Centre for the Study of Living Standards
Centre d'étude des niveaux de vie

111 Sparks Street, Suite 500
Ottawa, Ontario K1P 5B5
613-233-8891, Fax 613-233-8250
csls@csls.ca

The Apprenticeship System in Canada: Trends and Issues

Andrew Sharpe
James Gibson
Centre for the Study of Living Standards

CSLS Research Report 2005-04
September, 2005

The Apprenticeship System in Canada: Trends and Issues

Abstract 4
Executive Summary 6
I. Introduction 13
II. Approaches to the Evaluation of the Apprenticeship System 15
a) School-to-Work Transition Approach 15
b) Skills Deficit Approach 17
c) Differences and Common Issues in the Two Approaches 18
III. Theoretical Perspectives on Apprenticeship 19
a) Apprenticeship as a Form of Learning 19
b) Perspectives of the Employer 20
i) Microeconomic Motives 20
ii) Collective Action Motives 22
c) Perspectives of the Employee 23
d) Perspective of Government 24
i) Credit Constraints 24
ii) Information Failures 25
iii) Regulation of Training Quality 25
iv) Subsidizing Employer Costs 25
IV. National Systems of Apprenticeships 25
a) Germany 26
b) France 29
c) Great Britain 30
d) Ireland 32
e) United States 32
f) Australia 33
g) Implications 39
V. Apprenticeship in Canada 40
a) Institutional Framework 40
b) Apprenticeship Registration 42
c) Apprenticeship Completions 46
d) Apprenticeship by Trade 49
e) Apprenticeship by Province 53
f) Apprenticeship by Gender 55
g) Age Composition of Apprentices 57
VI. Determinants of Registration and Completion Trends in the Apprenticeship System in Canada 59
a) Awareness of the Apprenticeship System 59
b) Apprentices' Expected Value of Training 60
c) Costs of Apprenticeships to Apprentices 61
d) Costs of Apprenticeship to Employers 62
e) Employment Instability 63
f) Program Structure 63
g) Training Quality 64
h) Gender Equity 65
i) Apprenticeship Training Outcomes 65
i) Employment 65
ii) Income 66

VII. Institutional Innovations 67
a) Federal Institutional Reform 67
b) Provincial Institutional Reform 69
i) British Columbia 69
ii) Ontario 71
iii) Alberta 73
iv) Quebec 74
VIII. Key Issues 75
a) Challenging Microeconomic Constraints on Apprenticeship Registration 76
b) Collection Action Problems and Apprenticeship Registration 77
c) School-to-Work Transitions and Completion 78
d) Assessing the Skills Deficit 79
e) Expanding the Breadth of Apprenticeships 81
IX. Knowledge Gaps and Directions for Future Research 83
X. Conclusion 86

The Apprenticeship System in Canada: Trends and Issues

Abstract

This report provides an overview of the trends and issues related to the apprenticeship system in Canada. The report is divided into eight major sections. Section one presents two different approaches to the evaluation of the apprenticeship system, namely the school-to-work transitions perspective and the skills deficit perspective. Section two discusses theoretical perspectives on apprenticeship looking at employer, employee and government approaches. Section three reviews the institutional features of national apprenticeship systems in Germany, France, Great Britain, Ireland, and Australia. Section four examines developments in apprenticeship programs in Canada, including trends in registrations and completions, with data broken down by trade, province and gender.

Section five discusses the factors determining apprenticeship registrations and completion in Canada, including awareness of the apprenticeship system, the costs of apprenticeship to apprentices and employers, employment stability, program structure, training quality, gender equity, and apprenticeship training outcomes. Section six reviews institutional innovations in the apprenticeship system in Canada focusing on developments at the federal level, and in British Columbia, Ontario, Alberta, and Quebec. Section seven identifies and discusses key issues facing the apprenticeship system in Canada, including constraints on apprenticeship registration, low and falling completion rates, and the potential for the expansion of the apprenticeship system. Section eight lays out knowledge gaps related to our understanding of the apprenticeship system and areas for further research.

The report concludes that the market for apprenticeship is principally constrained by employer demand rather than by the supply of potential apprentices. Consequently, it proposes reforms based on three main principles: apprenticeship programs should focus on improving the quality rather than the quantity of potential apprentices; financial incentives should be primarily directed towards firms; and strong apprenticeship sectoral committees are important in improving apprenticeship training and helping employers make investments in apprentices.

Résumé

Ce rapport est un aperçu des tendances et des enjeux reliés au système d'apprentissage au Canada. Il est divisé en huit sections principales. La première section présente deux méthodes différentes d'évaluer le système d'apprentissage, soit l'approche de la transition entre l'école et le travail et l'approche axée sur la pénurie de compétences. La deuxième section discute des conceptions théoriques des systèmes d'apprentissage selon la perspective de l'employeur, de l'employé et du gouvernement. La troisième section passent en revue les caractéristiques des systèmes nationaux d'apprentissage de l'Allemagne, de la France, de l'Angleterre, de l'Irlande et de

l'Australie. La quatrième section traite des développements dans le système d'apprentissage au Canada, incluant les tendances dans le niveau d'inscription et le taux de réussite, à l'aide de données par corps de métier, par province et par sexe.

La cinquième section s'attarde aux facteurs expliquant les niveaux d'inscription et les taux de réussite observés au Canada, y compris la connaissance du système d'apprentissage, les coûts liés au système pour les apprentis et les employeurs, la stabilité de l'emploi, la structure des programmes, la qualité de la formation, l'équité entre les sexes, et les résultats de la formation. La sixième section recense les innovations institutionnelles du système d'apprentissage canadien en se concentrant sur les développements au niveau fédéral, en Colombie-Britannique, en Ontario, en Alberta et au Québec. La septième section identifie et étudie les problèmes clés auxquels fait face le système d'apprentissage canadien, tels que les contraintes liées à l'inscription, le taux de réussite peu élevé et sa progression négative, et le potentiel de croissance du système d'apprentissage. La huitième section expose les lacunes de la connaissance reliée à notre compréhension du système d'apprentissage et propose des domaines de recherche pouvant être explorés dans le futur.

Les auteurs concluent que le marché des stages est principalement contraint par la faible demande des employeurs plutôt que par le manque d'apprentis potentiels. De ce fait, ils proposent des réformes axés autour de trois principes : les programmes d'apprentissage devraient se concentrer sur la qualité plutôt que sur la quantité des apprentis potentiels ; les incitatifs financiers devraient d'abord visés les entreprises ; et la participation d'organismes sectoriels robustes est fondamentale pour assurer l'amélioration de la formation des apprentis et encourager les employeurs à investir dans le système d'apprentissage.

The Apprenticeship System in Canada: Trends and Issues: Executive Summary

Training, like education, is a form of investment in human capital and has long been regarded by policy-makers as essential to both national competitive advantage and to the long-term well-being of workers. Apprenticeship is a unique form of education where apprentices not only learn skills in an academic setting but also learn in a practical, work-based environment. The apprenticeship system has been a crucial provider of training in Canada, particularly for the skilled trades for which it remains the principal means of entry.

The Canadian apprenticeship system has been under review in the past decade due to concerns in a number of areas, including the low number of completions relative to total registrations. This debate has centered on the apprenticeship system's role with respect to two related but distinct sets of issues. The first is the school-to-work transition agenda, which is concerned with supporting youth entering the work force in an increasingly demanding and complex labour market. From this perspective, apprenticeship has a valuable role to play as an educational alternative for youth who currently do not pursue post-secondary education. Currently, negative public perception of the trades, among other factors, has kept youth participation marginal in the apprenticeship system such that most apprentices are currently over the age of twenty-four.

The second motivation for discussion is the concern on the part of certain organizations that Canada may face an impending skills shortage, particularly in the skilled trades. From this perspective, inadequate numbers of registrations and completions, combined with the aging workforce, could result in skilled labour scarcity in the near future. Consequently, it is argued that the apprenticeship system should greatly increase registrations and completions in order to ensure an adequate supply of skilled labour to the economy.

This report evaluates the apprenticeship system in terms of its overall performance and its ability to meet the aspirations of policy-makers outlined above. Consequently, the following questions are addressed:

- What factors affect employer demand for apprentices?
- What factors affect students' decisions to enter into an apprenticeship program?
- What is the principal constraint on apprenticeship registration?
- What accounts for the low apprenticeship completion rates relative to other forms of post-secondary education?

- Given the constraints, what is the most appropriate role for the apprenticeship system within the post-secondary education system as a whole, from both a school-to-work and a skills deficit perspective?

- What kind of reforms may achieve this role?

A review of the economic literature on training and apprenticeship emphasizes what are referred to as "poaching externalities." Because training involves not only firm-specific skills but also skills that are useful to other firms, private actors do not supply a socially optimal amount of training to their employees. This occurs because training is costly, like other investments, but firms cannot be assured that they will enjoy the benefits of these investments because other firms may hire workers away (known as "poaching.") Thus, the incentives that exist for firms to profit from others' investments leads to socially sub-optimal results: firms would rather invest more in employees if they did not face the risk of poaching. Apprenticeship is an institutional means of reducing the cost to training for employers, where the apprentice offsets some of this cost by offering labour at reduced wages.

