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# Overcoming Skills Shortages in Canada

**David Carey**

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**By David Carey**

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## ABSTRACT/RÉSUMÉ


### Overcoming skills shortages in Canada

Skills shortages have developed in certain fields and regions in recent years. Earnings premiums for people in some professions, notably health, engineering and skilled trades have increased. And vacancy rates have risen for skilled trades, with the increase being particularly large in Alberta and Saskatchewan. While reforms have been implemented to strengthen adjustment so as to overcome these shortages, there is still room to go further by improving labour market information, increasing responsiveness of the education and training system to labour market demand, making the immigration system more reactive to current labour market conditions and reducing regulatory barriers to inter-provincial labour mobility. This Working Paper relates to the 2014 *OECD Economic Review of Canada* (http://www.oecd.org/eco/surveys/economic-survey-canada.htm).



*JEL classification codes*: J080, J15, J24, J31, J6
*Keywords*: skills shortages, earnings premiums, vacancy rates, apprenticeships, high-skilled immigrants, inter-provincial mobility, employment insurance


*********


### Combler les pénuries de compétences au Canada

Les pénuries de compétences ont progressé dans certains secteurs et régions au cours des dernières années. L'avantage salarial s'accroît dans certaines professions, notamment la santé, l'ingénierie et les métiers spécialisés. Et les taux de postes vacants augmentent également dans les métiers spécialisés, en particulier en Alberta et dans la Saskatchewan. Des réformes ont été mises en œuvre pour renforcer le processus d'ajustement afin de combler ces pénuries, mais il est possible d'aller plus loin en améliorant l'information sur le marché du travail, en renforçant la réactivité du système d'enseignement et de formation et du système d'immigration face aux attentes du marché du travail, et en réduisant les obstacles à la mobilité interprovinciale de la main-d'œuvre. Ce Document de travail se rapporte à l'*Étude économique de l'OCDE du Canada 2014* (www.oecd.org/fr/eco/etudes/etude-economique-canada.htm).



*Classification JEL* : J080, J15, J24, J31, J6
*Mots clefs* : pénurie de compétences, avantage salarial, taux de vacances d'emploi, apprentissage, immigrants hautement qualifiés, mobilité interprovinciale, assurance-chômage

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# Overcoming skills shortages in Canada

By

David Carey[1]

Skills shortages occur when employers are unable to recruit staff with the required skills at the going rate of pay (Quintini, 2011); they are macroeconomic, not to be confused with *skills mismatches*, which arise when individuals are over- or under-skilled for their jobs (Box 1). Such shortages set in motion adjustment mechanisms to eliminate them, notably an increase in the price of skills in short supply. This encourages employers to economise on the use of these skills and gives individuals a stronger incentive to acquire them. However, adjustment may be impeded by a variety of factors. The slower and/or less complete is adjustment, the greater will be the losses in potential production from not shifting resources to the activities affected.

Generalised shortages of people with post-secondary-education (PSE) credentials have not developed in recent years. Earnings premiums for people with PSE over those with high-school diplomas have been broadly stable since the late 1990s. This suggests that the large increase in the proportion of the labour force with PSE credentials was commensurate with the increase in the demand for such workers relative to workers with a high-school credential. Nevertheless, pressures might still exist in specific fields of study. In fact, average university-degree premiums have increased substantially for Canadian-born workers in management, health care and engineering. There has also been a regional dimension to skills shortages, with earnings premiums for people with a post-secondary certificate/diploma increasing more in Ontario and the Atlantic provinces than elsewhere. Vacancy rate data suggest that skills shortages have increased most in the skilled trades since the recession, with particularly large increases in Alberta and Saskatchewan.

The process of adjustment to overcome skills shortages has been impeded by gaps in labour-market information, barriers to increasing the supply of skills in demand through education and training, limited responsiveness of the immigration system to labour-market conditions and regulatory barriers to inter-provincial labour mobility. While there have been significant reforms in all of these areas to strengthen adjustment, there is still room to go further. This could be done by providing students with better information on expected returns to PSE, reducing numeracy and literacy barriers to PSE attainment, making the education and training system more sensitive to labour-market demand, further increasing the

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responsiveness of the immigration system to labour-market demand (notably by implementing the Express Entry system) and removing barriers to inter-provincial labour mobility in the regulated trades and professions and for the serially unemployed (seasonal workers).

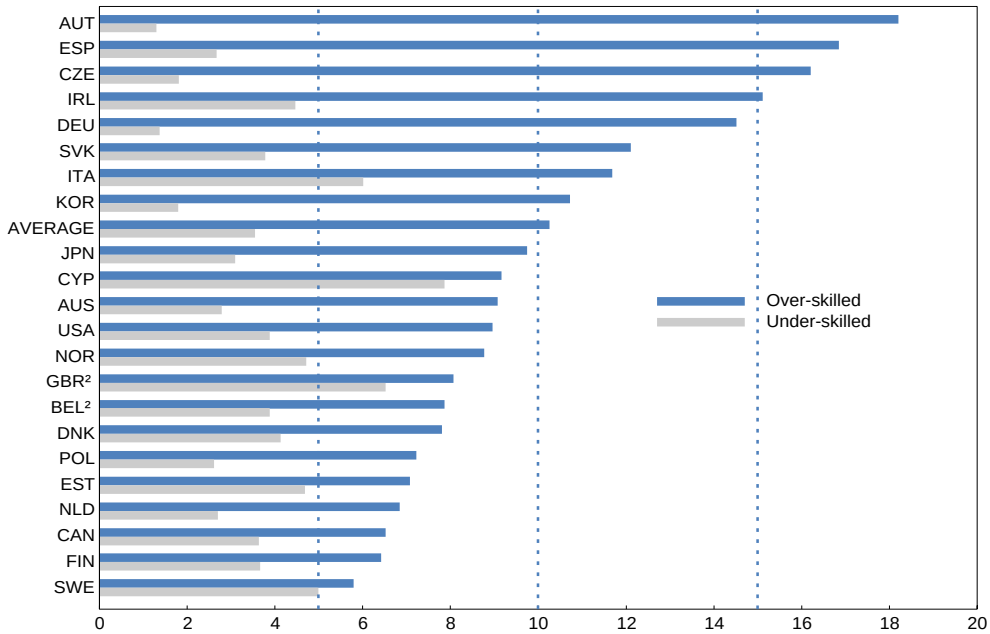
Box 1. **Skills mismatch is low in Canada**

Skills mismatch occurs when an individual's skills are not well aligned with those required for his or her job. If skills are less than required for the job, there is a skills deficit (skills gap) (Quintini, 2011). In the opposite case, where an individual's skills are greater than required for the job, there is skills underutilisation (over skilling). Skills mismatch means that a country is not making the best use of its previous investments in human capital. Mismatch reduces job satisfaction and wages, increases employee turnover and unemployment, and reduces GDP growth through the waste of human capital and/or a reduction in productivity (OECD, 2013).

The OECD (2013) has developed a measure of skills mismatch that shows that a relatively small proportion of Canadians are over-skilled in literacy for their current job, while the proportion who are under-skilled is near the average of countries included in the study (Figure 1). This measure has been developed using results from the OECD Survey of Adult Skills (PIAAC), notably responses to the questions whether individuals feel that they "have the skills to cope with more demanding duties than those they are required to perform in their current job" and whether they feel "they need additional training in order to cope well with their present duties". Workers were classified as well matched in a domain if their proficiency score in that domain was between the minimum and maximum score observed among workers who answered "no" to both questions in the same occupation and country. Workers were deemed to be over-skilled in a domain if their skills score was higher than the maximum score of self-reported well matched workers and under-skilled in a domain if their score was lower than the minimum score of self-reported well matched workers. This measure of skills mismatch is considered to be an improvement over existing indicators, as it is more robust to reporting bias and does not impose the strong assumptions needed when directly comparing skills proficiency and skills use (OECD, 2013).

Figure 1. **Skills mismatch in literacy in Canada is low by international comparison**

Percentage of over- and under-skilled workers[1]




1. Over-skilled workers are those whose proficiency score is higher than that corresponding to the 95th percentile of self-reported well matched workers ( i.e. workers who neither feel they have the skills to perform a more demanding job nor feel the need for further training in order to be able to perform their current jobs satisfactorily) in their country and occupation. Under-skilled workers are those whose proficiency score is lower than that corresponding to the 5th percentile of self-reported well matched workers in their country and occupation.
2. Flanders only for Belgium and England, Northern Ireland only for the United Kingdom.

*Source*: OECD (2013), *OECD Skills Outlook 2013*: *First Results from the Survey of Adult Skills*, OECD publishing.

A related measure is qualifications mismatch. When people have education credentials that exceed (are less than) those required for their job, they are considered to be overqualified (underqualified). A recent study (Uppal and LaRochelle-Côté, 2014) shows that there has been little change in the proportion of university graduates in Canada who are overqualified since 1991, despite a large increase in supply. The proportion of university graduates aged 25-34 who work in occupations requiring only a high-school education was 18% in 2011, virtually the same as in 1991. However, over-qualification rates were much higher among university-educated immigrants who did not have a degree from Canada or the United States (43% for women and 35% for men, compared with rates of 15-20% for men and women born in Canada and among immigrants with a university degree from Canada or the United States). Over-qualification rates were also high (about a third) for people with a university degree in the humanities. In contrast, fewer than 15% of men and women with a university degree in education, in health and related fields, and in architecture, engineering and related fields were overqualified.

This paper, which complements the chapter on improving tertiary education in the 2012 *Survey*, begins by assessing the extent and nature of skills shortages in Canada. After considering the responsiveness of labour supply to such shortages, the paper goes on to look at how adjustment could be strengthened through further measures to enhance labour-market information. In the next section, additional measures to increase the supply of skills in demand through education and training are discussed, while in the following section, further steps to make the immigration system more responsive to labour market demand are considered. The paper finishes by looking at how skills shortages could be reduced by going further in lowering inter-provincial barriers to labour mobility.

## Skills shortages have increased

### *Skills shortages reduce potential incomes while they last*

When skills shortages occur, demand for the skills in question exceeds supply (supply is the short side of the market), resulting in high vacancy rates. In a market economy this situation puts upward pressure on wage rates and other conditions of employment for jobs that require these skills. This provides an incentive for workers or potential workers to acquire these skills and for former workers who already have them to return to this type of work or, if the shortage is regional, move to the location of the shortage. The rise in supply of workers with the skills in question eventually eliminates the shortage, although the new equilibrium is likely to entail a higher wage premium for jobs requiring these skills.

The speed and/or extent of adjustment to eliminate skills shortages may be impeded for a variety of reasons. On the demand side these include the quasi-fixed costs of hiring, training and firing new employees (Gomez and Gunderson, 2006). On the supply side they include imperfections in the market for education and training, legislative and regulatory barriers to regional and occupational mobility and disincentives to mobility from the public social safety net. Gomez and Gunderson (2006) identify a number of market imperfections that may inhibit supply and demand matching, including information imperfections and asymmetries, lags in institutional responses and a lack of incentives for educational institutions to respond to students' field-of-study preferences.

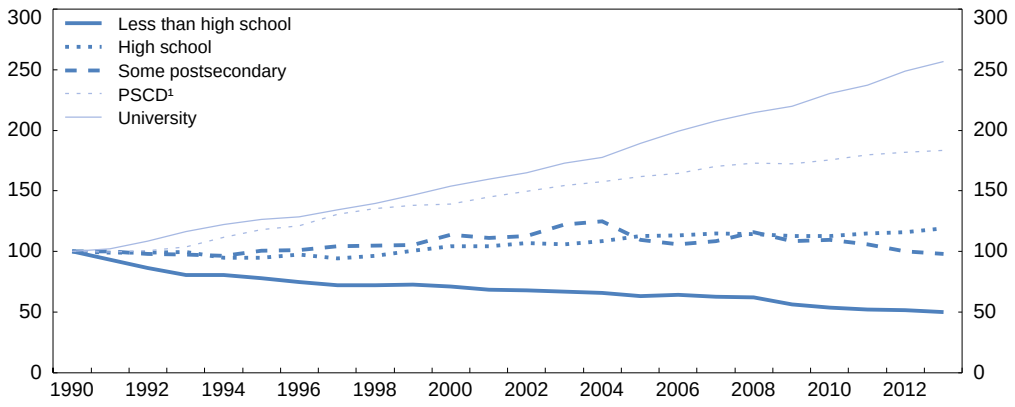
Slow or incomplete adjustment means that opportunities for some workers to earn more by acquiring skills more highly valued in the labour market than those they currently possess are lost. Moreover, if potential workers in the areas experiencing shortages are currently under-employed, earnings and national income also will be lower than they would be if adjustment were complete with these workers more fully employed. National income could be further reduced by the failure to realise natural-resource rents. As discussed below, the boom in the oil and gas sector has substantially increased shortages in the skilled trades in Alberta and Saskatchewan. The Alberta government reports that a number of resource-based investment projects have shifted elsewhere because employers could not find the skilled workers needed.

Labour demand and supply have become increasingly skills intensive. Employment growth over the past three decades has been highest for those with PSE attainment, especially a university degree, and slowest for those who have not graduated from high school (Figure 2).

One indicator of whether or not skills upgrading has been accompanied by skills shortages is the development of earnings premiums for people with PSE over those with only high-school credentials. An increase (decrease) in this premium indicates that the demand for PSE skills relative to high-school skills has increased faster (slower) than supply, pointing to the potential presence (absence) of a skills shortage. PSE earnings premiums have been broadly stable since 1997 (the earliest year for which comparable data are available), reflecting a small increase in the premium for a post-secondary certificate/ diploma and a small decrease for a university degree, suggesting that a generalised shortage of PSE skills has not developed (Figure 3).

Figure 2. **Employment growth has been fastest for persons with post-secondary attainment**

Index, 1990 = 100

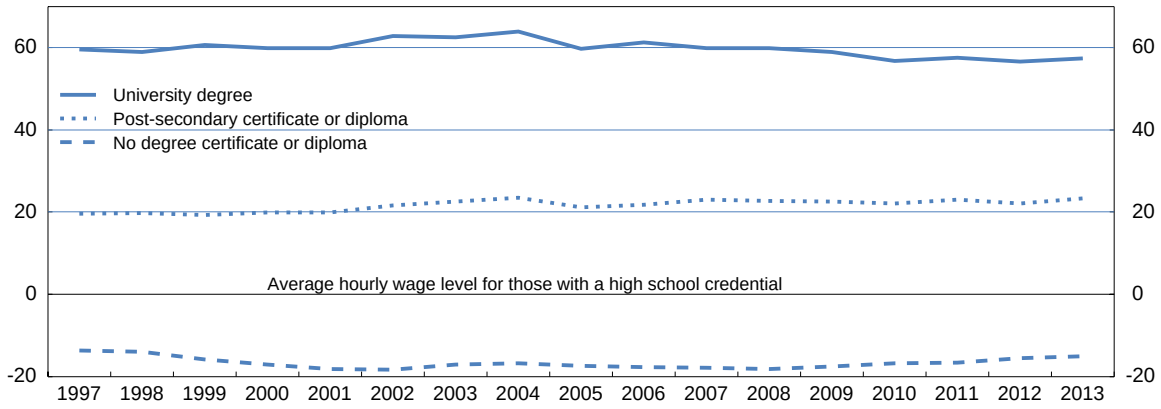



1. Post-secondary certificate or diploma.

*Source*: Statistics Canada.

