the probability of moving to another province is nearly 10 times smaller (-0.27 percentage points). EI beneficiaries are also 3.3 more likely to change industry than non-beneficiaries. However, this result must be interpreted with care as it does not necessarily imply that EI has a positive impact on the probability of moving. It may just simply reflect the fact that EI beneficiaries are unemployed and therefore are more likely to change job and industry.

In addition, a one-month increase in job duration does not increase individuals' loyalty to their occupation by

much. Its marginal effect records less than one-tenth of 1 percentage point, which is consistent with findings from the literature. Also, the probability of changing industry for a worker in a regulated profession is 2 percentage points lower than that of unregulated individuals, while the probability for an apprentice trade of changing province remains very small, only two-tenths of 1 percent lower than that of other individuals. Being covered by a collective bargaining agreement has a negative impact on the probability of changing both province and industry. The impact on the probability of changing industry is 2.6 percentage points lower than for non-unionized employees. In comparison, the probability of moving to another province for unionized employees is only 0.3 percentage points lower than for non-unionized employees.

Summary and conclusions

Inter-provincial and inter-industry mobility are two major labour market adjustment mechanisms by which the economy can respond to sectoral and structural changes. In the literature, few studies have investigated joint inter-provincial and inter-industry mobility decisions. There is also very little

evidence on how institutional (formal) occupational barriers inhibit inter-provincial and inter-industry mobility.

In this paper, we present stylized facts that characterize inter-provincial and inter-industry mobility in Canada on a year over year basis between 1994 and 2005, and specify a bivariate probit model to examine simultaneously inter-provincial and inter-industry mobility. While inter-provincial mobility rates in Canada remain fairly low, inter-industry mobility rates are much higher. There are also substantial variations across provinces and industry groups for both types of mobility. Overall, Alberta has the largest net inflow of inter-provincial migration. Manufacturing, Trade and Accommodation and Food sectors have the largest net outflows of workers moving to other industries, while the other sectors record net inflows.

Regression analyses provide evidence that the wage differential is a key determining factor of inter-industry mobility, while inter-provincial migration decisions are relatively insensitive to changes in financial incentives. This is explained by the fact that the cost of moving to another province is generally far greater than the cost of changing industry as the latter does not necessarily imply changing province, region or even city. Therefore, the decision to change province usually reflects greater expected income gains. This also suggests that providing financial benefits through policies to move could generate sufficient incentives to change industry but not to change province.

In general, older workers are less likely to move and immigrants (both recent and established) are less likely to change province or industry, when we control for skill mismatch. This latter finding is a very important one as it strongly suggests that since recent immigrants are generally more highly educated but also more likely to experience a skill mismatch, they have a greater incentive to change industry. Moreover, recent immigrants who have the right skill match are less likely to move than established immigrants and Canadian born individuals.

Regulatory barriers significantly reduce both the probability of inter-industry mobility for regulated professions and the probability of inter-provincial migration for apprentice trades. Also, union membership and job tenure reduce the probability of moving, which is not a surprising result.

Inter-provincial and inter-industry mobility are complex issues in terms of cause, process and consequence. This paper represents an attempt to simultaneously examine these two types of mobility in the past decade, which has been rarely done thus far. Our results signal that inter-provincial labour mobility is a much less important labour market adjustment mechanism than inter-industry labour mobility, which takes place mostly within provinces. As the numbers clearly show, compared with inter-industry labour mobility, inter-provincial labour mobility rates are very small, at least 20 times smaller. In fact, we can safely conclude that intra-provincial labour mobility is a much larger adjustment mechanism than inter-provincial labour mobility.

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¹ For example, see Finnie (1990, 2001 and 2004) and Osberg, Gordon, & Lin (1994).

² See Clemens, Veldhuis, & Karabegovic (2005).

³ See Akyeampong (2006) for detailed statistics on unionization rates in Canada.

⁴ For a review of evidence on the impact of EI on labour mobility, see Lin (1995).

⁵ Osberg, Gordon, & Lin (1994) give a detailed description of the Heckman-Lee approach.

⁶ Marginal effects of continuous variables are evaluated at the mean level.