However, substantial evidence exists that apprenticeships are maintained at a net cost of employers. Scholars point out that the institutional features of national apprenticeship systems are designed to deal with this problem. Germany is the most prominent case, where a complex network of employer and labour associations regulate the supply of apprenticeships. A combination of social norms, legislative regulation and informal regulation by these economic associations both encourages firms to take on costly apprentices and alleviates the risk of poaching. Another important example is France, where a training levy forces all French firms to invest in employee training, including apprenticeship. Thus, apprenticeship institutions evolve to regulate the quality of training but also to encourage its supply, by enabling collective action by firms to train with less risk.

The Canadian apprenticeship system resembles its British and American counterparts where it is the market mechanism that determines the supply of apprenticeships rather than industry consensus mechanisms found in Northern European models. Consequently, the educational system is oriented towards general, rather than vocational education and firms have much less commitment to supplying apprenticeship opportunities. In addition, the provincial responsibility for education and apprenticeship has resulted in a multiplicity of approaches to administering apprenticeship; effectively, there is not so much a national apprenticeship *system* in Canada as much as a number of provincial apprenticeship *systems*. However, the federal government does retain a role in promoting apprenticeship at the national level and in maintaining inter-provincial standards to ensure labour mobility.

An examination of apprenticeship registration and completion trends up to 2002 highlights several dimensions of apprenticeship in Canada:

Since 1977, apprenticeship registration has grown at a respectable rate and has kept pace with other forms of post-secondary education, although it remains a small part of the post-secondary education system.

- Total registration in apprenticeship programs in 2002 was 234.5 thousand, representing 2.13 per cent of the labour force aged 15-44.

- At 2.6 per cent per year between 1997 and 2002, apprenticeship registration has grown faster than the labour force aged 15-44. Its share of post-secondary education enrollment has also increased, from 11.6 per cent in 1985 to 12.6 per cent in 1998 (the most recent year for which community college enrolment is available), although earlier data on university enrollment shows that apprenticeship's share of total post-secondary enrollment was 12.9 per cent in 1977. Strong growth in apprenticeship registration since 1998 has undoubtedly increased apprenticeship's share of post-secondary registration even further.

Apprenticeship registration growth is highly cyclical and is closely associated with the unemployment rate.

- Apprenticeship registration experienced strong growth from 1985 to 1991 (5.6 per cent per year) but then contracted sharply from 1991 to 1996 at 2.9 per cent per year. Apprenticeship registration picked up again in 1997 and has accelerated in recent years, such that it grew at 6.3 per cent per year from 1997 to 2002.

- These trends closely conform to unemployment rate trends, which strongly suggests that the decline in apprenticeship registration during the early 1990s was linked to the economic downturn and increases since 1997 are due to strong economic growth.

Apprenticeship registration varied considerably by trade groups, provinces, and gender from 1991 to 2002.

- Strong growth in apprenticeship registration has been experienced by smaller trade groups, including food and services (6.7 per cent per year from 1991 to 2002) and miscellaneous trades (7.7 per cent) as well as the largest trade group, metal fabricating trades (2.2 per cent). Other trade groups had below-average registration growth, including building construction (0.6 per cent) and electrical and electronics (0.7 per cent).

- Strong growth was experienced by Newfoundland (12.3 per cent per year between 1991 and 2002), Alberta (5.5 per cent) and Saskatchewan (5.0 per cent), while decreases occurred in Quebec (-1.5 per cent) and New Brunswick (-2.0 per cent).

While female registration grew substantially from 1991 to 2002, it became increasingly concentrated in traditional areas of apprenticeship.

- Female registration grew rapidly at 9.2 per cent per year in 1991-2002, such that its share of total registration increased from 4.3 per cent in 1991 to 9.3 per cent in 2002.

- While the proportion of females in each trade group increased, female registration as a whole became increasingly concentrated in traditional areas such as food and services trades, such that the shares of female registration in non-traditional areas such as building construction, electrical and electronics and motor vehicle and heavy equipment fell.

While apprenticeship registration has grown substantially, the number of apprentices completing their programs has not grown proportionately.

- From 1977 to 2002, apprenticeship registration increased 90.8 per cent but apprenticeship completion actually decreased, by 5.3 per cent.

- By all calculations, the ratio of apprenticeship completions to apprenticeship registrations has decreased substantially. By perhaps the most appropriate estimation, the completion rate of apprentices in 2001 was 46.9 per cent, down from 62.9 per cent in 1982 (the earliest year available).

Several factors stood out as possible determinants of these trends in registration and completions. First, employment instability was clearly a major barrier both to increased registration and to completion. Because apprenticeship requires continuous employment, economic downturn can seriously harm both the apprentice and the employer. For the apprentice, advancement in the program is suspended until they can find another employer. For the employer, the investment in training has been lost, as the apprentice will likely take a position elsewhere. In a Statistics Canada survey of apprentices in 1994-1995, 37 per cent of apprentices reported that they had experienced temporary unemployment during their apprenticeship, 24 per cent indicated that lack of work made completing the apprenticeship difficult and 41 per cent of male non-completers stated that lack of work was the principal reason for their discontinuation.

A negative perception of the trades is often cited as having a detrimental effect on registrations. A number of reports have stressed that both parents and students viewed apprenticeship as inferior to university, because they believed the trades to be second-class careers with poor wages, unstable employment and little possibility for career advancement. The secondary education system also has an academic bias, such that students are both prepared and encouraged to enter university rather than apprenticeships. Consequently, employers often lament the quality of apprenticeship candidates, which translates to less labour value to offset the cost of investment.

The relatively old age of apprentices has a great impact on completion rates. In contrast to other forms of post-secondary education, the median age of apprentices is between twenty-seven and thirty. Consequently, apprentices are more vulnerable to income interruptions because of employment instability or educational training than students in other forms of post-secondary education or the younger apprentices in other countries. First, many apprentices already have financial responsibilities; in a 1994-1995 survey, 35 per cent of female and 40 per cent of male apprentices had children. Second, apprentices generally have significant work experience that makes the prospects of non-completion less detrimental; over half of respondents in the same survey indicated that they had held more than three jobs prior to entry.

In the face of these challenges, many provincial governments have reformed their apprenticeship systems in the past ten years, including the revision of their statutory framework. In general, these reforms have made apprenticeship policy industry-driven, shifting governance from legislative regulation to sectoral committees composed of employer and labour associations. Alberta has had particular success with this formula and argues that greater employer participation has occurred because of increased flexibility and improved content in apprenticeship programs. Ontario has recently announced initiatives to give tax credits for 25 per cent of apprenticeship wages, as well as accrediting apprenticeship certification for college diplomas and vice versa. British Columbia has recently implemented a new design that greatly downsizes the administration of the apprenticeship program and modularizes existing apprenticeship programs into smaller components.

This report argues that the market for apprenticeships is principally constrained by employer demand rather than by the supply of potential apprentices. The close association between new apprenticeship registrations and the unemployment rate strongly suggests that it is not the supply of apprentices which determine new registrations but rather employer demand for apprentices. From this premise, encouraging more young people to consider apprenticeship is useful, but the increases in registration desired by policy-makers can only be realized if employers increase the number of apprentices they take on. This has been in fact the case since 1997 due to strong economic growth. Also, it is clear that the Canadian apprenticeship system is not principally an institution that facilitates school-to-work transition but rather one that re-trains workers who already possess labour market experience.

Consequently, the suggestions of ways to improve the functioning of apprenticeship systems in Canada arising from the analysis in this report are based on three main principles. First, promotion of the apprenticeship program should focus on improving the quality rather than the quantity of potential apprentices, which would increase the value of their labour to employers. Second, financial incentives should be primarily directed towards firms, rather than apprentices. Finally, strong apprenticeship sectoral committees are important in improving apprenticeship training and helping employers make investments in apprentices. These principles are embodied in the following six suggestions:

1. **The core strategy in promoting the apprenticeship system should be to increase its transparency and improve the preparation of incoming apprentices.**

    - Clearer institutional signals sent to potential apprentices about the high level of skills required would enable them to better prepare themselves before entering their apprenticeship program.

    - Providing more labour market information about expected earnings and employment opportunities would improve the match between apprentices and skill shortages and direct them towards trades with better employment stability.

2. **The apprenticeship system should be "laddered," or integrated into the post-secondary system to improve the potential advancement of apprentices and the flexibility of their credentials.**

    - A laddered apprenticeship system would draw higher quality apprentices and encourage employer investment. It would also affirm the value of apprenticeship training relative to other post-secondary education and reduce the negative image of the trades.