Figure 3. **Post-secondary education earnings premiums have been stable**

Relative to earnings for a high school graduate




*Source*: OECD calculations using *Labour Force* Survey data from Statistics Canada.

However, there are indications that skills shortages have developed in certain fields and regions in recent years. Ontario and the Atlantic provinces have had the largest rises in earnings premiums at the post-secondary certificate/diploma level and the smallest declines at the university degree level (Table 1). In the Prairie provinces, the increase in the earnings premium for a post-secondary certificate/diploma was almost the lowest in Canada and the decrease for a university degree was the greatest, despite higher increases in real earnings for people with PSE credentials than elsewhere. This result reflects the fact that real earnings for people with a high-school credential rose far more than in the rest of the country. The large increases in real earnings at all levels of education attainment combined with small increases in earnings premiums suggests that the Prairie provinces have been more subject to across-the-board labour shortages than to skills shortages. And for interprovincial mobility incentives, it is real earnings differences that matter, not local skills premiums.

Table 1. **Regional changes in real earnings and in earnings premiums relative to high-school graduate earnings**

1997-2013, per cent

| | Increase in real earnings | Increase in earnings relative to earnings for a high-school graduate |
|---|---|---|
| ***Post-secondary certificate/diploma (PSCD)*** | | |
| Atlantic Provinces | 17.0 | 2.0 |
| Québec | 6.2 | 1.8 |
| Ontario | 5.7 | 3.3 |
| Prairie Provinces | 24.4 | 0.5 |
| British Columbia | 10.2 | 0.4 |
| Canada | 10.4 | 1.2 |
| ***University degree (UD)*** | | |
| Atlantic Provinces | 14.0 | -0.6 |
| Québec | 2.9 | -1.4 |
| Ontario | 2.0 | -0.2 |
| Prairie Provinces | 15.0 | -7.1 |
| British Columbia | 5.5 | -3.8 |
| Canada | 5.6 | -3.2 |
| ***High-school diploma (HSD)*** | | |
| Atlantic Provinces | 14.8 | - |
| Québec | 4.4 | - |
| Ontario | 2.3 | - |
| Prairie Provinces | 23.8 | - |
| British Columbia | 9.7 | - |
| Canada | 9.0 | - |

*Source*: OECD calculations using Labour Force Survey data from Statistics Canada.

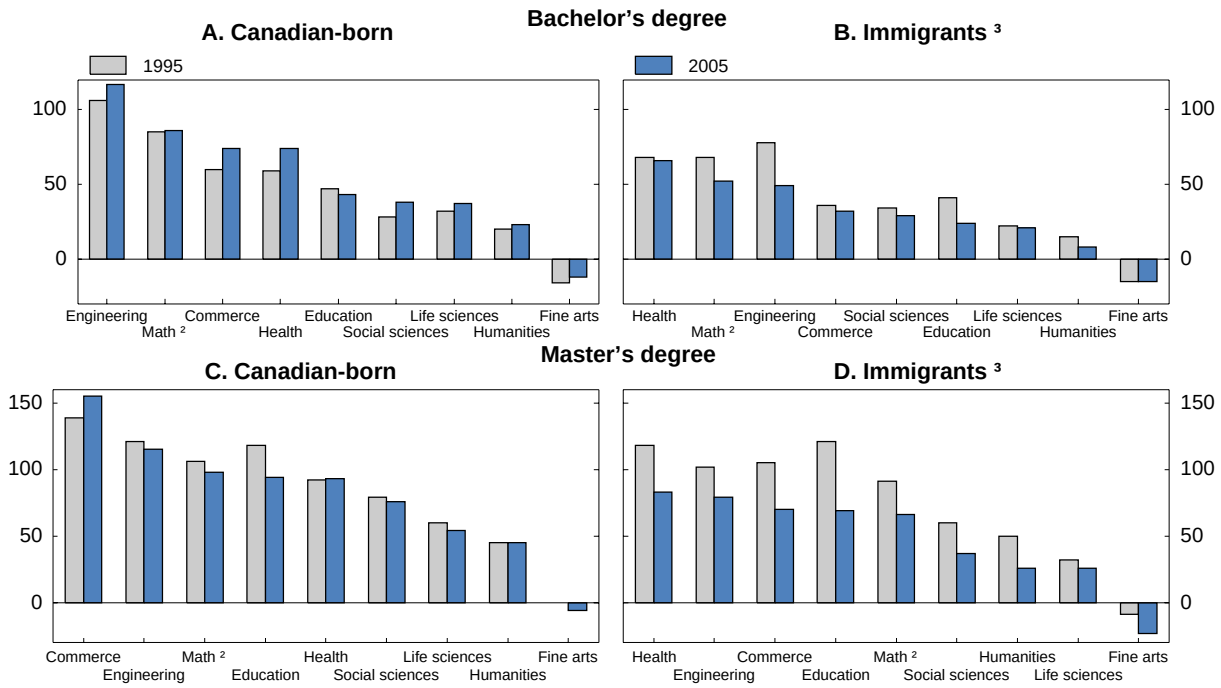
### *In most fields university degree earnings premiums have increased for the native born but have fallen for immigrants*

Based on census data, university-degree premiums increased on average between 1995 and 2005 for Canadian-born workers in engineering, commerce and health care and are higher in these fields than in most others (Figure 4). By contrast, the corresponding earnings premiums for immigrants were stable or declined and remained much lower than for the native born, indicating that their qualifications and foreign work experience do not have the same value in the labour market. With the change in immigrant source countries since the early 1990s, foreign qualifications increasingly are not equivalent to Canadian

qualifications, and immigrants often do not have adequate skills in English or French to perform well in highly skilled roles. However, this earnings gap diminishes markedly over time since arrival as immigrants improve their official-language skills, gain Canadian work experience and become qualified to local standards (Morrisette and Sultan, 2013).

Figure 4. **Earnings premiums for university degrees by field of study**[1]

Population aged 25-64 in the labour force, percentage gap over average earnings for high school graduates




1. Earnings are not adjusted for the number of hours worked.
2. Including computer science and physics.
3. Immigrants include both those who earned their degrees abroad and those who earned them in Canada.

*Source*: Internal Employment and Social Development Canada (ESDC) analysis using Census data.

An alternative approach to assessing the attractiveness of investing in university education is to calculate internal rates of return. This gives a more accurate picture of the incentives faced by people considering such investments than do earnings premium data, as costs (including lost earnings while studying) and the time value of money are taken into account. Two recent studies find that internal rates of return to completing a university degree compared with remaining at the level education attainment immediately below (e.g. a master's degree compared with a bachelor's degree) are highest for commerce, medical and, at bachelor's level, engineering degrees, confirming the pattern found for earnings premiums (Box 2).

Box 2. **An examination of incremental rates of return by field of study and degree level**

Stark (2007) estimated that rates of return (based on 1995 data) for a bachelor's degree (i.e. the extra earnings net of costs of completing a bachelor's degree instead of stopping education at the high-school diploma level) were considerably higher on average for both men and women than returns on financial investments, making a bachelor's degree a profitable investment (Table 2). There was, however, a wide distribution of returns. Returns were generally higher for women, owing to their assumed lower foregone earnings while studying. The highest returns were for medical degrees. For other bachelor's degrees, returns were higher for science than non-science degrees, although this did not hold for all major fields within these groups. For both genders the highest returns on non-medical bachelor's degrees were in the commerce, maths and physics, health and engineering fields. The lowest returns were on degrees in the humanities and agricultural-biological fields for men and fine arts for women.

The extra return to a master's degree (compared to stopping education at the bachelor's level) in aggregate was lower than for a bachelor's degree. Again, in aggregate and across most fields of study, returns were higher for women than for men. In contrast to the case for a bachelor's degree, the extra return to a master's degree in a non-science field exceeded the return for a science field by a substantial margin. There was even greater heterogeneity at this level than at the bachelor's level. The highest incremental returns were in the commerce field, as at the bachelor's level, and in education. Among science fields, only a degree in health yielded relatively high incremental returns. Incremental returns were negative on engineering degrees and on mathematics and physical science degrees for men.

At the aggregate level, the extra return to a Ph.D. degree was less than on a master's degree for both genders, although again there was considerable variation cross fields. As for bachelor's degrees, a Ph.D. in the sciences offered a higher incremental rate of return than in non-science fields. The highest incremental returns were in fine arts and agricultural and biological fields, all fields that offered low incremental returns at the master's level. This suggests that the motivation for obtaining a master's degree in these fields was to obtain an entry ticket to the Ph.D. programme.

Moussaly-Sergieh (2005) found broadly similar patterns at the aggregate level using 2000 data – incremental returns were lower on higher-level degrees and for men than women. At the bachelor's level, the highest returns were on medical degrees. Engineering and commerce had high rates of return, in contrast to the humanities and biological sciences.

Table 2. **Rates of return by field of study and degree level, 1995**

Per cent

| | Bachelor's | | Master's | | Ph.D. | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Total non-medical degrees[1] | 9.9 | 12.1 | 4.1 | 8.6 | 1.3 | 4.3 |
| Non-science | 9.1 | 11.8 | 7.0 | 9.6 | 0.0 | 3.4 |
| Education | 5.4 | 11.3 | 9.4 | 11.4 | 4.0 | -0.2 |
| Fine and applied arts | * | 4.4 | 3.5 | 1.3 | 7.9 | 7.7 |
| Humanities and related | 3.6 | 10.0 | -6.0 | 3.8 | 7.4 | 5.1 |
| Social science and related | 10.0 | 11.7 | * | 6.2 | 3.6 | 7.8 |
| Commerce, management business and administration | 13.3 | 15.9 | 19.1 | 23.1 | * | 2.1 |
| Science | 11.5 | 13.5 | 1.2 | 5.2 | 1.7 | 6.0 |
| Agricultural and biological | 4.9 | 9.1 | 0.7 | 2.9 | 6.8 | 8.9 |
| Engineering | 13.0 | 13.9 | -1.9 | -0.7 | 0.9 | * |
| Health professions | 10.4 | 15.5 | 16.2 | 8.2 | * | 7.1 |
| Math and physical science | 11.9 | 14.6 | -1.6 | 2.5 | 2.9 | * |
| Total medical degrees | 15.1 | 15.9 | | | | |

*Note*: * Indicates that the programme did not converge to a solution.

1. Non-medical degrees exclude degrees in medicine, dentistry, veterinary studies and optometry but include degrees in other health professions such as nursing and physiotherapy.

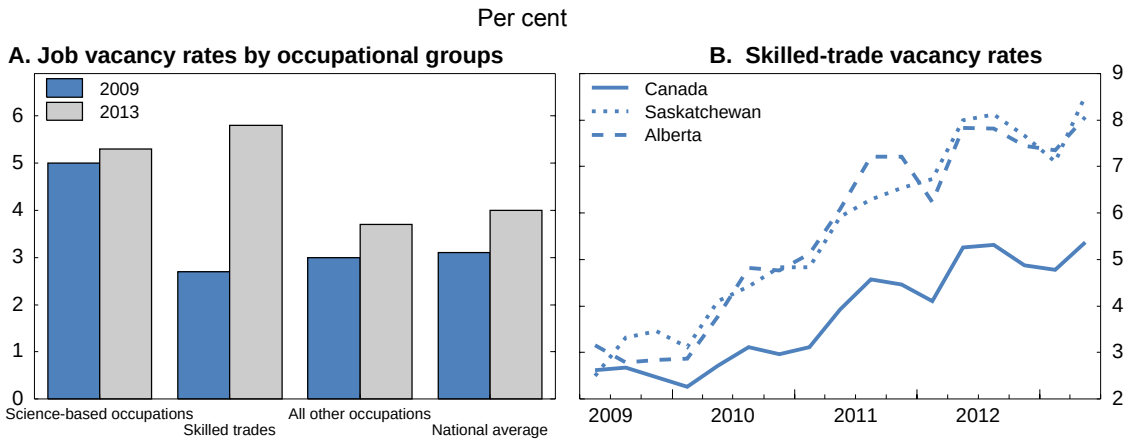
*Source*: Stark (2007), "Which Fields Pay, Which Fields Don't", *Department of Finance Working Paper,* 2007-03.

### *Skilled-trade-vacancy rates have increased, especially in Western Canada*

Job-vacancy data suggest that demand for skilled tradespersons has grown faster than supply during the current business cycle. Indeed, vacancy rates in the skilled trades now exceed those in science-based occupations (e.g. engineers) (Figure 5). Skilled-trade vacancy rates have increased more and are higher in Alberta and Saskatchewan than in the rest of the country.

A big part of the skills shortages in Alberta is in the construction sector for the energy industry. With resource projects getting underway in other parts of the country, such as LNG in British Columbia and oil and gas in the Atlantic Provinces, and further expansion of oil-sands projects to come, these shortages could become acute if promoters do not agree to phase development so that their demands for construction workers do not peak simultaneously.

Figure 5. **Vacancy rates have increased most in the skilled trades in Alberta and Saskatchewan**




*Note:* The job vacancy rate is the number of online job postings divided by labour demand, *i.e.,* online postings plus employment.

*Source*: Finance Canada (2014), *Jobs Report: The State of the Canadian Labour Market* and D. Burleton et al. (2013), "Jobs in Canada, Where, What and For Whom", *TD Economics Special Report*, 22 October.

### *Official projections point to growing shortages in mainly skilled occupations and surpluses elsewhere*

The labour-market outlook by occupation over 2011-20 prepared by the Employment and Social Development Canada (ESDC) using the Canadian Occupation Projection System (COPS) indicates that, for about 60% of occupations, growth in demand (job openings) and supply (job seekers) are expected to be broadly balanced. Occupations for which excess demand is projected mostly require PSE, predominantly at the post-secondary certificate/ diploma level (Table 3). While there are a number of occupations for which excess supply is projected that require PSE, more than half of the occupations for which excess supply is projected require only a high-school diploma (skill level C). None of the occupations in projected excess supply requires only the lowest level of education attainment (less than a high-school diploma, corresponding to skill level D), continuing the trend observed in the wage premium data of less unfavourable labour-market conditions for the lowest skill level than for persons with a high-school diploma.

It should be noted that these projections are intended only to highlight potential pressure points in the absence of endogenous adjustment. In reality, wages and conditions of employment will adjust in response to shortages or surpluses, encouraging employers to economise on (use more) occupations in shortage (surplus) and employees to enter (not enter or leave) occupations in shortage (surplus), thereby diminishing imbalances.