3. **While older apprentices should not be neglected, new programs should keep targeting young apprentices and focus on improving their quality.**

    - The large number of youth who do not pursue post-secondary education is the most likely group to provide the large number of registration sought by policy-makers.

    - In addition, younger apprentices' opportunity costs are lower, as young workers face lower earnings, higher employment instability and less financial responsibility, and are thus more likely to complete their programs than older apprentices.

4. **Financial incentives will be more effective directed towards firms than towards students.**

    - Lowering the cost of investment in apprentices will increase employer demand for apprentices.

    - Ontario's apprenticeship tax credit program, equal to 25 per cent of an apprentice's wages, is a promising example of a politically feasible means of supporting apprenticeship.

5. Sectoral committees should be strengthened and given the responsibility not only of determining program content but also of promoting apprenticeship with firms.

- Greater employer input into the content of apprenticeship programs will also improve the fit between the skills provided to apprentices and the skills demanded by employers

- An excellent example of successful apprenticeship promotion is the Construction Owners Association of Alberta policy of awarding points on contract tenders for the number of apprentices that are engaged on a project.

6. Modularization policies should retain strong incentives for full completion of the apprenticeship program

- Modularization policies have important advantages in recognizing the training of skilled labour and encouraging multiple trade certification.

- However, these policies must be designed carefully in order to ensure that incentives for deeper and broader training still exist. This is important as modularization may unintentionally encourage specialized, partly trained tradespeople.

The Apprenticeship System in Canada: Trends and Issues

I. Introduction[1]

Training, like education, is a form of investment in human capital and has long been regarded by policy-makers as essential to both competitive advantage and to the long-term well-being of workers. Recently, scholars have argued that the demands of the "knowledge economy" increasingly favour skilled labour with the current trends of rising educational attainments in the employed and strong associations between poor education and unemployment. As an institution that provide training, the apprenticeship system have been the subject of considerable policy interest.[2] Policy-makers are asking whether the system is currently fulfilling its role in training workers for apprenticeable occupations.

The apprenticeship system[3] in Canada is more popular than ever, with 234 thousand apprentices registered in 2002. While apprenticeship remains a small part of the post-secondary education system, comprising 13 per cent of post-secondary enrollment in 1998 (the most recent year for which community college registrations are available), its registrations have kept pace with those of universities and community colleges. Following a decline in registrations in the first half of the 1990s due to the recession, apprenticeship registrations picked up significantly after 1997 with stronger economic growth. Yet the system continues to be under critical examination from policy-makers as a possible answer to labour market issues facing Canada.

Evaluations of apprenticeship institutions have been motivated by two different approaches. The first is the school-to-work transition approach, which argues that the

[1] We wish to thank Industry Canada for providing financial support for this project. The authors would like to thank Richard Roy for the invitation to prepare this paper. We would also like to thank Craig Eschuk, Paul Stoll, and Wayne Roth of Human Resources and Skills Development Canada and Richard Roy, Marie-Hélène Legaré, Daniel Boothby, and Lee Gill of Industry Canada for very useful comments on the first draft of the report.

[2] On January 14, 2005 the Minister of Human Resource and Skills Development announced the establishment of a five-member apprenticeship advisory committee to consult with business, labour, and provincial and territorial government and to make recommendations on apprenticeship issues from both business and union perspectives. The news release states that the committee is tasked with collecting and synthesizing the views of workplace partners on pan-Canadian issues such as increasing the participation of business and labour in apprenticeship, and improving the interprovincial mobility of apprentices and skilled tradespeople. This reflects the government's interest in ascertaining how apprenticeship can met the current and rising demands for skilled, adaptable and mobile trades workers in Canada. The February 23, 2005 federal budget also highlighted the apprenticeship system. The budget made an additional investment of $125 million over the next three years to work with stakeholders in moving forward on a Workplace Skills Strategy where one of the objectives is the strengthening of apprenticeship systems in Canada.

[3] The key trait of apprenticeship is the formal contract between the apprentice and the employer whereby the employee agree to provide on-the-job training to the apprenticeship for a specific period of time in exchange for the apprentice's labour. See Box 1 for further details on the basics of the apprenticeship system..

apprenticeship system could improve youth transitions from initial education to working life by creating stronger links between the formal education system and the workplace. Motivated by high youth unemployment rates and other difficulties affecting youth, this perspective views apprenticeship as a means to improve the welfare of youth, particularly youth from disadvantaged groups. The second approach emphasizes the apprenticeship system's role in providing the economy with a supply of skilled workers. In Canada, this approach is tied to a national debate about whether an impending skills shortage exists with the aging of the workforce. From this perspective, reform of the apprenticeship system could both target the supply of training towards sectors that face imminent skills shortages and provide young workers with 'soft skills' required by emerging sectors and best learnt in the workplace.

Box 1 Apprenticeship Programs in Canada: The Basics

An apprenticeship program is a contract between an apprentice and an employer in which the apprentice exchanges labour for practical training in a workplace environment. The official duration varies by program, but is generally three to four years. Apprenticeship is a form of alternation education, where apprentices spend most of their time obtaining training in the workplace but also attend academic components of the apprenticeship program at training institutions. Generally, this 'academic release' period is from four to eight weeks per year.

Apprentices must find their own employers (or "sponsors") to provide the workplace portion of the training. Apprentices that have difficulty finding a sponsor may enroll in college programs that provide foundation skills for certain trades. In addition, apprentices may opt out of academic release if they challenge or pass the final examination independently. Some apprenticeship programs also have previous learning assessment and recognition (PLAR) mechanisms, such that experienced tradespeople can demonstrate their knowledge of skills and receive exemptions from academic portions of the program.

At the end of the apprenticeship program's duration, apprentices may sit their examinations for their trades qualification (TQ). This examination includes a written component, but does not always include an assessment of practical abilities. A trades qualification is not compulsory for employment in many trades but is in others, although this designation varies by province (see Main Table 30).

A number of reports evaluating the Canadian apprenticeship system have been written over the past ten years, in addition to the work on provincial reforms. The Canadian Labour Market and Productivity Centre (1990), the Economic Council of Canada (1992), the Canadian Labour Force Development Board (1997), the Centre for the Study of Living Standards (1999), the Government of Canada (2002) and the Canadian Apprenticeship Forum (2004) have all examined specific areas of the apprenticeship system. [4] This report provides a quantitative look at the current state of the Canadian apprenticeship system, in order to evaluate what role it could play with respect to the two approaches outlined above. Several characteristics make it stand out from previous studies. First, it integrates the disparate and fragmented literature on apprenticeship, as few works have provided a comprehensive look at apprenticeship in

[4] Indeed, the issue of industrial training and apprenticeship has been on the public agenda for nearly a century, if not longer. For example, the four volume 1913 Royal Commission on Industrial Training and Technical Education provides a fascinating detailed portrait of apprenticeship training in Canada, the United States and Europe at the turn of the century. Many of the issues related to apprenticeship training discussed in 1913 are still pertinent today.

Canada. Second, it presents the most recent statistics available, as well as looking at developments in provincial systems that have occurred recently. Third, it examines international experiences in apprenticeship policy for best-practices that could be applied to Canada. Finally, it draws on the scholarly literature on apprenticeship to provide both practical and theoretical insights into the Canadian system.

The organization of the report is as follows. The second section examines the different approaches from which policy-makers have evaluated the apprenticeship system. The third section reviews the scholarly literature on training and apprenticeship, with a particular focus on the employer's decision to take on apprentices. The fourth section examines apprenticeship systems in comparative perspective, particularly in Germany, France, Great Britain, Ireland, United States and Australia. The fifth section looks at trends in registration and completions in Canada, particularly across provinces, trades and by gender. The sixth section examines possible determinants of both the levels and recent trends in registration and completions, drawing on both qualitative and quantitative survey evidence drawn from numerous reports. The seventh section examines recent reforms in the apprenticeship system, both at the federal level and at the provincial level. The eighth section discusses the issues raised in the beginning of the report in depth, drawing from the evidence presented. The ninth and final section concludes with a number of suggestions for improving the functioning of the apprenticeship system in Canada, based on the analysis presented in the previous sections.

II. Approaches to the Evaluation of the Apprenticeship System

Policy-makers have expressed interest in the apprenticeship system in recent years, particularly as an institution to deal with challenges associated with the changing nature of the labour market. Debate has focused on whether the apprenticeship system could be a viable solution to certain potential labour market problems, and what reforms would be required to shift the apprenticeship system towards these new roles envisioned by policy-makers. This section will examine the principal two sets of issues that have motivated discussion: the school-to-work transition agenda and the skills deficit agenda.

a) School-to-Work Transition Approach

Many scholars argue that recent shifts in the nature of industrialized economies have made the transition from initial education to working life increasingly difficult for youth (OECD, 1999; Taylor, 2003). The increasing complexity of the labour market includes:

> the shift from goods-producing to service-sector work; a steady increase in female labour force participation; growth in the proportion of non-standard work forms; an increase in the use of computer based technologies in the workplace; the gradual upskilling of work, and increasing polarization between "good" and "bad" jobs in terms of security, working conditions, and pay. (Taylor, 2003: 1)

Canada has been no exception to these trends. Youth well-being has been threatened by high youth unemployment rates, over 160 per cent of adult rates for most of the 1990s, particularly after the recession in the early 1990s and the subsequent "jobless recovery" (Marquart, 1998: 2). In addition, youth are increasingly engaged in non-standard (e.g. part-time) work, often in low-paid clerical, sales and service occupations (Taylor, 2003). Disadvantaged groups face even more difficult transitions. In 1991, first nations youth faced a 25 per cent unemployment rate, followed by disabled youth (21 per cent), and youth from visible minorities (19 per cent), much greater than the total youth unemployment rate of 16 per cent (OECD, 1999: 4).

Motivated by these trends in youth welfare, the school-to-work agenda engages many long-standing issues concerning schooling, employment and training with respect to youth. In particular, the value of vocational education has been re-examined, particularly as to whether certain labour market institutions are associated with better school-to-work transitions (Ryan, 2001). Clearly, the apprenticeship system is a particularly important labour market institution in this respect, particularly in Northern European countries such as Germany.

In Canada, efforts at improving school-to-work transitions have been made at the provincial level with programs that attempt to integrate the apprenticeship system into the secondary school system. This is motivated by policy-makers'concerns about the "forgotten half" or the group of youth who do not pursue post-secondary education and who are often inadequately prepared for the workplace:

> According to the 1995 follow-up study to the 1991 school-leavers survey (Frank, 1996), 55 per cent of the cohort of twenty-four-year-olds had either graduated from a post-secondary program or were still post-secondary students. That leaves 45 per cent of young people who either found a job without any further education or who were 'floundering,' combining spells of unstructured job experience, post-secondary education or labour-market training, and unemployment (Schuetze, 2003: 69).

Scholars often point out that an academic bias exists in secondary education, which results in a strong mismatch between students' expectations for university education and the availability of such training (Taylor, 2003). According to the 1995 survey on school-leavers, 11 per cent of those surveyed had not completed high school and 17 per cent had not pursued any education after completion of high school. For those 28 per cent who cannot or choose not to enter university or college, there are no clearly designed pathways to the post-secondary education needed to succeed in the labour market (Frank 1996). Thus, a more effective apprenticeship program could improve school-to-work transitions by providing educational opportunities for high school leavers that do not pursue other forms of post-secondary education and also for students in other forms of post-secondary education who may find better skill fits in the trades.

School-to-work themes have also been addressed within a broad effort to integrate disadvantaged groups into the apprenticeship system, particularly women, first nations, visible minorities and persons with disabilities (Canadian Apprenticeship Forum (CAF,, 2004:42). Apprenticeship programs are an important route for entry into the traditional

trades, as they offer attractive expected earnings relative to other occupations that do not require academic post-secondary education. Concern regarding discrimination against these disadvantaged groups has been addressed in several reports (CAF, 2004:25). However, while these concerns have many similarities to mainstream school-to-work literature, they are not limited to youth but also see apprenticeship as a means to improve the welfare of disadvantaged adults as well.

b) Skills Deficit Approach

Public policy debate on the role apprenticeship system in Canada has been primarily motivated by concern about an impending skills shortage. *Knowledge Matters*, a report released by Human Resources Development Canada in February 2002, is the primary source detailing the approach of federal policy-makers to these problems. It clearly articulates the three premises of this approach:

> First, the knowledge-based economy means an ever-increasing demand for a well-educated and skilled workforce in all parts of the economy and in all parts of the country… Second, there is a looming demographic crunch that means our future labour supply will be inadequate to meet the demands of the economy… Third, our learning system must be strengthened if we are to meet the skills and labour force demands of the next decades (Government of Canada, 2002).

The Report of the Expert Panel on Skills released by the federal government in 2000 found no existing *technical* skills shortages for the five industries examined.[5] It did, however, find shortages of technical skills combined with *essential skills* (communications and teamwork) and *management skills* (cost control and budgeting) (Government of Canada, 2000). However, it found that the "skills development system" was under stress, where the future demands of the demographic crunch were not being met by commensurate enrollment in post-secondary education. In its recommended actions, the Expert Panel on Skills advocated enhancing the apprenticeship system, as well as other forms of alternation education and improved school-to-work transitions.

There is particular concern about the demographic challenge in the skilled trades, for which apprenticeship remains the principal post-secondary education pathway. In Alberta, for example, the mean and modal age of tradespeople is 41 and the median age is 42; thus, over half of the workforce in the skilled trades in Alberta was over 42 in 2003-2004 (AITB, 2004: 58).

Internationally, the apprenticeship system has been criticized for not adapting effectively to the "new economy" described above, both in terms of the content of its training provision and the sectors to which it supplies training. In addition, the institutional structures of the systems themselves have been criticized as too inflexible in the face of these challenges (Bertrand, 1998). For example, Lehmann (2000: 299) notes that the world-class German system has been criticized within Germany for "its strong

[5] The five "strategic industry sectors" were: aerospace, automotive, biotechnologies, environmental technologies, and information and communications technologies.

channeling into different career tracks that precludes cross-track upward mobility into higher skill and wage strata [that] is increasingly at odds with the changing aspirations of young people in a more open and fluid society." Other scholars criticize the apprenticeship system as an inappropriate medium for transmitting the essential skills needed in an increasingly fluid economy. Lehmann also notes that apprenticeship programs have been slow in developing programs to address emerging sectors such as information technology, health care, and other service and knowledge industries, which have been successfully claimed by university programs.

In Canada, the apprenticeship system has been primarily criticized not for failing to adapt to the training demands of new labour markets, but for failing to maintain an adequate supply of training for traditional ones. Although registrations have increased significantly in the past few years, some researchers believe that they may still not be sufficient to meet the labour market demands of the coming demographic crunch. Part of the problem is the general failure to promote the trades as an attractive career path given the negative image of the trades still prevails. Furthermore, timely completion of apprenticeship programs is worse than in other forms of post-secondary education, further undermining the supply of certified journeypersons.

c) Differences and Common Issues in the Two Approaches

At first glance, the school-to-work transition and skills deficit appear to be perfectly consistent. After all, increased registration and completion rates in the apprenticeship system benefit both workers who obtain trades qualifications and increases the supply of skilled labour for the economy. However, they are different in the priorities they hold for the apprenticeship system. The school-to-work transition approach is concerned with worker welfare and is primarily concerned with the distribution of training to youth and disadvantaged groups. In addition, it holds that apprenticeship training is intrinsically important as an educational alternative for students without an affinity for classroom learning. The skills deficit approach is concerned with the apprenticeship system's ability to respond to the demands of the labour market, particularly its responsiveness to emerging sectors. While apprenticeship is a potentially useful institution from a skills perspective, it does not place the same intrinsic value on the form of education it provides and views it as substitutable with other post-secondary options. Nevertheless, several common questions stand out from both approaches, which will be addressed in the paper:

- What factors affect employer demand for apprentices?
- What factors affect students' decisions to enter into apprenticeship programs?
- What factors account for the demographic inequality (based on gender and ethnicity) in apprenticeship registration?
- What is the principal constraint on apprenticeship registration?

- What accounts for the low apprenciceship completion rates relative to other forms of post-secondary education?

- Given the above constraints, what is the most appropriate role for the apprenticeship system within the post-secondary education system as a whole, from both a school-to-work and a skills deficit perspective?

- What kind of reforms may achieve this role?

III. Theoretical Perspectives on Apprenticeship

Theoretical perspectives on apprenticeship have been developed by researchers in the education field, who discuss the nature of apprenticeship as a form of learning; and by researchers in the economics field, who examine the dynamics of apprenticeship provision in training markets. This section surveys the theoretical literature on apprenticeship, focusing on the provision of apprenticeships, or why employers and apprentices choose to form apprenticeship contracts.

The literature on the economics of apprenticeship can be divided into two streams or approaches, focusing on either the demand for or supply of apprentices. Demand-side approaches start from concerns about skills deficits, or whether firms under-invest in training due to certain features of the labour market. Theoretically, this leads to the question of what motivates firms to provide apprenticeships, particularly since empirical evidence suggests that firms face net costs in doing so. Supply-side approaches are located in the broader literature on school-to-work transitions and investigate what impact apprenticeships have on youth employment and wages. Clearly, apprenticeship outcomes are important in understanding what motivates individuals to pursue apprenticeships, but must be understood relative to other educational alternatives, particularly university education.

a) Apprenticeship as a Form of Learning

The concerns discussed above about the rapidly changing nature of the economy have given rise to concern among educators that traditional forms of learning may not adequately prepare graduates for working life. In Canada, employers have complained that much of the knowledge and skills acquired in the education system is inadequate or irrelevant to the workplace (Schuetze and Sweet, 2003). 'Alternation education' combines experiential and cognitive forms of learning by situating learning both in the classroom and the workplace, and is an increasingly popular solution to these issues. This approach is advocated on the following grounds:

> Alternation approaches assume that the context in which knowledge and skills are applied is critical in their acquisition. The principle of alternation emphasizes the notion of "learning by doing," but in conjunction with and informed by a theoretical understanding of the problem at hand. Alternation education thus combines practical skills development

> with the acquisition of more formally organized, theoretical knowledge (Schuetze and Sweet, 2003: 5).