Table 3. **Occupational outlook summary and their educational requirements**

| | | Difference between expected job openings and job seekers as annual percentage of 2010 Non-student employment | Recent labour-market status | Education level[1] |
|---|---|---|---|---|
| **NOC** | **Top 15 occupations with a shortage outlook and the largest projected excess demand** | | | |
| N822 | Supervisors, Mining, Oil and Gas | 3.1 | Shortage | B |
| N413 | College and Other Vocational Instructors | 1.8 | Balance | A |
| N122 | Administrative and Regulatory Occupations | 1.7 | Balance | B |
| N623 | Insurance & Real Estate Sales Occupations | 1.6 | Balance | B |
| N825 | Contractors, operators and supervisors in agriculture, horticulture and aquaculture | 1.5 | Balance | B |
| N031 | Managers in health, education, social and community services | 1.4 | Shortage | Management |
| N315 | Nurse Supervisors and Registered Nurses | 1.2 | Shortage | A |
| N112 | Human Resources & Business Service Professionals | 1.2 | Shortage | A |
| N311 | Physicians, Dentists and Veterinarians | 1.1 | Shortage | A |
| N411 | Judges, Lawyers and Quebec Notaries | 0.5 | Shortage | A |
| N341 | Assisting Occupations in Health Services | 0.2 | Shortage | C |
| N215 | Architects , Urban Planners and Land Surveyors | 0.2 | Shortage | A |
| N626 | Police Officers & Firefighters | 0.1 | Shortage | B |
| N312 | Optometrists / Chiropractors / Other Health Professions | 0.0 | Shortage | A |
| N321 | Medical Technologists / Technicians | 0.0 | Shortage | B |
| **NOC** | **Top 15 occupations with a surplus outlook and the largest projected excess supply** | | | |
| N945 | Machine Operators and related in fabric, fur and Leather products manufacturing | -4.5 | Surplus | C |
| N051 | Managers in art, culture, recreation and sport | -3.3 | Balance | Management |
| N943 | Machine Operators: Pulp and Paper Products | -3.2 | Surplus | C |
| N951 | Machining, metalworking, woodworking and related machine operators | -2.7 | Surplus | C |
| N949 | Other Assembly and Related Occupations | -2.6 | Surplus | C |
| N013 | Managers in Communication (Except Broadcasting) | -2.4 | Balance | Management |
| N843 | Agriculture and Horticulture Workers | -2.1 | Surplus | C |
| N525 | Athletes, Coaches, Referees and Related Occupations | -2.0 | Balance | B |
| N072 | Facility Operation and Maintenance Managers | -1.8 | Balance | Management |
| N729 | Other Construction Trades | -1.8 | Balance | B |
| N644 | Tour and recreational guides and casino occupations | -1.6 | Surplus | C |
| N217 | Computer and information systems professionals | -1.6 | Balance | A |
| N727 | Carpenters and Cabinetmakers | -1.4 | Surplus | B |
| N743 | Other Transport Equipment Operators | -1.4 | Balance | C |
| N948 | Mechanical, Electrical and Electronics Assemblers | -1.3 | Surplus | C |

NOC = National Occupational Classification.

1. The National Occupational Classification (NOC) is organised into five skill categories: management occupations; skill level A, for occupations that usually require university education; skill level B for occupations that usually require college education or apprenticeship training; skill level C for occupations that usually require secondary school and/or occupation-specific training; and skill level D for occupations where on-the-job training is usually provided.

*Source*: HRSDC (2011), Canadian Occupational Projection System, 2011 Reference Scenario.

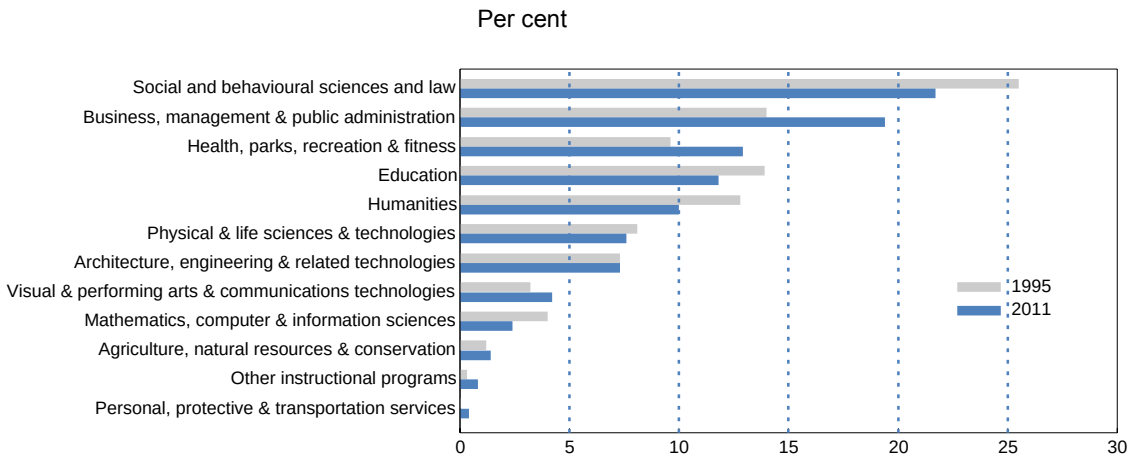
**Labour supply rises in response to skills shortages, but weakly in some cases and/or with long lags**

More Canadians acquire PSE credentials when expected earnings premiums for them increase. Belzil and Hansen (2006b) find that the probability of staying in education longer increases as expected PSE earnings premiums increase. This effect is lowest for high school and highest for those enrolled in university programmes (increasing the probability that they complete their degrees).

Expected earnings also affect the choice of field of university study and hence the distribution of graduates' qualifications, although the effect may not be large. Belzil and Hansen (2006b) find that an increase in expected earnings significantly increases the probability of choosing a field of study. Business studies are the most sensitive to expected earnings. Similarly, Boudarbat and Montmarquette (2006) find that university undergraduates' choice of field of study responds to differences in expected earnings, with the effect somewhat stronger for men than for women. However, they also find a significant effect of attitudinal variables on field-of-study choices, and that the strength of these effects is such that large variations in earnings across fields of study – relative to those currently observed – would be needed to substantially change students' study choices.

This finding is borne out by the apparent supply response to earnings premium patterns noted above – higher in engineering than in other fields and rising since the mid-1990s, especially if immigrants are excluded, and lower and falling in the humanities. Despite the rising pecuniary advantages of studying engineering and disadvantages of studying the humanities, the share of (first-university cycle) architecture, engineering and related graduates in total graduations has been stable, while the share of humanities graduates has declined only slightly (Figure 6). The share of graduates in mathematics and physical sciences also declined, despite stable above-average earnings premiums. On the other hand, there has been a very large increase in the share of management graduates, bearing out Belzil and Hansen's (2006b) finding that students in this field are highly sensitive to financial incentives.

Figure 6. **Total graduations by field of study, 1995 and 2011**




*Source*: Statistics Canada and OECD calculations.

The time needed for graduation rates to adjust to a labour-market shock may be long, at least in the natural sciences and engineering fields. Majumdar and Shimotsu (2006) find that a permanent increase in R&D expenditures (as a percentage of GDP) in Canada leads to a permanent increase in graduations in natural sciences and engineering. Under a static expectations model, 80% of the adjustment occurs within six years, whereas under a rational expectations model it takes 10 years.

In the trades, adjustment to eliminate skills shortages through increased training in these fields or migration is somewhat faster than for occupations requiring university degrees. Coe and Emery (2006) examine the labour-market adjustment process in eight construction trades in 20 Canadian metropolitan areas. They find no marked occupational differences in the distributions of half-lives of adjustment (i.e. the time for half of the initial wage shock to have dissipated), with median estimates for these occupations in the range of 2.3-3.0 years.

Policymakers can increase economic well-being by speeding up adjustment to eliminate skills shortages where the cost of the government intervention is less than the benefit from faster adjustment. Potential areas for action include improving labour-market information, making the post-secondary education system and immigration system more responsive to labour-market conditions and removing barriers to domestic labour mobility.

**Better labour market information would improve job matching and education investment decisions**

***Labour market information can decrease adjustment costs***

Provision of labour market information (LMI) can facilitate job matching and improve human capital investment decisions (Sharpe and Qiao, 2006). Policymakers are also reliant on LMI to help inform public investment and spending decisions. For instance, more detailed local LMI would facilitate better targeting of public monies (Advisory Panel on Labour Market Information, Drummond Report, 2009). As such information is non-excludable, there is a strong case for the government to pay for its provision (Sharpe and Qiao, 2006).

Based on an international comparison of LMI systems in five countries (Canada, the United Kingdom, Germany, the United States and Australia), Sharpe and Qiao (2006) characterise the Canadian system as excellent, having a diversified set of information providers and sources. The Advisory Panel also acknowledged that Canada has one of the best LMI systems in the world but conceded that it is always possible to do better. Indeed, the Panel pointed out that globalisation, urbanisation and Canada's shift towards an increasingly knowledge-based economy are causing skills requirements and labour market conditions to change at an unprecedented rate, making it more important than ever to sharpen and develop the tools to monitor and predict these changes.

For students to respond to skills shortages by choosing to acquire the skills in short supply, they need to be well informed about expected returns to PSE. The provision of such information to secondary-school students can be particularly effective in encouraging them to continue their education beyond the secondary level. Yet, there are no institutional requirements to provide LMI in schools, a shortcoming which Sharpe and Qiao (2006) considered to be the main weakness of Canada's LMI system. Where guidance counselling is available, career guidance is frequently underfunded – counsellors are generally fully occupied responding to students' personal crises.

Belzil and Hansen's (2006) study raised the possibility that high-school students from families where the father has less than PSE attainment do not continue their education to the PSE level owing to poor information (including from role models) about job prospects by level of attainment. These authors found that fathers' education matters more for the probability of continuing schooling than mothers' and that the effect of having a father who has a PSE qualification is greater at the high-school level than at higher levels of education. These findings also suggest that credit constraints are not a major barrier to continuing education at the PSE level (assuming parental education and income transfers to children are correlated).

The provision of LMI to secondary-school students can be a highly cost-effective intervention to improve the quality of their PSE investment decisions. Johnson et al. (2006) carried out a two-stage

experimental study of factors influencing individuals' interest in PSE in a laboratory setting. They concluded that a relatively low-cost intervention (a 90-minute presentation) could increase the probability of a target group (youth aged 18-24 years with poor understanding of the relation between education and labour market outcomes) choosing to continue education beyond the secondary level. The intervention had no effect on the probability for older people (aged over 24), who have less to gain from PSE, continuing their education beyond the secondary level, highlighting the importance of targeted measures. This study also demonstrates that laboratory methods can be used in small-scale tests to evaluate the effectiveness of different approaches to LMI before they are implemented on a large scale.

In a similar vein, Frenette (2009) found that secondary-school students who are aware that the occupation in which they wish to work requires a university degree (three-quarters are aware at age 15, rising to 84% by age 17) have much higher subsequent university attendance rates (controlling for factors such as academic performance, and parental education and income). This suggests that providing this information to secondary students could increase participation rates in PSE.

Students also need adequate LMI to guide their choices of field of study. While rich information on labour-market prospects (earnings and unemployment rates) by occupation is already available through the *Working in Canada* and *Job Bank* websites, students need information linking fields of study to occupational outcomes to make sound decisions. As things stand, labour-market prospects and hence expected returns by field of study are often unclear. Given individuals' difficulty to diversify their human capital, this also exposes them to the risk of making costly mistakes when they invest in their skills (Gomez and Gunderson, 2006). Many youths choose university studies over college or apprenticeship training in pursuit of superior earnings prospects, even though numerous college and apprenticeship credentials yield more than many university degrees (Table 4). Significant enhancements in LMI will occur soon when Employment and Social Development Canada begins providing easily accessible information on the outcomes of graduates from various fields.

There is currently no data collection method in place which would allow for the disclosure of valuable information on labour-market outcomes (other than earnings) by institution. Yet, this is an important piece of information to guide students' decisions. Degree majors from different universities are not treated equally in the labour market. Many large employers recruit exclusively from certain schools, diminishing the value of identical degree majors from others. As this information is already collected, the direct cost of making it available would be minor. Transparency would increase pressure on those whose degree majors have a relatively low value in the labour market to improve or specialise in other fields.

***More detailed vacancy and unemployment data would facilitate job matching***

Job matching would be facilitated by better vacancy data. Following the recommendations of the Advisory Panel Report (2009) (Box 3), Statistics Canada began to collect and publish vacancy data. However, they apply only to broad industrial categories, as opposed to specific occupations, and do not provide enough information at the local level. This limits their usefulness to workers looking for a job in a new and unfamiliar labour market, to governments for selecting skilled immigrants and designing skill development policies and educational programmes, and to employers for drawing up their skill-management policies. In response to these shortcomings, the Alberta government has started developing its own LMI that aims to provide information that will inform employers on where best to go to recruit.

Assessment of the efficiency of job matching would also be enhanced by the provision of data on the intensity with which employers seek to fill vacancies. Davis et al. (2012) showed that a potential cause of the outward shift in the Beveridge curve (relating unemployment and job vacancies) in the United States in recent years was a large drop in the intensity of job recruiting, which is highly cyclical. During periods of

weak demand, employers list job openings but do not actively pursue filling them – the job is only filled if a very good candidate turns up. Allowing for this factor, an outward shift in the Beveridge curve could be cyclical, rather than an indication of a structural decline in job-matching efficiency.

Table 4 **Earnings can be higher at the college or trades level than the bachelor's level**

Based on median earnings 5 years after graduation, 2011 adjusted to 2013 prices

| **Earnings for people with a college, CEGEP[1] or other non-university certificate or diploma in these fields** | **are higher than for people with a bachelor's degree in these fields** |
|---|---|
| Security and protective services (CAD 55 975) | Business, management, marketing and related support services (CAD 54 250)<br>Agriculture, natural resources and conservation (CAD 52 949)<br>Physical and life sciences and technologies (CAD 52 298)<br>Education (CAD 51 440)<br>Social and behavioural sciences (CAD 48 920)<br>Humanities and arts[2] (CAD 43 279) |
| Architecture, engineering and related technologies (CAD 52 882) | Agriculture, natural resources and conservation<br>Physical and life sciences and technologies<br>Education<br>Social and behavioural sciences<br>Humanities and arts[2] |
| Mechanic and repair technologies (CAD 52 270) | Education<br>Social and behavioural sciences<br>Humanities and arts[2] |
| Computer science, mathematics and statistics (CAD 47 891) | Humanities and arts[2] |
| Precision production (CAD 47 472) | Humanities and arts[2] |
| Construction trades CAD 44 488) | Humanities and arts[2] |
| **Earnings for people with a registered apprenticeship certificate in these fields** | **are higher than for people with a bachelor's degree in these fields** |
| Construction trades (CAD 57 963) | Business, management, marketing and related support services<br>Agriculture, natural resources and conservation<br>Physical and life sciences and technologies<br>Education<br>Social and behavioural sciences<br>Humanities and arts[2] |
| Mechanic and repair technologies (CAD 55 120) | Business, management, marketing and related support services<br>Agriculture, natural resources and conservation<br>Physical and life sciences and technologies<br>Education<br>Social and behavioural sciences<br>Humanities and arts[2] |
| Precision production (CAD 54 270) | Agriculture, natural resources and conservation<br>Physical and life sciences and technologies<br>Education<br>Social and behavioural sciences<br>Humanities and arts[2] |
| Architecture, engineering, and related Technologies (CAD 50 664) | Social and behavioural sciences<br>Humanities and arts[2] |

1. CEGEP; Collège d'enseignement général et professionnel (Québec).
2. Humanities: and design, music, performing, fine and applied arts.