Alternation education has been supported as a superior form of learning with respect to three issues. First, it is supported as an alternative education for remedial students, who are not academically motivated or gifted and benefit from the relevance and practicality of alternation education. Second, it is advocated as a means of familiarizing successful students with the demands of the workplace, both to contextualize learning but also to impart 'soft skills' best learnt on the job. This is the primary objective of cooperative education programs at the university level and career preparation at the secondary level. Finally, alternation education is argued to be simply the most effective means of acquiring systematic training in certain fields, particularly those that require 'tacit' knowledge "where know-how is accorded a greater place than formal knowledge, not because the craftsperson can do without formal knowledge but because the craft of the baker or the goldsmith cannot be learned solely from books" (Merle, 1994). Apprenticeship in crafts occupations is a clear example of this case for alternation education, but it also includes teachers, doctors and lawyers who acquire much of their training in practical settings through mentoring.

Educational perspectives on alternation also argue that alternation education is valuable as a 'structured training experience' not only for skills acquisition but also because it socializes participants with a professional identity. Scholars have argued that human capital perspectives on skill formation ignore the social context in which individuals choose to invest in training (Schuetze and Sweet, 2003; Ashton, 1999). Consequently, alternation education not only provides training but promotes social relationships and a professional identity which encourages individuals to continue to invest in training. Conversely, when training is offered in a social context not conducive to the creation of professional identity and social relationships (e.g. in a strictly academic setting), students may choose not to further invest in training.

From the perspective of education scholarship, apprenticeship is not only an institution that provides training for specific occupations, but one that provides a specific *form* of education that is both more effective in skill formation and more accessible by students who may not favour academic forms of learning. In addition, its association with the workplace endows participants with soft skills that are difficult to acquire in classroom settings but are demanded in the 'knowledge economy.' Finally, experience in the workplace both contextualizes learning and gives participants a sense of the kind of skills demanded, but also socializes participants with an identity which encourages them to invest in training.

b) Perspectives of the Employer

i) Microeconomic Motives

The employer's perspective is especially important as apprenticeship is effectively education embedded in employment, such that a willing employer is a necessary and often constraining condition for apprenticeships. The literature on the

provision of training departs from Becker's (1964) classic work on human capital and the market allocation of training. Becker distinguished between the acquisition of general skills, which were applicable to all firms, and specific skills, which were applicable only to the training firm. Based on this distinction, he argued that an efficient market provision of training would occur when firms would bear the cost of specific-skill training and the trainee would bear the costs of general training, subsequently reaping the benefits of their increased productivity in a perfectly competitive market. Firms would be unwilling to invest in any general training because they faced the threat of employee transfer to another firm, such that they would not be able to realize any returns on investment – the 'poaching' externality. Given the simplicity of this analysis, the results hold under only very restrictive conditions that may not apply in the real world, including perfectly functioning credit markets, the assumption that skilled workers produce no positive externalities and crucially, that skills would fall only into Becker's absolute categories of 'general' and 'specific' (Greenhalgh, 2002).

Subsequent literature on training has challenged Becker's analysis on a number of levels. Empirically, studies suggest that training and apprenticeship are costly, where the returns to employers in increased productivity do not offset the resources of time and money put into training. Consequently, explanations for the continued provision of apprenticeships hinge on non-competitive labour markets, where firms have a degree of monopsony power and set wages below the marginal productivity of workers as a means of recouping training costs (Acemoglu and Pischke, 1999a). Thus, apprenticeships hinge on a compressed wage structure, where the return on human capital is less than that in a competitive market. Consensus diverges on the source of firms' monopsony power, presenting a multiplicity of potential explanations.

For example, Acemoglu and Pischke (1999b) focus on adverse selection, where employees are differentiated based on both ability and training, and this knowledge is available to the training firm but not poaching firms. As firms' choices for layoffs are based on productivity, high ability workers who benefit more from training cannot both quit and signal to employers their high quality: they are lumped into a pool of workers who are presumed to be of lower productivity. Consequently, they can be retained at compressed wages due to their inability to signal their quality effectively. Similarly, Chang and Wang (1996) show that if prospective employers cannot assess the amount of human capital that has been accumulated through training, firms will be able to retain apprentices at lower wages.

Becker's definitions of general and specific training have also been challenged on the grounds that most skills are industry-specific rather than firm specific. Stevens (1994a, 1994b) develops a model based on the concept of transferable skills, which apply to a subset of firms rather than all or simply one, which differentiate both employees and firms based on their respective supply and demand of skill sets. Similar to the competitive market, a poaching externality exists for transferable skills such that firms will under-invest in transferable skills. Additionally, firms will have an investment bias towards less transferable skills, as they limit the mobility of workers and thus the ability of other firms to benefit from their investment (Stevens, 1994b). Clearly, training under

these conditions faces market failures, as the benefits of transferable skills to the firm and the employee are less than the total social benefits, which include other firms. Greenhalgh (2002) contends that the wide externalities of skills are under-appreciated, as human capital plays an important role in macroeconomic performance according to theories of endogenous growth, competitive advantage and strategic complementarity.

ii) Collective Action Motives

While economic theory sheds light on how microeconomic motives may permit apprenticeships under conditions of net cost, collective action approaches show how institutions may explain the variance of apprenticeships across industry and countries. Johansen (2002) argues that transferable training should be viewed as a collective or impure public good, in which it is rivalrous but non-excludable due to employee mobility.[6] Thus, poaching externalities pose two collective action problems, where employers would benefit from cooperation in both investing in more training and investing in more transferable training yet face costly threats of free-riding. Johansen points out that market solutions are likely to be limited, as they will address short-term skill shortages if functioning properly, but few individual incentives exist for firms to address long-term skill deficiencies. He argues that limited numbers of firms and powerful superordinate organizations (e.g. a state agency or an industrial board) are needed to enable collective action on the part of employers.

Despite the disconnect between the microeconomic and collective action literature, Ryan (2001) points out that the explanations are in fact complementary. There are likely multiple sources of market imperfection at work, including information asymmetries and matching frictions, but transferable skill differentiation would make a market imperfect by definition. Indeed, the work of Stevens (1994a) dovetails with that of Johansen (2002) and ultimately leads to similar conclusions, where Stevens argues that smaller numbers of firms lead to greater monopsony power and thus greater incentives for training. In turn, high concentrations of employees per firm reduce monitoring costs by superordinate organizations and decrease the probability of defections. Yet the technological sources of monopsony are unlikely to explain the variance of apprenticeship across countries (Ryan, 2001). Indeed, the success of apprenticeship systems in continental Europe is institutionally embedded in strong employers' associations and labour unions (as in the case of Germany) or with much greater degrees of state interventions (as in France). Ryan (2000) notes, however, that the Irish experience suggests that apprenticeship reform can occur with limited institutional development and without the national culture requisites deemed necessary by some.

Moreover, both literatures provide explanations about the variance of apprenticeship programs across industries. As noted above, both Stevens and Johansen argue that industries featuring high degrees of concentration are likely to invest in

[6] By this, Johnson means that any training which could be applied in another workplace (or not exclusively useful to one employer) is desired by many employers, but cannot be fully protected like other assets that are a firm's property. This is because an employee cannot be effectively bonded or indentured to a firm outside of long-term contracts and can thus simply move to another firm that offers a higher wage.

employee training. Johansen notes that the exception to this proposition is oligopolistic industries in which firms compete in a product market, where training may be regarded as a strategic means of differentiation. This might explain the slow spread of apprenticeships to newer service industries such as insurance or banking, and suggests that collective action supporting general training may be in tension with pressures for firms to carve out a niche in accordance with the 'New Economy' (Crouch, 1997).

In short, the collective action literature argues that labour market institutions such as apprenticeship systems arise in an effort to encourage investment in training. They accomplish this by structuring the incentives offered to employers to train, principally by protecting them from the poaching externalities inherent in such activity. Additionally, systems of apprenticeships vary considerably in the mechanisms they use to solve these collective action problems, depending on the characteristics of the labour market. The theoretical literature on collective action is useful in examining these responses, as it provides insight into the conditions under which these mechanisms will arise and be most successful.

c) Perspectives of the Employee

While incentives for firms to provide apprenticeships are a necessary condition for success, it is equally true that incentives must also exist for young people to commit to apprenticeships. A substantial school-to-work transition literature examines whether vocational education is economically beneficial to the trainee, situating it within issues surrounding schooling, employment and training. The deterioration of youth employment options across industrialized states in the past two decades came as a surprise, given "falling population shares, rising educational achievements and increases in the employment share of youth-intensive sectors" (Ryan, 2001). Scholars have pointed to an increasing skills bias in employment as an explanation, where production technologies have increasingly required skilled over unskilled labour. Yet a technological explanation must account for the variance of these results across countries, where deteriorating labour market trends for youth have been significant in the UK, France and the United States but less so in Germany, Japan and the Netherlands.

Ryan argues that national school-to-work institutions can explain these differences, where the latter countries have systems that promote vocational education, work experience, and school-employer linkages that facilitate the transition of youth to employment. Studies on vocational curricula suggest that vocational education is only selectively associated with higher pay, but strongly associated with lower unemployment (Payne, 1995). At the same time, the declining registration share of vocational education suggests that students increasingly favour general education, with its benefit of higher education options. As a variant on vocational education, apprenticeship features many of the same dynamics in European cases. It is associated with superior early labour market performance in youth, but more in terms of employment than in terms of compensation (Ryan, 2001).

An important question is what conditions must hold for young people to make large investments in apprenticeship training, which often yield lower returns and occupational mobility than university education. Crouch (1997) points out that general education offers more prestige and flexibility for the successful, but less advancement and fewer skills for the unsuccessful. Uncertainty about one's ability to succeed can yield a difficult choice in which option values may bias individuals in favour of general education. Apart from personal aptitude, limited access to capital may motivate the choice of apprenticeship over university education, as apprentices have the benefit of wages (Malcomson, Maw and McCormick, 2003).

Another issue related to the perspective of employees is that the risks associated with apprenticeship training may be greater than those associated with more general types of training or education. Life-time income prospects may well be more risky (higher variance) for persons with specific rather than general skills. This may be particularly the case in apprentice trades as uncertain technological developments and globalization can potentially destroy the marketability of certain skills. This reality may be a factor in employee decisions related to participation in apprenticeship programs.

d) Perspective of Government

i) Credit Constraints

Like all investments in education, government can encourage worker registration in apprenticeship programs by offsetting the credit market imperfections inherent in human capital investment. Potential apprentices are likely to be credit-constrained as human capital cannot be used as collateral in investment like other forms of capital (although less so than other forms of post-secondary education that do not provide wages.) Consequently, apprentices may find themselves unable to finance the costs of training, which include the expenses of classroom sessions and tools, especially older apprentices with family responsibilities. This is particularly true in the Canadian context, as apprentices are sometimes unable to qualify for student loans, unlike their university and community college counterparts. If government could offer or guarantee low interest loans, the credit constraints facing potential apprentices would be alleviated (Stevens, 1999).

The difficulty with government-sponsored credit is that it leaves the prospective apprentice bearing the risk that the apprenticeship will not result in sufficient future income. Even for apprentices who pass their certification, the return to investment is uncertain due to instability of demand for specific skills in labour. Sectors that are prone to employment instability may find that individual risk-aversion is a significant deterrent for individuals who might otherwise use loans to finance their apprenticeship. Direct subsidies to apprenticeship programs alleviate this difficulty, shifting the risk to the government.

ii) Information Failures

Another solution to the perception of risk in apprenticeships is to increase the transparency of apprenticeship outcomes, or "how well young people can see through the system to plot a course from where they are in the present to a distant future goal" (Hamilton and Hurrelman, 1994: 331). Lehmann (2000) argues that the German apprenticeship system is an example of superior transparency, where the close connections between education, apprenticeships and employment send clear signals about the requisites and prospects for future employment. In contrast, the connections between education and employment are much more loose in the Canadian system, particularly in providing information about apprenticeships. This hinders a clear picture of benefits from apprenticeships for potential recruits.

iii) Regulation of Training Quality

The government also has a crucial role to play in the regulation of training quality. Without clear standards for training, apprentices face uncertainty about the quality of their training and employers have opportunities to exploit 'cheap labour' by providing poor training. Malcomsen, Maw and McCormick (2003) adds that the regulation of the length of apprenticeships has been important historically, as it determines the intensity at which training is provided relative to labour. Regulation also concerns collective action between firms, where superordinate organizations can alleviate firms' concerns about free-riders who provide either firm-specific training or underprovide training (Johansen, 2001). It is also important to ensure the transferability of skills and remove information asymmetries in employee mobility, such that potential employers have sufficient information to judge the skills of a potential worker (Acemoglu and Pishke, 1999b).

iv) Subsidizing Employer Costs

The French system of tax levies has been considered by policy-makers in the UK as both a means of financing training subsidies and forcing collective action to increase general training by employers. Stevens (2001) argues that training levies based on the profits of the firm will achieve both of these objectives, whereas training levies based on wage bills will reduce credit difficulties but not remove poaching externalities. In a comparative study between levy policies in Britain and France, Greenhalgh (2002) argues that training levies succeeded in greatly increasing firm expenditure on training, although the benefits of these expenditures have not been equitably distributed.

IV. National Systems of Apprenticeships

An important source of information about apprenticeship reform is the experience of other countries, which have found very different roles for apprenticeship in their labour markets and educational systems. Given the theoretical perspectives established above, this section will compare different systems of apprenticeship in order to explore the institutional solutions to training market failures employed by other states. As this

section will illustrate, national systems of apprenticeship vary greatly based on the degree of integration into the educational system, the mechanisms of regulation, forms of government support for apprenticeship, and industry commitment to the system. The implications of these lessons will also be discussed at the end of the section.

a) Germany

Policy-makers have increasingly turned towards the German system of apprenticeship as a model, as it is perhaps "the most comprehensive and detailed regulatory system for apprenticeship training in the Western world" (Raggart, 1998). It has been associated with high levels of skilled labour, superior competitive advantage and even the moderation of trends towards rising wage inequality (Acemoglu and Pishke, 1999b). At the same time, debate has arisen in Germany about the merits of vocational education, particularly whether it is "outdated and archaic, narrowly skill-based and more concerned with antiquated virtues… than with the more broadly defined demands of new workplaces" (Lehmann, 2000: 231).

The German system of vocational training is based on its streamed system of general education, where secondary education is differentiated at the age of ten into three educational tracks that prepare students for trades, commerce and university respectively. The German apprenticeship system is the largest in the world, both in absolute and relative terms. A total of 1.6 million apprentices were registered in 2002, 4.7 per cent of the labour force aged 15-54 (Summary Table 1). In 1997, 46 per cent of 18 year old males and 36 per cent of 18 year old females participated in apprenticeships, evidence of both the widespread participation and the striking amount of gender equity relative to other systems (Ryan, 2000: 47). The program length of the German system varies based on occupation, where the vast majority of the programs are between three years and four years (72 per cent) and a limited number a full four years (22 per cent) (Steedman, 2001:4).

Summary Table 1: International Apprenticeship Systems

		Total Registrations as a Percentage of (%)				
	1	2	3	4	5	
	Apprenticeship Registrations (thous.)	Population, 15-24	Population, 15-54	Labour Force 15-24	Labour Force 15-54	Date
A Germany	1,622	18.0	3.7	36.2	4.7	2002
E Australia	407	14.8	3.6	21.9	4.6	2003
G Canada	234	5.7	1.3	8.6	1.6	2002
B France	363	4.8	1.1	15.8	1.5	2002
F Ireland	25	3.8	1.1	7.6	1.5	2002
C U.K.	224	3.4	0.7	5.0	0.9	2002
D U.S.	489	1.4	0.3	2.2	0.4	2003

Source: Main Table 29

The integration of general and vocational education is achieved through the Germanic "dual system," which has been the model for other continental European systems such as Austria and Switzerland. The term "dual system" denotes the location of education at both the workplace and in vocational schools. The majority of the education

is provided at the firm through on-the-job training. Apprentices attend vocational school part-time, either for one or two days a week or for an extended period, known as block release. Approximately a third of off-the-job training is devoted to general instruction in subjects such as language and mathematics (Ryan, 2000: 50). The curriculum is largely driven by the firm training, upon which both apprentices and employers place the most importance (Lehmann, 2000).

In all the systems of national apprenticeship reviewed here, the responsibility for finding an employer willing to provide the apprenticeship training rests with the aspiring apprentice. However, the German system places a great deal of resources into structuring this search to render it both coherent and transparent. The search process is encouraged and integrated into the last two years of secondary school education, where classroom time and resources are spent disseminating information about potential apprenticeships. The Chamber of Commerce also publishes the list of potential apprenticeships offered by employers. The average entering age into apprenticeships is 18 years, a full year older than the end of secondary school at 17 years. Unsuccessful applicants are encouraged to attend pre-apprenticeship vocational colleges, where skills are consolidated; in 1998, 10 per cent of entering apprentices had participated in vocational colleges (Steedman, 2001: 12-13).