*Source*: Calculations by Employment and Social Development Canada based on Statistics Canada's 2011 National Household Survey.

Box 3. **The main findings and recommendations of the Drummond report**

Following widespread consultations with Canadians concerned with LMI, the main messages that the Advisory Panel on Labour Market Information (Drummond Report) reported back were that:

- A job vacancy survey can be of direct aid to workers in acquiring appropriate skills or finding jobs in a new and unfamiliar labour market and to governments for skilled immigrant selection and skill development policies and education programmes.
- Canada faces challenges in education data collection. Even relatively straightforward data on colleges and degree-granting institutions, as well as data on workplace skills use are unavailable or years out of date.
- Canadians want more information on local labour markets. Very limited reliable information (other than the Census, which is not timely) is available even for fairly large cities and towns. This deficiency makes it difficult for Service Canada regional offices to meet their customers' information needs.
- There are gaps in LMI with respect to the labour-market performance or needs of certain groups, including women, youth, older workers, visible minorities, immigrants, Aboriginal peoples and the disabled.
- LMI is difficult to find and use; and
- Macroeconomic policymakers and economists need vacancy-rate data and a labour price index to help them steer the economy on a sustainable, non-inflationary track.

The Panel made general recommendations to improve LMI in seven areas:

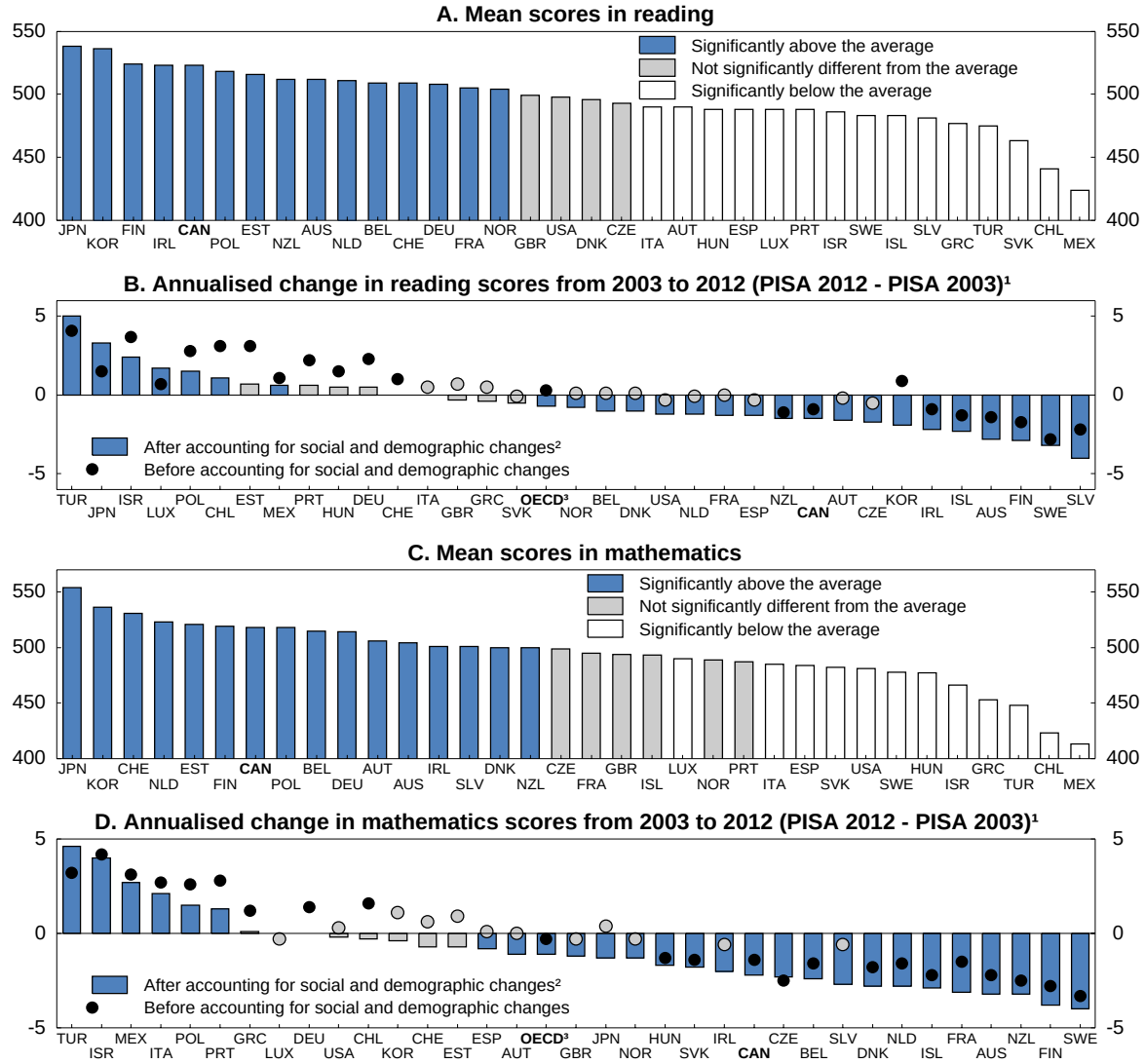
- **Governance:** The Forum of Labour Market Ministers (FLMM) should assume a leadership role and provide the broad strategic direction needed to manage and coordinate Canada's overall LMI system.
- **Data collection:** Statistics Canada should fill the main gaps in the national LMI system and work with the provinces/territories to fill the gaps more specific to their circumstances.
- **Data analysis and interpretation:** Governments should improve this to make sure the information is relevant, well targeted to different users and easy to understand.
- **Raising awareness and improving data dissemination:** Once a better system is in place, a major effort is required to ensure that Canadians are aware of the available LMI and its uses and that it is more easily accessible, timely and user friendly.
- **Funding:** All governments should contribute financially to the improved LMI system, and Statistics Canada should make available all basic national labour-market statistics on its website free of charge.
- **Implementation: T**he FLMM should produce a follow-up implementation report.

## Increasing the supply of skills in demand through education and training

### *Strengthening literacy and numeracy skills*

Strong literacy and numeracy skills are necessary to perform well in a modern, globalised information-based economy. Canadian students are strong performers in reading skills and mathematics in the PISA study, which tests these skills for 15 year-olds, although performance has deteriorated at a faster rate in mathematics than in most other OECD countries (Figure 7). By contrast, literacy and numeracy scores of young adults compare much less favourably. According to the OECD's recent Adult Skills Survey (PIAAC) (OECD, 2013), the average literacy score for the 16-24 age group in Canada is below the average of the 23 countries/regions that participated in the study, while the average numeracy score is not

Figure 7. **Canada's PISA scores in reading and mathematics skills, 2012**



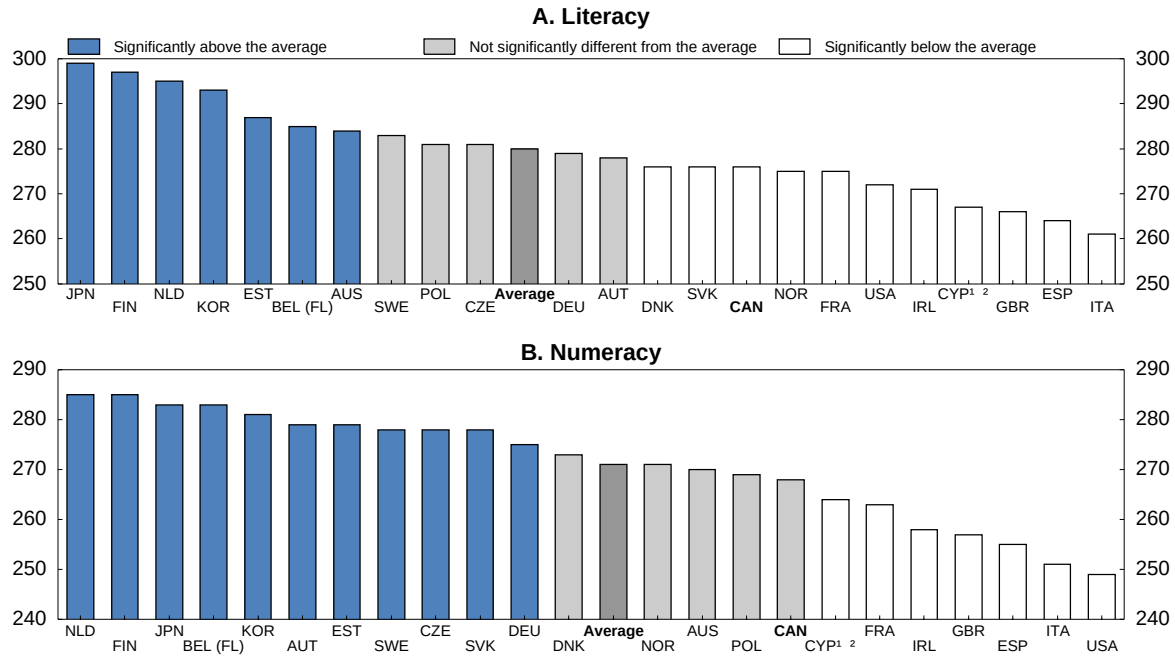

1. Statistically significant values are marked in a darker tone. The annualised change is the average annual change in PISA score points. It is calculated taking into account all countries'/economies' participation in PISA. For more details, see Annex A5 of *PISA 2012 results: What students know and can do* (volume I).
2 The annualised change adjusted for demographic changes assumes that the average age and PISA index of social, cultural and economic status, as well as the percentage of female students, those with an immigrant background and those who speak a language other than the assessment at home are the same in previous assessments as those observed in 2012. For more details on the calculation of the adjusted annualised change, see Annex A5 of the PISA 2012 results.
3. OECD average 2000 considers only those countries with comparable reading scores since PISA 2000.

*Source*: OECD (2013), *PISA 2012 results: What students know and can do* (volume I).

significantly different from the country/region average (Figure 8). Among the countries/regions that participated, Canada's rank in reading skills/literacy falls from 5th in PISA to 15th in PIAAC, while for mathematics/numeracy it falls from 7th to 16th. This worsening suggests that Canadian upper secondary and PSE contribute less to literacy and numeracy skills development than in most other countries. One factor could be that participation in university education is lower in Canada than in many other countries, reflecting the high proportion of students who study in colleges and polytechnics.

Figure 8. **Literacy and numeracy scores for 16-24 year-olds, 2012**

Mean proficiency scores




*Note*: Statistical significance at the 5% level. Literacy-related non-response (because of a lack of background information due to language difficulties, or learning or mental disabilities) is excluded from the calculation of mean scores. However, these figures present an estimate of lower-bound mean scores by attributing a very low score (85 points) to such adults.

1. *Note by Turkey:* The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

2. *Note by all the European Union Member States of the OECD and the European Union:* The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

*Source*: OECD (2013), *OECD Skills Outlook 2013*, Figures 2.3a and 2.7a.

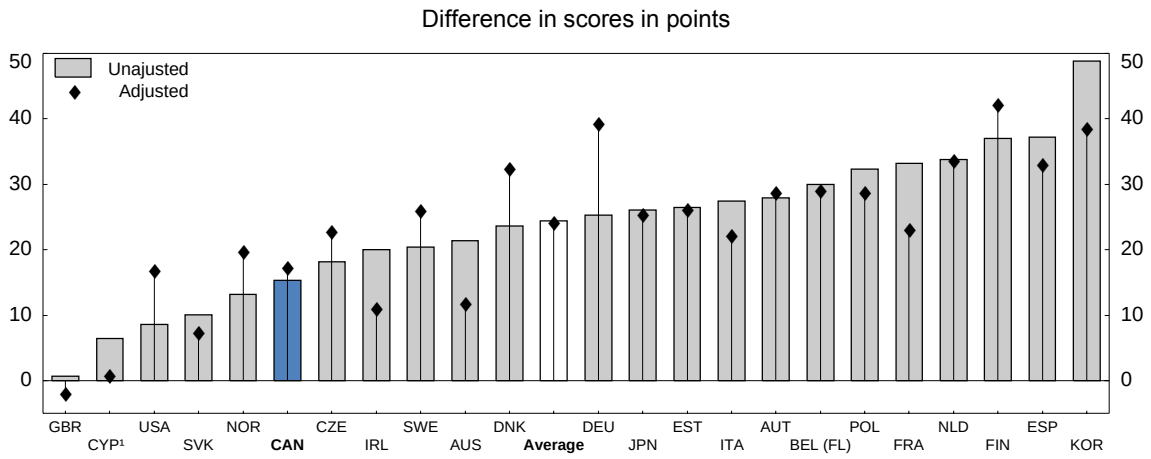
Moreover, literacy and numeracy scores for the 16-24 age group are not much higher than for the 55-65 age group. Adjusting for a variety of factors – gender, immigrant status and language ability, educational attainment, socio-economic background and type of occupation – the difference in literacy scores between these age groups in Canada is lower than in most other countries (Figure 9). This could reflect, an earlier "massification" of post-secondary education than in other countries, a smaller improvement in the education system than in other countries, a more limited difference in education attainment between the young and the old than in most other countries or that skills deteriorate less with age in Canada than in most other countries. Further research is required to determine the relative importance of these explanations.

These skills are also the foundation upon which technical skills acquired in PSE are built. If this foundation is weak, students may not be able to pursue studies in high paying fields, such as engineering, and/or to complete these studies. Inadequate numeracy skills prevent many apprentices from completing the in-school part of their training, usually resulting in non-completion of the apprenticeship (see below).

To prevent weak literacy or numeracy skills being a barrier to PSE completion in general and in certain fields in particular, PSE institutions should consider investing in remedial education to bring

weaker students up to speed, as is done at the University of Chicago, despite the cost in terms of teaching resources. Upper secondary education also should be improved to ensure that fewer young adults leave the system with weak numeracy or literacy skills. To this end it could be helpful to require students to study (at least practical) mathematics and English/French until the end of secondary school. It could also be worthwhile to ensure that all secondary-school mathematics teachers have an adequate mathematics background – in Ontario, for example, this is not a requirement of the job.