Significant incentives exist for young people to participate in apprenticeships. The labour market for many occupations is closed by restriction to workers under 18, leaving employment options restricted to unskilled labour. The long length and high attrition rates in German university programs also deter many prospective university students, directing many of them towards apprenticeships. Steedman (2001: 24) argues that the greatest incentives are the "social and quasi-institutionalized recognition accorded to the apprenticeship qualification". Collective agreements effectively restrict most entry into skilled trades to apprentices and ensure that the semi-skilled/skilled wage differential is attractive enough to promote apprenticeship. In addition, considerable social status is associated with a completed apprenticeship, which constitutes a professional identity, in stark contrast to Canadian attitudes towards trades (Steedman, 2001).

The structure of incentives for both employers and apprentices is embedded in the institutionalization of 'social partnership' that characterizes the German state's highly complex involvement in the economy. Scholars argue that it is this constellation of institutions that alleviates the difficulties associated with the free market approach to training provision described in the previous section, namely: "employer free-riding on the training efforts of others, low quality in work-based training, undertraining in the face of high payroll costs for apprentices, and low educational content" (Ryan, 2000: 45). Apprenticeship institutions are supported by statute law, the Vocational Training Act of 1969, which is administered by the Ministry of Education and delegated to the national training authority, the Federal Institute for Vocational Training (BIBB). The principle of social partnership is realized by the BIBB Central Board, which advises the BIBB and features the mandatory representation of employers, employees and teachers.

The statutory framework of the system fulfills two broad functions: integrating apprenticeship into the education system and regulating work-place training. Like Canada, Germany has a federal system in which education is the responsibility of the provinces (*Lander)* that administer the off-the-job education. The strength of apprenticeship institutions, particularly their grounding in law, has permitted significant integration into the general education system, as evidenced by the search process described above. With respect to work-place training, the BIBB has the responsibility of regulating the training regulation for occupations, while district Chambers enforce those regulations. The Vocational Training Act provides regulating bodies with the responsibility of "the assessment and certification of apprentices at the end of their programmes, the inspection of employers' training programmes and the withdrawal of permission to recruit apprentices from employers who offer programs" (Ryan, 2000: 55).

The system is financed principally by employers, which contrasts with many other European systems where the government offers wage subsidies. The financing of the apprenticeship system is strictly divided into public and private responsibilities. Off-the-job training costs are entirely funded publicly, at no cost to the participants, while on-the-job training is the responsibility of the private sector. Apprentices are legally considered trainees with a lower wage commensurate with that status. Thus, firms are in effect compensated for their training with this legal regulation of apprentice payroll costs (Ryan, 2000). In addition to this institutional arrangement, unions are vital in structuring the benefits for employer participation. Scholars have argued that the significant power of German unions in constraining management flexibility has provided incentives for investment in employee training (Rieble-Aubourg, 1996). Unions are also instrumental in lowering intra-industry wage differentials and using informal sanctions in collective bargaining to reduce poaching externalities (Lehmann, 2000).

Thus, the German system is highly institutionalized, where powerful government bodies delegate their significant regulatory responsibilities to non-government sector associations. The functioning of these associations is dependent on their inclusive structure and the participation of both employers' associations and unions in managing the system. In turn, civil society's regulation of workplace training is integrated into education and reinforced by law. However, the system has come under stress in recent years due to poor employment prospects; the result has been substantial shortages of apprenticeships[7] and consequently a lack of access to the labour market for youth. Recent proposals for government intervention, which would force firms to meet a certain quota of apprentices based on their payroll, have met considerable opposition from business (O'Brien, 2004).

[7] A recent study of the Swiss apprenticeship system by Wolter, Muhlemann and Schweri (2003) found that most apprentices offset the costs of their training during their apprenticeship. Given the similarities between the German and Swiss apprenticeship systems, this might suggest that labour market deregulation of the apprenticeship system, which would reduce wages for apprentices and create openings for apprentices, might not have significant negative repercussions on the system.

b) France

In contrast to the civil society-led system of regulation in Germany, the French apprenticeship system relies upon state intervention. The French system is the foremost example of the use of training levies as a means of subsidizing apprenticeship and alleviating poaching externalities. Reforms during the previous decade have blurred previously distinct areas of privately and publicly provided training, such that apprenticeship is now partially integrated into a broad system of vocational education.

The French apprenticeship system is not nearly as extensive as in Germany, with 363 thousand apprentices in 2002, or 1.5 per cent of the labour force aged 15-54 (Summary Table 1). Secondary education in France is likewise not nearly as integrated with the apprenticeship system as that of Germany, where career counseling is not particularly extensive in its treatment of the trades (Steedman, 2001). Previously, apprenticeship and public education were strictly separate, where apprenticeship was relegated to the private sector and perceived as a second-best option for education. Recent reforms integrating apprenticeships with post-secondary qualifications have enhanced the status of apprenticeships, reducing this division and greatly encouraging apprenticeship registration. The duration of apprenticeships varies according to the level of qualification, where skilled trade designations are generally four years in length (Steedman, 2001: 5). The recent linkage of apprenticeship programs with higher level qualifications has greatly increased their attractiveness, as the career options available to certified apprentices have greatly expanded (Greenhalgh, 1999). Bonnal, Mendes and Sofer (2002) conclude that workers with apprenticeship certificates face superior employment prospects than participants of vocational schools and that apprenticeship appears to be a profitable form of human capital investment.

The French solution to the underprovision of training is a levy, where firms must devote 1.5 per cent of their payroll value to training or be taxed the difference. Dresser and Rogers (1999) describe this as the "play or pay" strategy, where the state structures the levy such that firms will prefer to "play," providing their own training which includes but is not exclusive to apprenticeship. This addresses capital market failures through subsidization but also poaching externalities, where the levy alleviates the possibilities for employers free-riding the training of others. The French levy also structures the type of training upon which firms must spend, where the levy is comprised of 0.9 per cent on universal training, 0.4 per cent to alternating training through a contribution to a national training organization (principally apprenticeship) and 0.2 per cent on individual training. The universal training may either be provided in-house or contracted out to a massive industry of certified training organizations. The alternating training levy is directed to the Organisme Mutualisateur de l'Alternance (OMA), which funds vocational education targeted at the youth labour market (Greenhalgh, 1999: 101).

The firms' levies are contributed to mutual funds, organized into Organismes Partaires Collecteurs Agréés (OPCAs) which operate at the sectoral level. Featuring representation by workers and employers, these sectoral collector organizations decide training priorities with the consultation of government ministries. Firms and workers may

apply for subsidized training or the reimbursement of training that occurs (Greenhalgh, 1999). The result is a significant investment in worker training: in 1994, spending on vocational education was at 1.81 percent of GDP, 59 percent of which was subsidized by the state (Greenhalgh, 1999). The cost of training to individuals is largely financed by firms through the training levy, where individuals pay no explicit cost for training and pay little in terms of foregone earnings, as individual leave for training is protected by law (Greenhalgh, 1999: 107).

c) Great Britain

The most sustained policy discussions regarding apprenticeship reform have occurred in Great Britain, where a market-driven system of training provision has dominated for over twenty years. The institutional characteristics of apprenticeship in the UK are much more similar to Canada and the United States than to Germany, with apprenticeship being of limited scope and driven principally by firms. The UK system remains diffuse, where the Modern Apprenticeship system (MA) accounted for 224 thousand apprentices in 2002, 0.9 per cent of the labour force aged 15-54, not including additional apprentices in the National Vocational Qualification apprenticeships (NVQ) (Summary Table 1). The small scale of apprenticeship persists even though it has expanded beyond the trades occupations into service sectors. Indeed, these non-traditional sectors comprise a large share of registrations, particularly business administration (14.2 per cent), retailing (9.9 per cent), hospitality (7.4 per cent) and health and social care (5.6 per cent) (NCVER, 2001: 36).

A major difference between the continental and UK apprenticeship systems is the content of training, where continental systems regulate quality through both the apprenticeship process and its assessment, whereas in the UK, regulation is less stringent and focuses solely on outcomes. National Training Organizations (NTOs) have assembled sectoral frameworks by which to evaluate skills according to the National Vocational Qualification (NVQ). However, the NVQ assessment does not regulate the training process and thus there is no regulated length to training. Certain NTOs require off-the-job training curricula as a condition for firm subsidization, and most apprentices receive off-the-job training through their participation, but this varies according to the sectoral framework. However, off-the-job training is not necessarily integrated into the national education system, as many firms provide it in-house (Ryan, 2000: 53-54).

Apprenticeship is assessed according to NVQ standards, which are competency-based rather than knowledge-based. Although this allows the *de facto* accreditation from other sources of education, the outcome is often the neglect of underpinning technical knowledge and certainly of general education. Thus, the training acquired from apprenticeships is employer-dominated, skill-based knowledge rather than educationally-driven technical knowledge that allows employee mobility. Although the introduction of a Key Skills assessment based on literacy and numeracy was introduced to offset this tendency, this reform has not been very successful (Ryan, 2000). The lack of duration requirements has been criticized heavily in the UK system, as the average duration in apprenticeships was far lower than the expected duration, with no apprenticeship over

two years in length. In specific sectors accounting for roughly a third of apprenticeship starts, the average apprenticeship was less than a year in duration (Steedman, 2001).