Figure 9. **Differences in literacy scores between the 16-24 and 55-65 age groups across countries, 2012**




*Note*: Unadjusted differences are the differences between the two means for the two age groups. Adjusted differences are based on a regression model and take account of differences associated with other factors: gender, education, immigration and language background, socio-economic background, and type of occupation. Only the score-point differences between the two age groups are shown, which is useful for showing the relative significance of age *vis-a-vis* observed score-point differences. All adults aged 16 to 65, including the non-employed, are in the analysis. For more detailed regression results, including for each category of each variable included in the model, see table B3.17(L) in Annex B in *OECD Skills Outlook 2013*.

1. See Notes 1 and 2 in Figure 8.

*Source*: OECD (2013), *OECD Skills Outlook 2013*, Figure 3.2 (L).

### *Making the PSE system more responsive to labour-market demand*

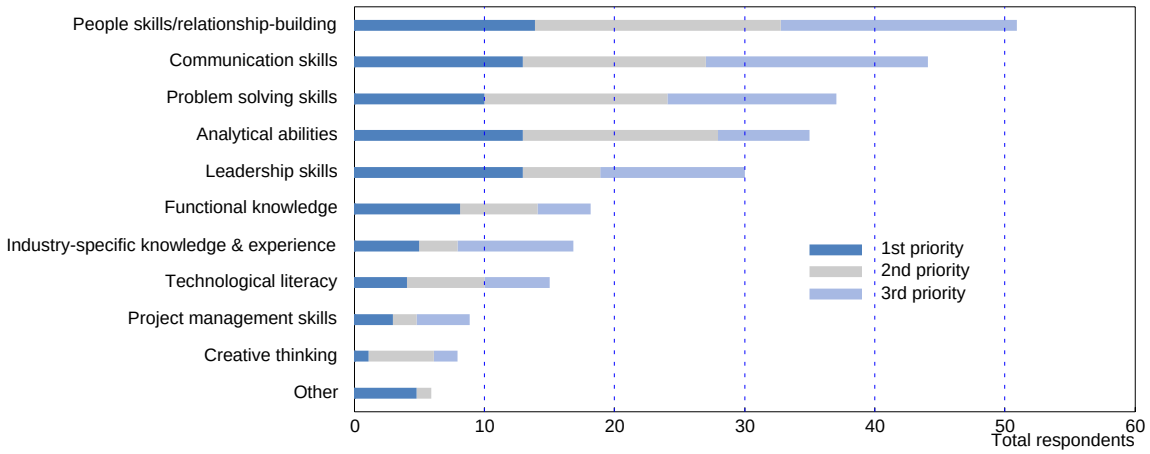
For students to be able to undertake studies in fields in high demand PSE institutions need to respond by making places available to satisfy students' choices. In a market-driven model, tuition fees would rise in fields in demand and fall in other fields, encouraging PSE institutions to expand study places in the former fields and shrink them in the latter. However, Canadian PSE institutions have little freedom to set tuition fees. Moreover, as it is difficult in the short term to wind down one faculty so that another can be expanded, any supply response is likely to occur only with a long lag. In the meantime PSE institutions are likely to respond to a rise in student demand in certain fields by making entry more restrictive and doing the opposite in other fields, which would only make sense if there were no shortages in the occupations using the skills acquired in the fields being restricted.

The experience of other comparable countries (Australia, New Zealand and the United Kingdom) that have endeavoured to go further in making PSE more market driven highlights the political difficulties of implementing such a model (Schwartz, 2006). Opposition to high tuition fees has been such that caps have been set at low levels, with the result that most universities charge the maximum permitted fee, resulting in no competition on price. While reforms in federal-government PSE funding have moved marginally in a "more-market" direction by shifting some funding from PSE institutions to students, this is unlikely to have a large impact on PSE institutions' supply response to students' demands.

The places to be expanded are likely to be more expensive than average if they are in science/technology/engineering/mathematics (STEM) fields. The Center for STEM Education and Innovation at American Institutes for Research (2013) finds that the full attribution cost – education and related spending per undergraduate completion – at US public four-year institutions in 2009 was USD 65 000-80 000 in most STEM fields compared with an average for all fields of USD 60 000. Engineering was much more expensive (almost USD 100 000), while mathematics and statistics were cheaper (less than USD 50 000). Universities would need larger budgets to adapt the places they make available to such a shift in demand.

Many employers would also like to see more done to equip university graduates with soft skills, which include the ability to work in teams and communication proficiency. These are very important attributes sought in entry-level hires by employers (Figure 10). While there are no survey data specifically on entry-level hires, a recent large-employer survey suggests that many of them have difficulty finding new recruits with these skills (Figure 11). These difficulties are undoubtedly greater for entry-level hires, as soft skills are often acquired in the workplace. As recommended in the 2012 *Survey*, increasing the weight of practice-intensive programmes would be effective for developing creativity, teamwork and leadership skills (Avvisati et al., 2013). Experiential learning (such as co-op placements) during university education has proven to be highly effective in developing the soft skills valued by employers (Sattler, 2011).

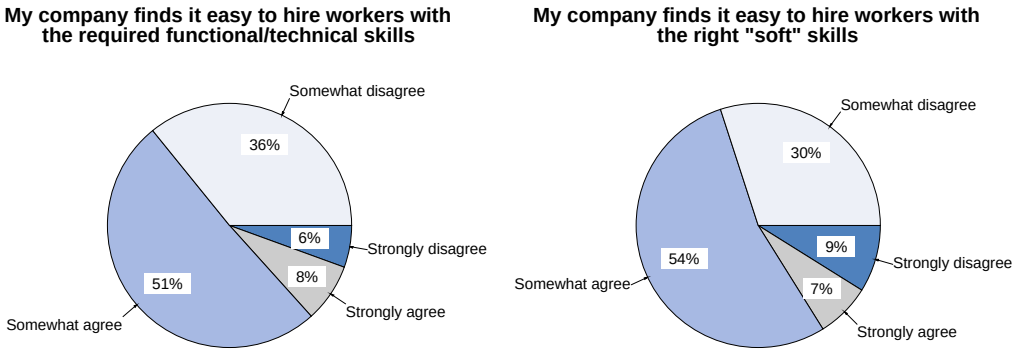
Figure 10. **Soft skills are very important when hiring entry-level employees, 2013**




*Note*: Survey The Canadian Council of Chief Executives is a not-for-profit, non-partisan organisation composed of the CEOs of Canada's leading enterprises.

*Source*: Canadian Council of Chief Executives.

Figure 11. **Many employers struggle to find workers with the right skills, 2013**




*Source*: Canadian Council of Chief Executives.

### *Increasing the efficiency of professional development training*

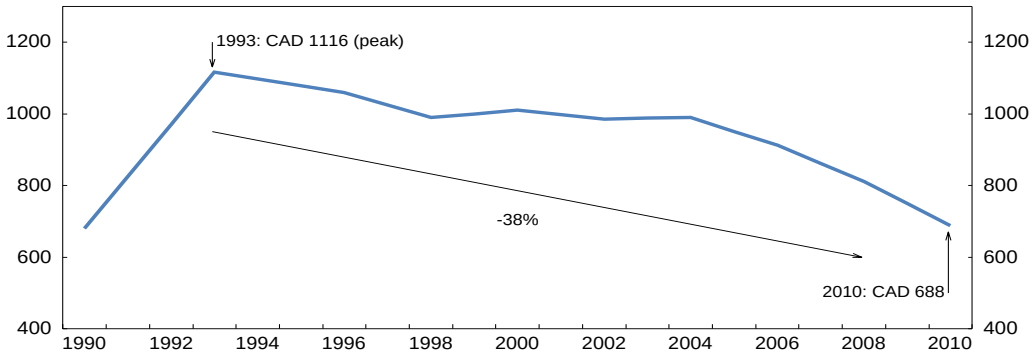
Professional development training is aimed at increasing the skills of employees or potential employees. It can be particularly valuable to help workers adapt to workplace changes such as the introduction of new technology or organisational arrangements and to equip potential workers with skills to make them more employable. Despite the increase in technological and organisational change occurring over the past two decades, expenditure on employer-sponsored training, most of which is non-formal, has been declining in Canada (Figure 12). Nevertheless, employer expenditure on non-formal training and the ratio of the cost of expected time spent in such training over a working life to annual salary are around the average for OECD countries, and participation in such training is above the average of countries that participated in the PIAAC study (Figure 13). By contrast, publicly funded training in Canada is low by international comparison (Figure 14). The result is that total training expenditure is comparatively low.

The Canada Job Grant is being introduced to make public training expenditures more demand-driven to help address skills shortages. Specifically, the Grant will enable employers to make decisions about who gets training and what type of training, ensuring that training is better aligned with job opportunities and thereby helping employers to fill vacant positions. Two-thirds of the costs of the Grant will be paid by governments, and the remainder will be cost-shared by employers. Provincial/territorial governments have some flexibility as to how the government contribution is funded, be it from the new Canada Job Fund Agreements, the Labour Market Development Agreements (which is mostly used to train unemployed individuals closer to the labour market) or other provincial/territorial own-source revenues. The cost-sharing aspect is intended to bring the amount of employer-provided training closer to the socially optimal level (which is higher than the privately optimal level owing to the external benefits of training).

While provincial/territorial governments strongly support the involvement of employers in improving the skills of their current and future employees, consistent with the Grant, they expressed concern that many SME employees could miss out on Grant training because their employers do not have the means to pay their share of the total training costs (including the employee's absence) or would find the Grant administratively burdensome. Provincial/territorial governments were also concerned about potential

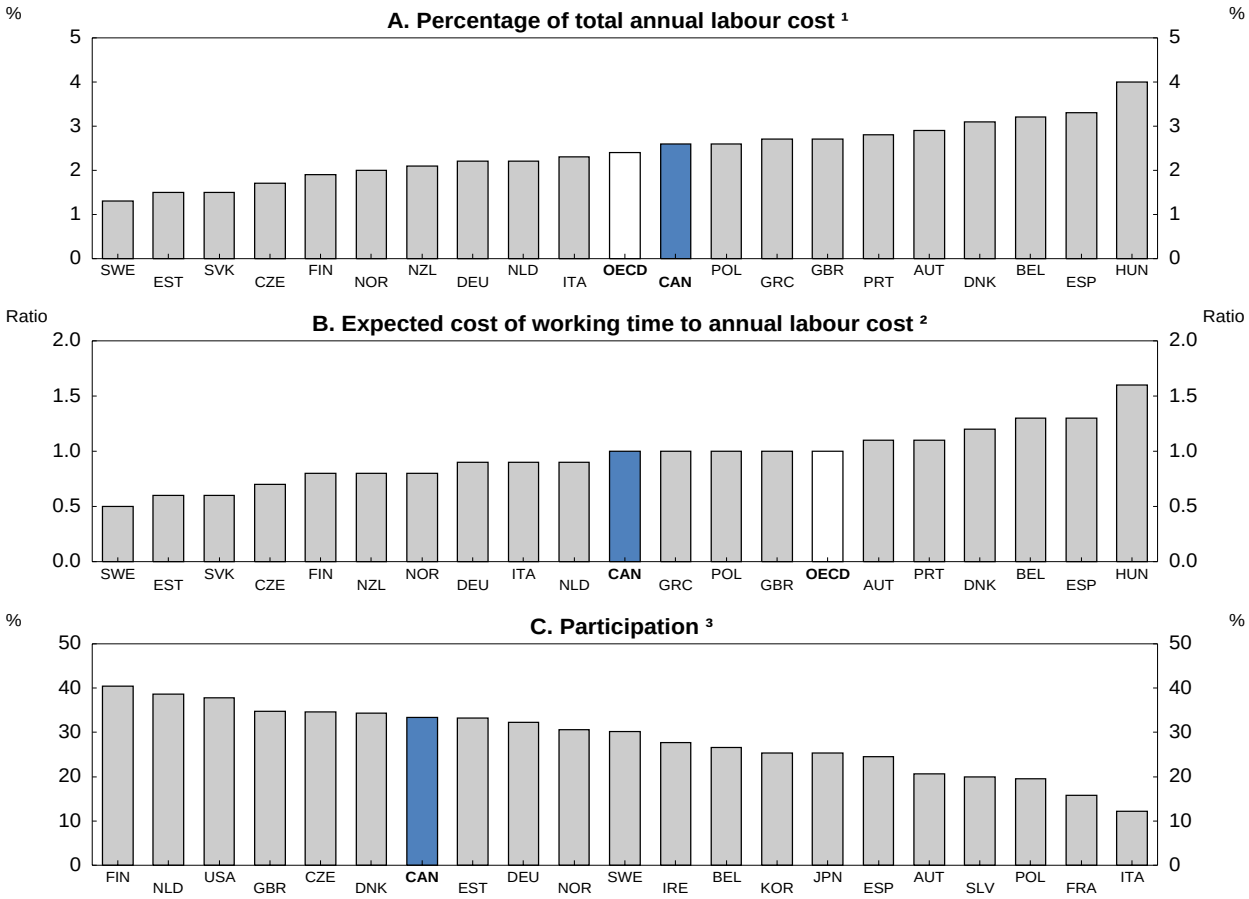
Figure 12. **Expenditure on employer-sponsored training per employee**

2010 constant CAD




*Source*: Burleton, D. et al. (2013), *Jobs in Canada, Where, What and For Whom*, TD Economics Special Report, 22 October.

Figure 13. **Employer investments and participation in non-formal training**

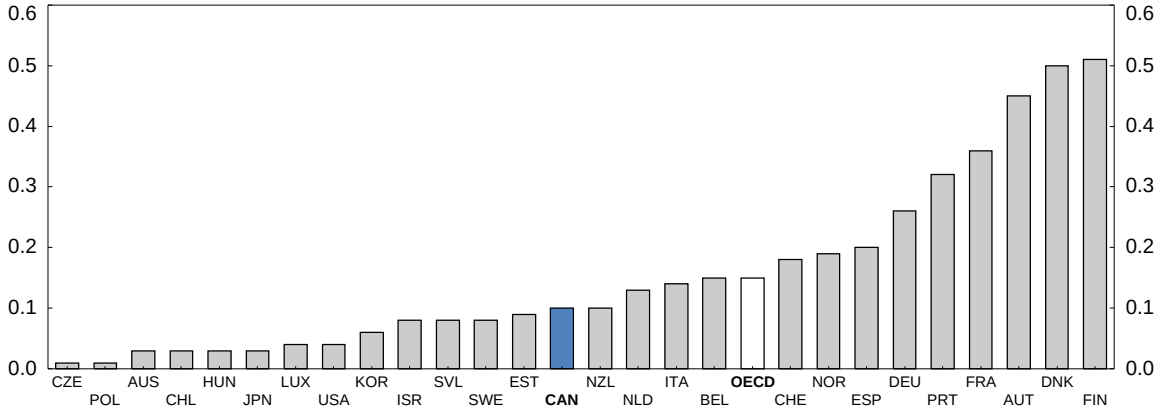



1. Total annual labour cost of employer-sponsored non-formal education as a percentage of annual labour cost, for employed 25-64 year-olds, 2007.
2. Expected cost of working time devoted to employer-sponsored non-formal education over the working life, for employed 25-64 year-olds, 2007.
3. Participation in organised sessions for on-the-job training or training by supervisors or co-workers during the past year, 16-65 age group, 2012.

*Source*: OECD, *Education at a Glance 2012* and OECD *Skills Surveys,*
http://www.oecd.org/site/piaac/PIAAC_Background_Compendium%20_Round1_12Nov2013.xlsx

Figure 14. **Publicly funded training expenditure in international comparison**

2011, as a percentage of GDP




*Source*: OECD Labour Market Programme Database.

challenges in tailoring the Grant to local circumstances. In response, the Grant is being designed to provide additional flexibility to meet the needs of small employers and employer associations, educational institutions and labour organisations, including a commitment to minimise the administrative burden. For example, small businesses will benefit from flexible arrangements under the Canada Job Grant, such as the potential to count wages as part of the employer contribution. As part of implementation, the Grant will be reviewed in the second year to allow time to make adjustments as necessary to ensure that it is meeting the needs of employers and jobseekers.

### *Increasing the apprenticeship completion rate*

Strong demand for tradespeople and an expansion of trades covered by the Red Seal programme, which harmonises trade certification regimes by developing common provincial standards, led to a doubling in the number of apprenticeship registrations and completions between 2000 and 2011 (Box 4). However, the completion rate remained at only about 50% over this period, (Canadian Chamber of Commerce, 2013). This completion-rate outcome is weaker than for university undergraduates, although the difference is undoubtedly exaggerated by the ways in which enrolment data are compiled (Laporte and Mueller, 2011). Completion rates are higher in some trades, such as electricians, where it can be necessary to be qualified to exercise the trade. Low completion rates limit the number of certified members (i.e. journeypersons) who will be available to train the next generation of apprentices.

Box 4. **Apprenticeship features**

Apprenticeships are workplace training programmes designed to teach students the skills needed to meet an industry standard (Canadian Chamber of Commerce, 2013). These programmes typically comprise 80-85% on-the-job training along with technical (block) training (Canadian Apprenticeship Forum, 2013). The on-the-job component requires the apprentice to accumulate the required number of hours under the supervision of the specified number of certified journeypersons. The technical component is undertaken in a college, union or private training centre or online. Once these requirements have been met, the apprentice may then take a written exam to become certified in a particular province or territory. Apprenticeships normally last from two to five years.

The lower completion rate of apprentices compared to undergraduates cannot be explained by smaller labour-market penalties for non-completion. According to one now older study (Akyeampong, 1991)

apprentice non-completers earned 77% of the hourly wage of journeypersons 12 months after the termination of a programme, whereas university undergraduate non-completers earned 81% of their graduating counterparts. Moreover, apprentices were less likely to be employed in the trade in which they were apprenticed than completers (52%, compared with 96%) and to have worked fewer months in the past year (8.5, compared with 11.5). More recent evidence (Laporte and Mueller, 2012) similarly highlights the large labour-market penalty for not completing an apprenticeship programme – it shows that hourly wage rates of apprenticeship completers are about 21% higher than those of non-completers. Among completers, those who obtained certification earn about 12% more per hour.

One of the barriers to completing is the lack of income during the in-class training component of apprenticeships. Apprentices are not paid during such training, which normally takes place in a block of eight to ten weeks once a year. While employers usually lay off apprentices just before such training so that they can claim Employment Insurance (EI) while in school, many apprentices cannot afford to live on EI during this period (Canadian Chamber of Commerce, 2013). Apprentices may also be prevented from completing the in-school component of their training by employers who are unwilling to release them for it, especially during periods of strong economic growth. Alternatively, apprentices may be prevented from completing by difficulties in maintaining their employment, and hence, in accumulating the number of hours of on-the-job training required to advance through the programme.

To reduce the financial barrier to apprentices completing their in-school training, the interest-free Canada Apprentice Loan of up to CAD 4 000 per period of technical training for apprentices in their first Red Seal trade (trades covered by the Red Seal Program) was proposed in the 2014 federal budget. Using complementary training and development programmes to support apprentices during their block courses could also help. Nova Scotia has done this with positive results. The new Canada Job Grant could also help to strengthen employers' incentives to sustain employment for apprentices and allow them to undertake their in-school training.

Barriers to completion (and to inter-provincial labour mobility) also arise when an apprentice moves between provinces. There is limited recognition of in-school training credits from other provinces (especially from pre-employment community college courses), and, because material is covered in a different order across provinces, a migrating apprentice risks being placed in a lower year of the programme, increasing the time to completion. Yet such mobility could help apprentices laid off in a depressed economic region to find employment again and hence continue to progress towards completion. The Canadian Council of Apprentices has been working on strengthening inter-provincial standards and assessment methods under the Red Seal Program to support greater harmonisation, transferability between occupations and sectors and more efficiently recognise immigrants' qualifications towards apprenticeship certification. The new format and process will be evaluated through a pilot project in 2013/14 for the Construction Electrician and Steamfitter/ Pipefitter trades. The Atlantic provinces have made considerable progress towards harmonising their apprenticeship systems, resulting in the near-elimination of these barriers to mobility among them. Nova Scotia and Alberta have also made progress on mutual recognition of training hours and credits, but the problem of the order in which material is covered remains to be resolved. The best solution would be to harmonise apprenticeship programmes across all provinces and territories (there are already National Curriculum guidelines for the major trades), as is occurring in Australia. The federal government should continue to work with provinces to harmonise programmes.

Another barrier to completion in some cases is inadequate numeracy and literacy skills. This can create difficulties for both in-school and on-the-job training. Apprentices with such weaknesses need access to remedial education. To reduce the prevalence of this problem in the future, pre-apprenticeship programmes to strengthen mathematics and tool-use skills should be offered, as is already done in a number of polytechnics and colleges (Canadian Chamber of Commerce, 2013). This would also increase

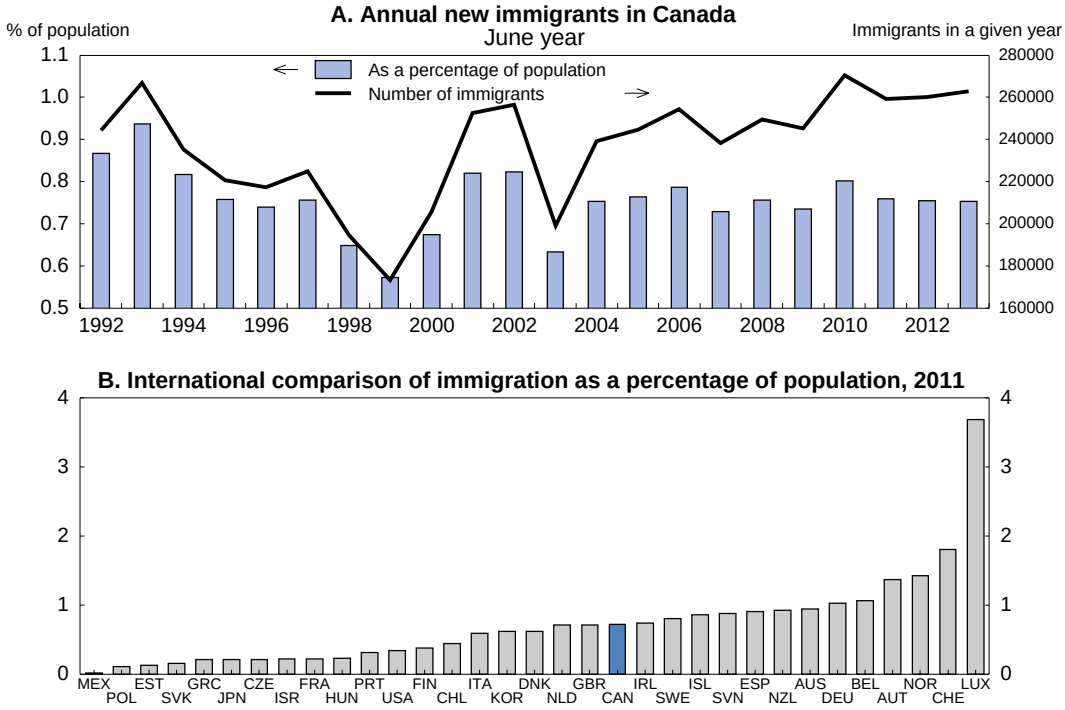
the likelihood that would-be apprentices will be taken on by an employer. It could also increase the speed of adjustment to skills shortages in the trades.

Increasing education requirements and the share of in-school training in apprenticeship programmes could speed labour-market adjustment. Using data for eight construction trades in 20 Canadian metropolitan areas, Coe and Emery (2006) found that higher educational requirements to become an apprentice and increased training hours required during apprenticeship decrease adjustment time. They also found that required apprentice work hours increase the time required for adjustment. These results suggest that substituting pre-apprenticeship education and training during apprenticeship for required hours of work experience might make adjustment more rapid.

**Making the immigration system more responsive to labour-market conditions**

Another possible source of skills in short supply is immigration. It has been running at around the annual target level of 250 000 (0.75% of the population) over the past decade (Figure 15). Some 60% of immigrants are chosen on economic criteria, which is higher than in most other countries.

Figure 15. **Immigration is high in Canada by international comparison**



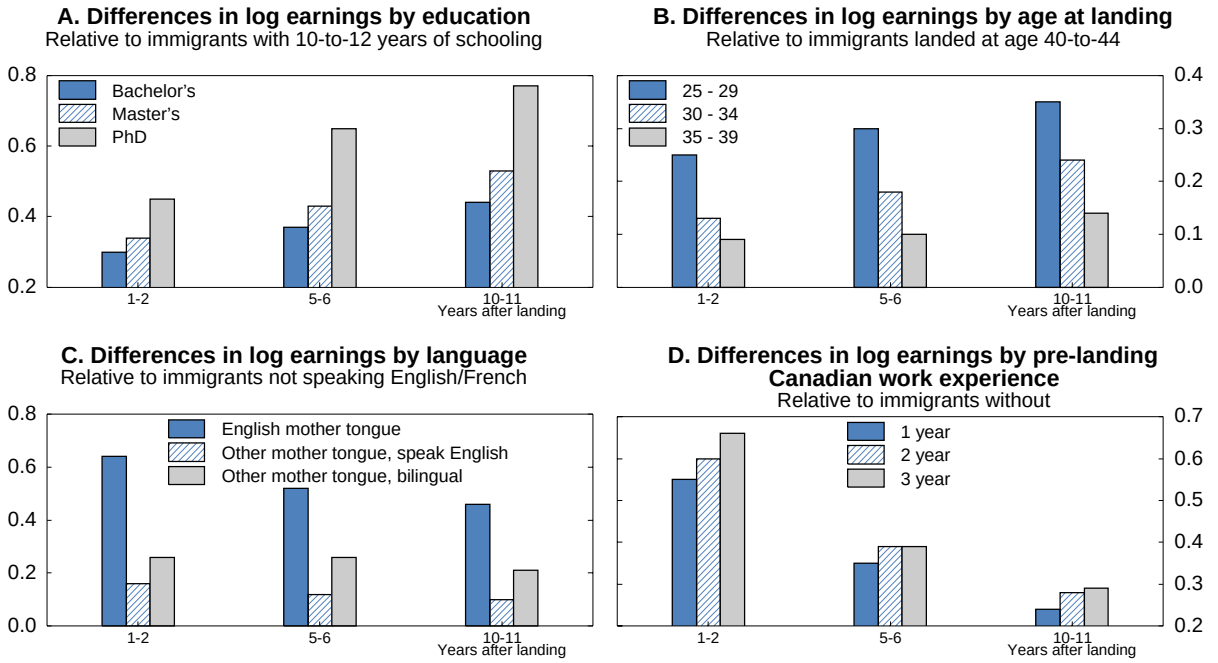

*Source*: Statistics Canada and OECD, population database.

In recent decades economic immigrants have been selected largely on the basis of their level of human capital because immigrants with high levels are likely to have better labour-market outcomes. Such immigrants are better able to adapt to changes in labour-market requirements than their less skilled counterparts and are likely to have a more favourable impact on public finances (Picot, 2013). Indeed, earnings premiums associated with higher levels of education for Principal Applicants of the Skilled Workers Class (in the Federal Skilled Worker Program (FSWP), which is the main programme for economic immigrants) grow substantially over time since arrival (Figure 16), as do those associated with younger age, when accumulation of human capital is more rapid. On the other hand, proficiency in the two

official languages and Canadian work experience prior to becoming a permanent immigrant generate large earnings advantages, even if they diminish over time.

Figure 16. **Differences in earnings among immigrants with different attributes**

Principal applicants, skilled worker class, 1997-99 landing years




*Source*: Statistics Canada.

The 2002 Immigration and Refugee Protection Act (IRPA) introduced changes to the FSWP that further stressed the long-term potential of economic immigrants by giving more weight to education and age. This reform also gave more weight to language and employment history, which enhance labour-market performance, especially in the short term.

A growing share of Canada's annual permanent residence admissions has come from the Provincial Nominee Program (PNP), increasing from 1% of economic immigrants when introduced in 1999 to 25% in 2012. Under the PNP provinces and territories nominate prospective immigrants to address regional economic immigration objectives. These nominees then apply to Citizenship and Immigration Canada (CIC) for permanent residence. Ministerial instructions, which allow CIC to place priority selection on particular occupations, are also driven mostly by occupational demand based on available labour market information. Other programmes introduced to respond more to current labour-market conditions include the Canadian Experience Class (CEC) introduced in 2008 to facilitate the transition of skilled temporary residents with Canadian work and/or study experience to permanent residents (although permitted numbers are low – for example, only 200 per year for Alberta) and the newly created Federal Skilled Trades Program (FSTP), which aims specifically to reduce labour shortages in trades.

These new programmes achieved the goal of improving the economic outcomes of new immigrants at entry in the 2000s, interrupting the deterioration of recent decades. Still, relative to the Canadian born, earnings remain well below the levels of the 1970s (Picot, 2013). In the initial years after arrival, these new classes of immigrants had much higher average earnings than FSWP immigrants (Table 5). The earnings advantage for PNP and CEC immigrants was mainly attributable to their greater Canadian work experience

prior to becoming immigrants and to pre-arranged jobs, while for FST immigrants the advantage probably resulted from strong demand in their intended occupations. However, as shown by the Statistics Canada internal analysis presented in the table below, the earnings advantage of these new categories of immigrants dissipates rapidly, so that by five or six years after arrival they no longer have an advantage over FSWP immigrants. Considering the continued rise in the earnings premium for immigrants with high human capital beyond this period (see Figure 16), it is likely that FSWP immigrants will have an earnings advantage over the longer run. This highlights the tension that can exist between taking immigrants whose skills are in high short-term demand and the longer-term goal of having immigrants with high long-term earnings potential.

Table 5. **Earnings differences among immigrant categories**

Differences in log earnings from Federal Skilled Workers Program

| | Landed in 2002-04 | | Landed in 2009 |
|---|---|---|---|
| | After 1-2 years | After 5-6 years | First full year after landing |
| Observed | | | |
| Federal skilled trades (derived) | 0.208 *** | 0.007 | 0.403 *** |
| Provincial nominees | 0.370 *** | 0.056 * | 0.379 *** |
| Canadian experience class | n.a. | n.a. | 0.445 *** |
| Federal skilled workers | Reference | Reference | Reference |
| Adjusted for differences in Canadian work experience and pre-arranged jobs | | | |
| Federal skilled trades (derived) | 0.220 *** | 0.009 | 0.234 *** |
| Provincial nominees | 0.112 *** | -0.099 *** | 0.228 *** |
| Canadian experience class | n.a. | n.a. | -0.032 |
| Federal skilled workers | Reference | Reference | Reference |

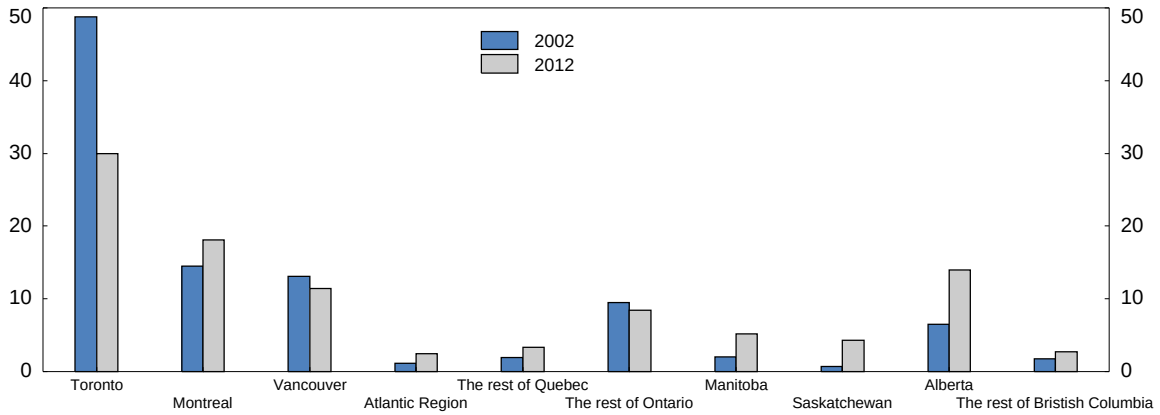
*Note*: * significant at p<0.05; ** p<0.01; ***p<0.001

*Source*: Statistics Canada, Longitudinal Immigrant Database; internal Statistics Canada analysis.

The new programmes also contributed to an increased dispersion of new immigrants, with greater numbers heading to Prairie provinces, where labour-market conditions have been stronger than in the rest of the country (Figure 17). Between 2002 and 2012, the share of new immigrants going to Toronto fell from 49% to 30%, while the share going to the Prairie provinces increased by 15 percentage points.

Figure 17. **Immigrants' destinations within Canada**

Distribution of new immigrants in per cent

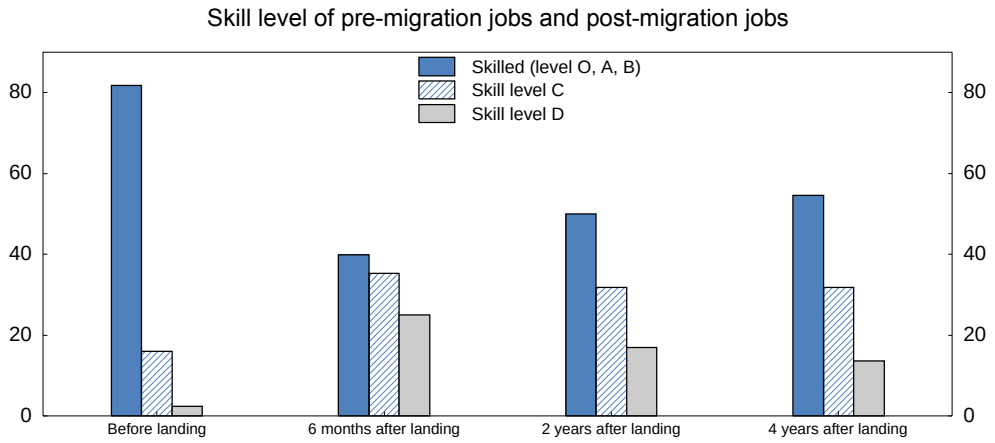



*Source*: Citizenship and Immigration Canada, *Facts and figures 2002 and 2012*.

Statistics Canada analysis indicates that the PNP in particular was an important contributor to the increased regional dispersion of entering immigrants. The growing share of the PNP in Canadian economic immigration accounted for virtually the entire rising share of new immigrants going to Saskatchewan and Manitoba, and played an important role in Montreal and British Columbia outside Vancouver (but not Alberta). Contrasting economic and labour-market conditions in Toronto and the western provinces also contributed to the switch in immigrant destination to Calgary and Edmonton, as did the change in source regions (migrants often prefer to go where there is already an existing community from the same source country).

Integration of highly skilled immigrants, who often initially take less skilled jobs, is a major challenge (Figure 18). As noted above, their earnings premiums are lower than for Canadian-born workers and have not increased in fields where premiums have risen for the Canadian born. Immigrants since the early 1990s mostly derive low returns on their foreign experience and foreign education (Green and Worswick, 2009; Ferrer and Riddell, 2008). With the change in source countries since the early 1990s, many immigrants have inadequate proficiency in both of the official languages to perform well in highly skilled roles. Another factor is that education quality is often lower in the new countries of origin (Sweetman, 2004).

Figure 18. **Immigrants' jobs before and after arrival by skill levels**




*Note:* Immigrants who arrived in Canada during the year to 30 September 2001. Occupational skill levels as defined in the National Occupation Classification Matrix 2006. O corresponds to management occupations, A to occupations that usually require university education, B to occupations that usually require college education or apprenticeship training, C to occupations that usually require secondary education and/or occupation-specific training, and D, the lowest skill level, to occupations for which training is usually provided.

*Source*: Statistics Canada, Longitudinal Survey of Immigrants to Canada, Detailed information for 2005 (Wave 3).

An important step to improve integration was the development of the *Pan-Canadian Framework for the Assessment and Recognition of Foreign Qualifications* by the intergovernmental Forum of Labour Market Ministers (2009). The purpose of the Framework is to articulate a new, joint vision for governments to take concerted action to improve the integration of immigrants and other internationally trained workers into the Canadian labour market. It builds on a variety of programmes to facilitate integration, including: the Foreign Credential Recognition Program, which offers financial support for projects that facilitate the assessment and recognition of international credentials; the International Qualifications Network, which is an online professional community where employers, regulatory bodies, governments and organisations share best practices in foreign credentials assessment and recognition; Health Canada's Internationally Educated Health Care Professionals Initiative, which expands the assessment and integration of such people in seven priority professions; and the Canadian Immigrant Integration Program, which provides free pre-departure orientation to immigrants by providing

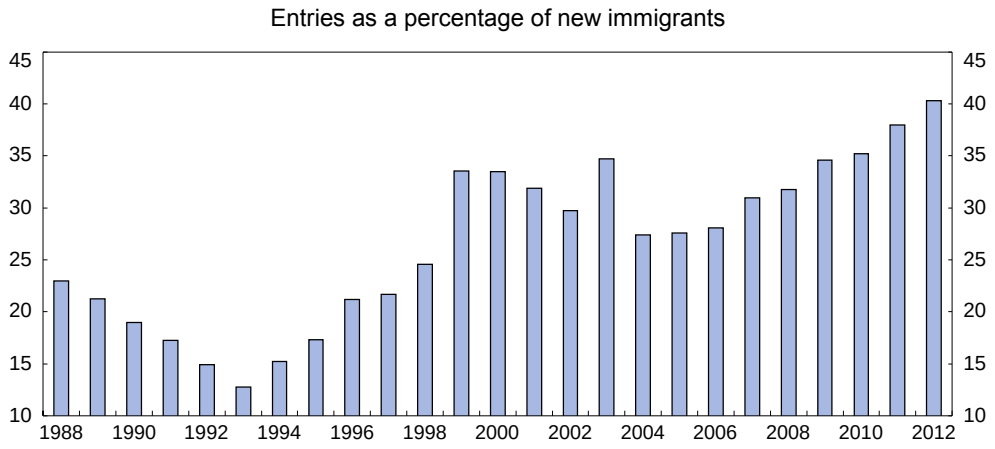
information, planning and online support through partners in Canada. To reduce the probability that future immigrants encounter high barriers to integration the federal government introduced in May 2013 a requirement for applicants under the FSWP to supply assessments of their education credentials and proficiency in English or French. Even for immigrants who pass these assessments it will be important to maintain integration programmes, such as those funded by Labour Market Agreements: immigrants may not know technical terms in their fields in English or French and may lack understanding of cultural differences. At the same time, improvements to the FSWP points grid came into effect based on a large body of research, which has consistently shown that language proficiency and youth are two of the most important factors in the immigrants' economic success.

A major concern with the way that the economic programmes have been functioning in recent years is that it has not been possible to prioritise applications according to labour-market needs. Applications had to be processed in the order that they were received, and there was a large backlog of unprocessed applications (which by 2008 would have taken eight years to process). This meant that qualified applicants with skills in high demand could not be invited to immigrate if they were not at the head of the queue. To make the programmes more responsive to current labour-market conditions, in 2015 the federal government will introduce the Express Entry System, based on the Expression of Interest (EOI) model, following the examples of Australia and New Zealand. Individuals expressing an interest to enter Canada and meeting certain eligibility requirements will be placed in a pool and ranked on the basis of education, work experience, language ability and the requirements of the labour market. Candidates in the pool will be required to register with the national Job Bank and are directed to information on employment opportunities. They will also be encouraged to market themselves to employers through additional means. Employers can then be matched with potential immigrants from the pool to meet their labour needs, while provinces can search the pool to identify individuals for nomination. CIC will invite the best candidates, including those with in-demand skills, job offers, or provincial nominations to apply for a permanent resident visa. Express Entry candidates who are not chosen after a period of time will be removed from the pool.

The federal government began a major reform to the Temporary Foreign Worker (TFW) Program in 2013. While originally conceived to relieve short-term labour shortages in high-skilled occupations, this programme had increasingly focused on lower-skilled occupations. And it has grown phenomenally since its inception to a level that represents a large share of total immigration (Figure 19). In April 2013, the government announced that companies could no longer pay TFWs less than the prevailing wage rate. In June the government passed legislation establishing an application fee and giving officials more powers to inspect employers and to suspend or revoke previous approvals if they were based on false information. While there is general agreement about the need to return the scheme to its intended purpose, its increased usage may also be a consequence of insufficient progress with the current immigration system in meeting Canada's rapidly changing skilled-labour needs (Burleton et al., 2013).

While the reforms in the past decade culminating in the adoption of the Express Entry system increase the immigration system's capacity to respond to short-term skills shortages, care will need to be taken not to sacrifice the longer-term economic goals of immigration. Cyclical and structural changes and adjustments by firms and workers can reduce demand for occupations in high demand at the time of immigrant selection. Hence, if immigrants are to be selected to fill current skills shortages, it is imperative that they have the human capital necessary to adjust to economic change in the longer run (Picot, 2013). There is also much to be gained from strengthening integration of highly skilled immigrants so that they use their human capital to full capacity.

Figure 19. **Usage of the Temporary Foreign Worker Program**




*Source:* Citizenship and Immigration Canada, *Facts and figures 2002 and 2012.*

## Reducing labour-mobility barriers would help ease skill shortages caused by geographic mismatches

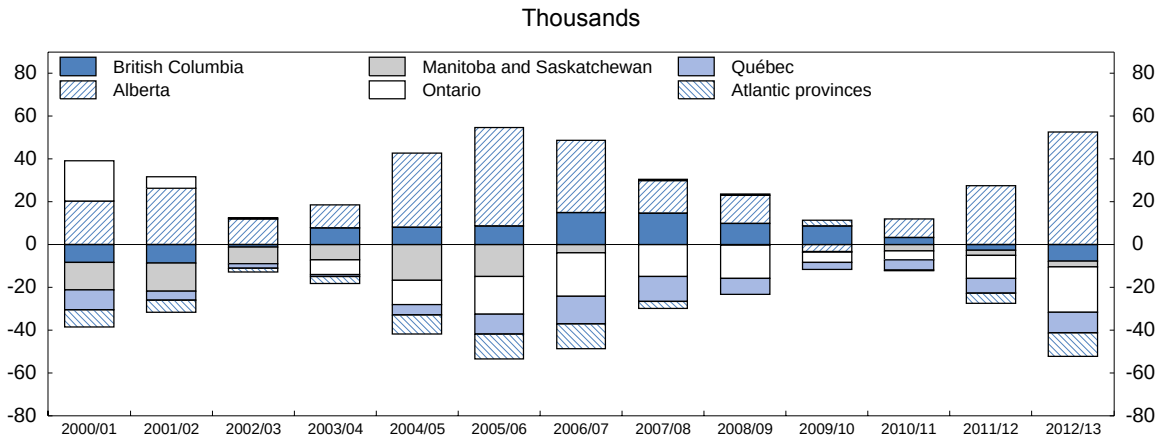
### *Labour mobility plays a comparatively large role in labour-market adjustment*

Migration within Canada is an important labour-market adjustment mechanism. Internal migration flows are similar in Canada and the United States (Bayoumi et al., 2006). Indeed, migration flows appear to be the major long-term adjustment mechanism to sustained asymmetric labour-market shocks in Canada and the United States, but not in euro-area countries. Bayoumi et al. (2006) also found that migration becomes a more important factor in labour-market adjustment as one moves west in Canada. An example is the way that Canadians have moved to Alberta in response to the energy-sector boom. By 2012/13, Alberta had an annual net inter-provincial migration gain of over 50 000, approaching the previous peak, while all other provinces except Saskatchewan had net outflows (Figure 20). It must be noted that given the large geographic area of Canada and many of its provinces, the majority of Canada's geographical labour mobility actually occurs within provincial borders – about 75% of Canada's labour flows involve movement within provinces, while the other 25% involve movement between provinces.

Migration flows understate the extent of inter-provincial labour mobility because there is also substantial inter-provincial employment, which is defined as individuals who commute to work in one province while maintaining their permanent residence in another (Figure 21). Each year, the total number of inter-provincial employees has exceeded the total number of new inter-provincial migrants – individuals who changed their province/territory of residence from one year to the next – by a wide margin. Given that about one half of inter-provincial employees in a given year are new, the flow of inter-provincial employees is comparable to that of inter-provincial migrants.

As a consequence of these flows, labour-market conditions are converging across provinces. In particular, the dispersion of employment rates has fallen steadily over the past three decades to similar rates as in the United States (Figure 22). This contrasts with the euro area, where the dispersion of employment rates has been increasing since 2004 to a level that is now considerably higher than in Canada.

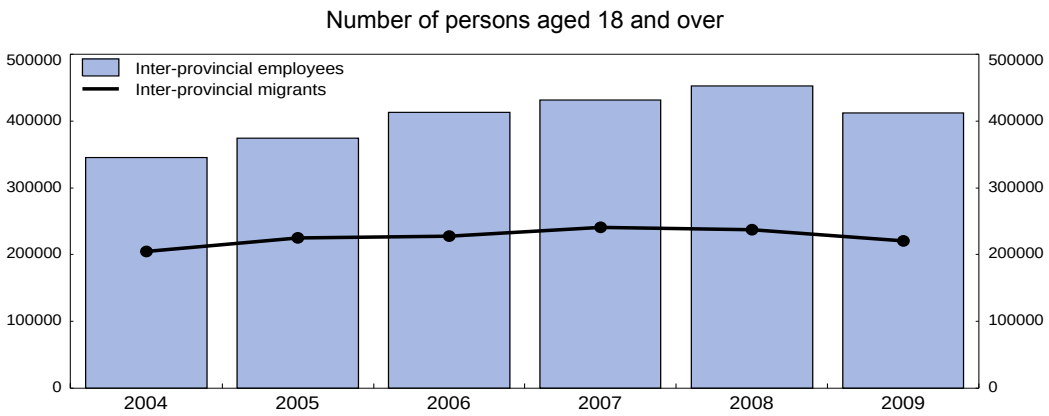
Figure 20. **Alberta has experienced large net inter-provincial immigration**




*Source*: Statistics Canada.

**How to read this figure**: Each bar shows annual net inter-provincial migration flows by province/groups of provinces. Provinces/groups of provinces with a net inflow are shown with positive flows (e.g. Alberta and Ontario in 2000/01) while provinces/groups of provinces with net outflows are shown with negative flows (e.g. all the other provinces/groups in 2000/01). In the last two years, Alberta alone had a net inflow; Saskatchewan also had a net inflow but this is not visible in the figure because it is grouped with Manitoba, which had a larger net outflow.

Figure 21. **There are more inter-provincial employees than migrants**

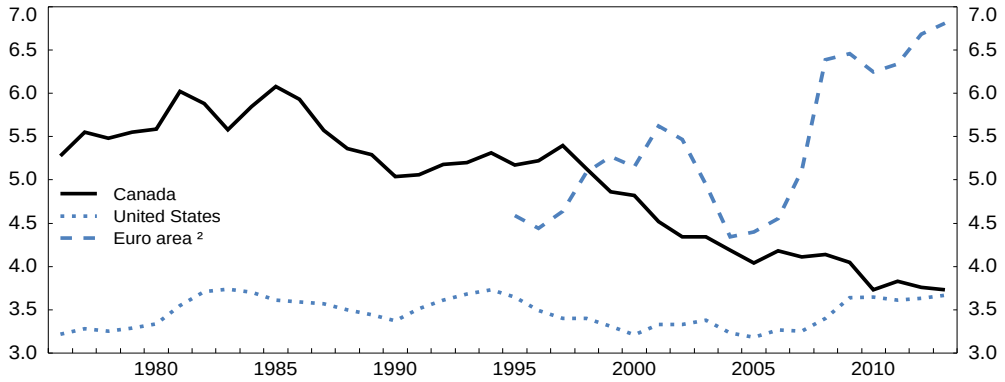



*Note*: Preliminary estimates for 2008 and 2009.

*Source*: Statistics Canada.

Figure 22. **The inter-provincial dispersion of employment rates has fallen considerably in Canada**

Mean absolute difference[1]



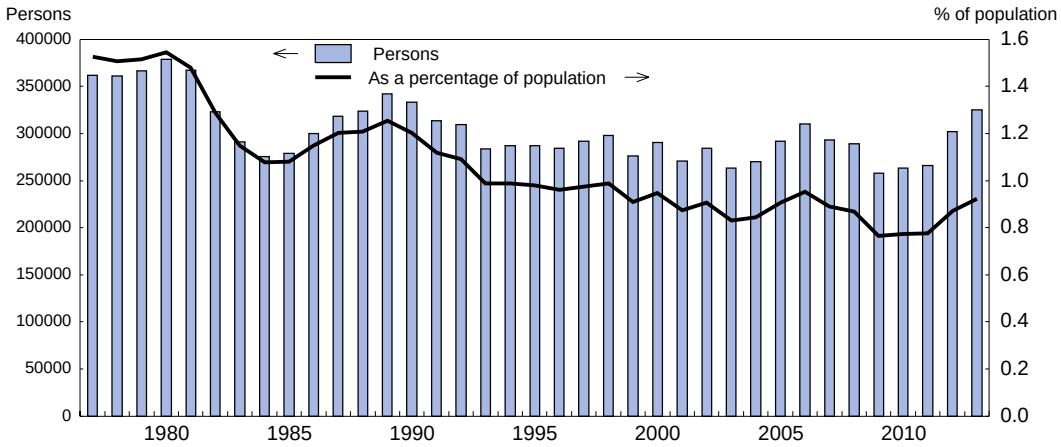

1. The mean absolute difference (MAD) is a dispersion measure which shows the sum of the absolute value of the difference between the employment rate of the US state/Canadian province/Euro-area country and the national average divided by the number of subnational units in the monetary union.
2. Eleven founding members (Austria, Belgium, Germany, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Spain and Portugal).

*Source*: Bank of Canada (2013), "Canada Works", speech given by Mark Carney, former governor (2008-13) of the Bank of Canada to the Chambre de commerce du Montréal métropolitain, in Montréal, Québec on 21 May 2013.

Convergence of disposable incomes and employment rates is the main factor that underlies a decline in inter-provincial migration from about 1½ per cent of the population in the 1970s to about 1% in the mid-1990s, where the rate has broadly remained (Figure 23). Amirault et al. (2013) found that differences in employment rates and median household incomes help to explain Canadian migration patterns. Other important factors are population ageing and an increase in home ownership rates, which are negatively related to migration flows.

Figure 23. **Inter-provincial migration**

Total population




*Source*: Statistics Canada, CANSIM table 0510017.

Despite the comparatively high level of geographical labour mobility and labour-market convergence that has occurred, there still appear to be inter-provincial barriers to mobility. Using sub-provincial data for economic regions, Amirault et al. (2013) found that provincial borders are negatively related to economic

mobility. If barriers created by provincial borders could be overcome, greater labour mobility would facilitate labour-market adjustment and possibly result in stronger productivity growth (Leung and Cao, 2009).

***The Agreement on Internal Trade (AIT) has been made more effective***

Canadian governments have taken a variety of steps over the years to reduce regulatory barriers to labour mobility across provincial borders. These barriers arise when people from one province have difficulty obtaining the professional or occupational license required to practice their profession or trade in another; approximately 20% of employment is in regulated fields (Grady and Macmillan, 2007). An important early measure was the harmonisation of qualification requirements and mutual recognition of qualifications for various Red Seal trades about 50 years ago. The Red Seal trades cover some 80% of trades qualifications. More recently, provincial governments agreed to reduce barriers to labour-market mobility more generally under the Agreement on Internal Trade (AIT), which came into force in 1995.

Initially, the AIT was not very effective. An official survey found that 35% of about 13 000 regulated workers who moved to a different province in 2004 did not have their qualifications recognised by the regulators in the destination province (Forum of Labour Market Ministers, 2005); for foreign trained workers the rejection rate was 49%. Some 8% of regulatory bodies said that they had failed to register applicants because they were not residents, and another 18% said that they had not changed regulations to accommodate all applicants who were qualified in other jurisdictions (Knox, 2010). In other words, nearly 10 years after the AIT came into force, many regulators had ignored their obligations under the original Labour Mobility Chapter, and provincial governments had not sought their compliance as they had undertaken to do.

In view of the disappointing AIT outcome, the difficulty of reaching a more effective agreement with all provinces quickly and the importance attached to inter-provincial labour mobility, British Columbia and Alberta reached their own more ambitious agreement (the Trade, Investment, and Labour Mobility Agreement, TILMA) in 2006 (Grady and Macmillan, 2007). The principal improvement in TILMA from the AIT was reciprocal recognition of workers' occupational credentials.

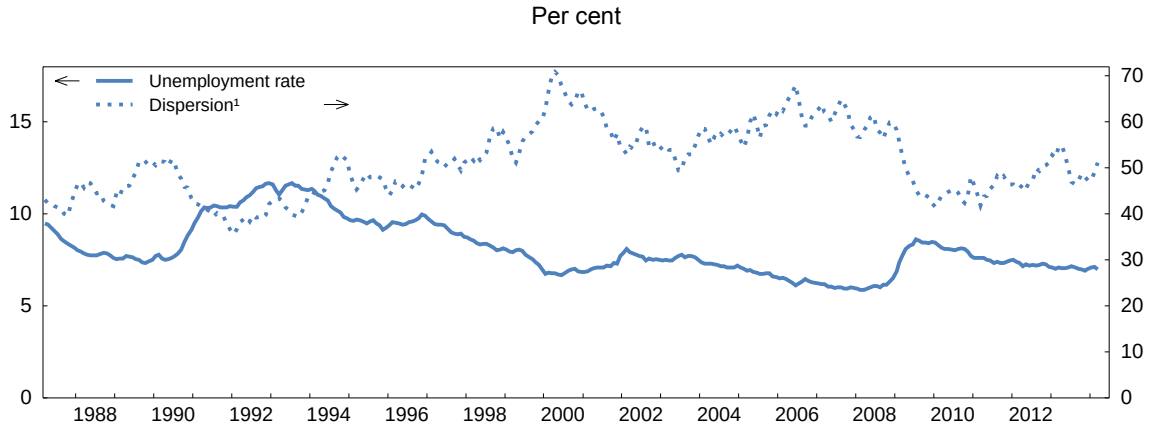
The AIT was strengthened in 2009, when the principle of certificate to certificate recognition was established in the new Chapter 7 (Labour Mobility). Its cornerstone is Article 706, which stipulates that any worker certified in an occupation by a regulatory authority in a province or territory will, upon application, be certified for that occupation by all other provinces or territories. Prior to the 2009 amendments, regulated workers moving from one province to another faced a wide range of barriers such as additional qualification requirements, re-examination and re-training. After the amendments, the burden of proof is in effect reversed from individual workers to regulators and is strengthened by recent AIT Dispute Resolution Panel decisions on Crane Operators (2012) and Public Accounting (2012). The decisions in these cases, brought originally by individuals, confirm both that jurisdictions cannot refuse to certify workers from other jurisdictions unless there is demonstrable evidence of risks to the public (e.g. risks to health and safety), and that differences in educational standards and length of training between jurisdictions do not, by themselves, justify restrictions on labour mobility. However, provinces and territories continue to have the right, under certain conditions, to recommend additional requirements to meet special circumstances. Where significant differences in skills, areas of knowledge or abilities exist, a government may approve an exception to full labour mobility for an occupation (i.e. maintain additional certification conditions for a worker in that occupation, even if the worker is certified elsewhere). Justification for an exception must be clearly documented, must be approved by the relevant government and must be publicly posted to comply with Chapter 7 obligations to ensure regulators and individual workers have access to the requirements in a given occupation across jurisdictions. There are currently 44 exceptions posted across 14 professions, which is low given the hundreds of regulated occupations.

However, the fact that only two cases have ever been brought before the Panel, despite the findings reported above that many regulated workers moving province have had their qualifications rejected by the receiving province, raises doubts about the Panel's accessibility. Moreover, these cases took a long time to resolve – three years for Crane Operators and 10 years for Public Accountants. An investigation should be made to identify barriers to accessibility and how they can be reduced. Steps should also be taken to expedite cases more quickly.

***Incentives for long-term EI dependence in high unemployment regions***

While the regional dispersion of unemployment rates might be expected to decline in the long term as workers move from high- to low-unemployment regions, this has not occurred (Figure 24). This may be partly because the Employment Insurance (EI) scheme provides incentives for seasonal work in high-unemployment regions, where contribution periods to qualify are shorter and maximum benefit periods longer than elsewhere (Riddell and Kuhn, 2010). EI effectively subsidises workers to remain in seasonal jobs that would not otherwise provide an acceptable annual income for many such workers, instead of moving to full-time work elsewhere. However, some research has shown that EI receipt is not a primary factor in decisions to migrate.

Figure 24. **Unemployment and its regional dispersion**




1. The dispersion measure is the coefficient of variation (standard deviation divided by the mean) across 69 regions of Canada.

*Source*: Statistics Canada, CANSIM table 2820054 and OECD calculations.

The EI programme has long required claimants to conduct reasonable job search and accept a reasonable offer of suitable work to avoid EI benefit suspension. New EI rules that clarify what a reasonable job search for suitable employment means came into effect at the beginning of 2013. As benefit duration increases, claimants are required to expand their job search and reduce restrictions with regard to acceptable type of work and earnings. Those claimants who make frequent use of the EI programme are subject from the beginning of their claim to more expanded job search criteria. While it is clearly too early to assess the effects of these changes, they may reduce the incidence of EI use by seasonal workers. However, the effects are likely to be greater in Ontario and Quebec, where an acceptable job offer is more likely to be forthcoming than in the rural parts of the Atlantic provinces. If the reform proves ineffective overall, it could be worth introducing experience-rated EI premiums for employers (whereby their contribution rates depend on their past record of laying off workers), as suggested in the 2008 *Survey*. Such a reform would increase contribution rates for seasonal workers, giving them a clearer signal to move to obtain year-round employment if seasonal employment does not provide an acceptable annual income.

This reform could be supported by better access to training opportunities including EI support while in training for seasonal workers who want to retrain to obtain year-round employment.

**Recommendations to reduce skills shortages**

**Key recommendations**

- Build on announced new measures to provide better information on expected returns to post-secondary education to improve students' study choices.
- Strengthen the single market for labour by making the Agreement on Internal Trade Dispute Resolution Panel more accessible and expediting its procedures. In addition, continue to work with provinces and territories to harmonise training and certification requirements of all apprenticeship programmes across the country to increase completion rates and inter-provincial mobility of apprentices.
- If recent Employment-Insurance reforms do not clearly cut repeat use, adopt experience-rated premiums and enhance opportunities for seasonal workers to retrain.

**Other recommendations**

- Provide a deeper occupational and regional breakdown of vacancy and unemployment data to facilitate job matching and data on recruitment intensity to strengthen surveillance of job-matching efficiency.
- Reduce the incidence of weak numeracy or literacy skills being a barrier to post-secondary education completion, perhaps by requiring students to study mathematics and English/French until the end of secondary school or by investing in remedial education in post-secondary education institutions.
- Increase experiential-learning components of university programmes to develop the soft skills sought by employers.
- Sustain programmes for immigrants to complement their foreign credentials and become qualified to local standards.

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