The decentralized nature of the apprenticeship system translates to a difficult search process for prospective apprentices. Guidance is not integrated into the education system and the informational resources available to youth are marginal. While five percent of apprentices are directly trained by employers, the vast majority of apprenticeship placements are coordinated through training providers (Steedman, 2001). Assessment of apprenticeship certification is also largely outsourced to training providers.

Commensurate with the diffuse regulation of apprenticeship assessment and search processes, the UK apprenticeship system does not promote interventionist policies to promote apprenticeship as an educational option. While continental European apprenticeship systems have reformed the incentive structures for entering apprenticeships, the British system has been undermined by the increasing relative benefits of university education with such initiatives as the Educational Maintenance Allowance and the expansion of university admissions, part of the United Kingdom's goal of putting half of youth through university (Steedman, 2001: 26). Nonetheless, market incentives exist, as apprenticeship outcomes were superior in England and Wales in terms of pay over full-time vocational education by 12 percent (Payne, 1995). However, apprenticeship was associated with lower unemployment only in youth with superior educational achievements at 15-16.

At the root of the UK's relatively weak regulatory regime is a decentralized institutional structure which has been decisively criticized by scholars, who cite its institutional weakness and incoherence (Ryan, 2000). The system enjoys no legal status under statutory law and is represented as a program under the Ministry of Education and Skills. The MA program was introduced in 1994 as a replacement to the former Industrial Training Board system (ITB), but possesses the power only to promote apprenticeships and approve financial support for training programs (Ryan, 2000: 53).

National training policy is not administrated through a national body, but advised through the sectoral NTOs and the local Learning and Skills Councils (LSCs). Although some bodies have chosen inclusive policies, no legal requirement exists for inclusion of employee or teacher representatives. In contrast to the regulatory powers of the continental European committees, these advisory bodies have no statutory powers of regulation; regulation is achieved only through NTO's discriminatory powers regarding employers' access to funding (Ryan, 2000: 53). The responsibility for assessment remains with NVQ associations, whose representatives can be members of the firm being assessed. As Ryan points out, this creates significant opportunity for moral hazard for firms, who may pressure their employees into lax assessment in order to under-provide training and exploit cheap labour (Ryan, 2000: 55).

In contrast to continental European systems, the lack of statutory basis for apprenticeship renders public financing an *ad hoc* exercise according to sector and

educational content. The division of costs between firm and apprentice is also variable, as apprentices may be contracted as regular employees, common-law apprentices or trainees. This heterogeneity is reduced by the fact that MA apprentices are considered regular employees, but wage outcomes are decentralized and often are determined by collective agreements at the plant level. The result is that the financing of the system is opaque for both firms and apprentices, particularly in terms of apprentices' expected earnings after completion (Ryan, 2000: 58).

d) Ireland

The Irish apprenticeship system is an interesting case, as it provides persuasive evidence that apprenticeship systems can be reformed without the institutional frameworks present in continental Europe. Until the 1990s, Irish apprenticeship was very similar to that of the UK in its market-based approach and weak regulatory regime. However, legal reforms in 1993 transformed it into a system resembling that of continental Europe (Ryan, 2000). At present, 25 thousand apprentices participate in the apprenticeship system, or 1.5 per cent of the labour force aged 15-54 (Summary Table 1).

The 1993 Apprenticeship Act shifted the Irish system from the decentralized UK model to a design similar to that of continental Europe. The act rooted the apprenticeship institutions in statutory law, delegating the responsibility of occupational training regulation to a national body, the Foras Àiseanna Saothair (FAS). Ryan (2000: 59) argues that the new system embodies continental principles, "notably mandatory educational content, joint regulation of work-based training, and full public funding of the institutional costs of part-time education and training conducted away from the workplace." The implementation of this regulation was designed both to regulate training quality in a broad effort to upskill the Irish labour force and to encourage firm participation in apprenticeships.

These policy reforms have been connected to a sharp increase in apprenticeship registrations. The data are even more impressive given the narrow occupational scope of the apprenticeship system, which is restricted to traditional trades and excludes large occupational categories such as hairdressing and upholstering (Ryan, 2000: 58). Two caveats must be offered for these results: they followed the Irish economy's incredible boom through 1995-2000 and they benefited from EU subsidization. Nevertheless, the results suggest that market-based approaches can be reformed through adoption of continental principles: "the linkage of apprenticeship to the education system, the development of social partnership for the design and administration of apprenticeship, and the adoption of a statutory framework to underpin the whole" (Ryan, 2000: 62).

e) United States

The apprenticeship system in the United States is not nearly as extensive as its European counterparts, with approximately 489 thousand registered apprentices, roughly 0.4 per cent of the labour force aged 15-54 (Summary Table 1). Berik and Bilginsay (2000) notes that the majority of craftworkers do not pursue apprenticeships but acquire

training informally through employment. Gender inequity is severe, where 1990 data reveal that women constituted only 5.3 per cent of new apprentices (Berik and Bilginsay, 2000: 604).

The apprenticeship system is enshrined in statutory law, the National Apprenticeship Act of 1937, administered jointly by the Department of Labor's Bureau of Apprenticeship and Training and State Apprenticeship Councils (SACs).[8] This joint partnership administrates the regulation of programs. Federal funding is restricted to $16 million, directed towards the administration of the system, while State expenditures total approximately $20 million.[9] Assessment and certification is performed by SACs, where completion results in an Apprenticeship Completion Certificate (ACC), which is nationally recognized.

Apprenticeship programs are industry-driven, where firms pay virtually all of training costs without significant subsidization.[10] Thus, registered apprenticeships are industry-driven programs that are negotiated between firms and labour organizations, where state involvement is limited to assuring the minimum standards. This includes a minimum of 144 hours of technical knowledge training related to the trade.[11]

Despite the absence of a government role aside from support, potential apprentices have several incentives to enter. Apprenticeships are formalized in a contract, the Apprenticeship Agreement, whose length of training is dependent on occupation and which generally binds the employer to make efforts to retain the apprentice for the duration of the contract. Apprentices face increasing pay scales as they advance throughout the apprenticeship, up to 85-90 per cent of the journeyperson's wages. Despite apprenticeship's competition with vocational education in community colleges rather than high schools, apprenticeships showed increased earning for young males of 35 per cent (Blanchflower and Lynch, 1994). However, female apprentices have much poorer performance, where they do not show pay increases over even labour market programme participants, whose pay outcomes are almost indistinguishable from no education at all (Ryan, 1998: 305).

f) Australia

The Australian apprenticeship system is an important case to examine, as it closely resembles the Canadian apprenticeship system and has undergone successful reforms in the past decade. Since the early 1990s, the Australian apprenticeship system has focused on expanding the range of occupations covered by apprenticeships, creating national standards for assessment and making apprenticeship program arrangements more flexible. Apprenticeship registration has increased dramatically at 14.9 per cent per year from 1995 to 2003, largely as a result of the expansion of apprenticeable occupations into new sectors, including clerical, sales and service sector occupations (Summary Table 2).

---

[8] http://www.logos-net.net/ilo/150_base/en/init/usa_3.htm, accessed 6/3/2004
[9] http://www.nastad.net/index.cfm?page=10, accessed 6/3/2004.
[10] http://www.nastad.net/index.cfm?page=10, accessed 6/3/2004.
[11] http://www.logos-net.net/ilo/150_base/en/init/usa_3.htm, accessed 6/3/2004

Consequently, it is an important example of how the apprenticeship learning model could be expanded beyond its traditional service sectors in the trades to provide 'structured training experience' for other sectors in the labour market.

Summary Table 2: Registration and Completion Trends, Australia and Canada

	Total Registration			Completions			Total Registration		Completions	
	Australia	Canada	Difference	Australia	Canada	Difference	Australia	Canada	Australia	Canada
	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Index, 1985=100	Index, 1985=100	Index, 1985=100	Index, 1985=100
	A	B	C = B-A	D	E	F = E-D	Index (A)	Index (B)	Index (D)	Index (E)
1985	128.6	139.2	10.6	36.5	19.1	-17.4	100.0	100.0	100.0	100.0
1991	160.2	192.9	32.7	40.2	19.7	-20.5	124.6	138.6	110.1	103.3
1995	136.0	164.6	28.6	32.9	17.1	-15.8	105.8	118.2	90.1	89.4
1996	156.7	166.5	9.8	31.7	16.1	-15.6	121.9	119.6	86.8	84.3
1997	172.3	172.3	0.0	44.3	16.4	-27.9	134.0	123.8	121.4	85.8
1998	194.2	177.7	-16.5	53.9	16.5	-37.4	151.0	127.7	147.7	86.3
1999	252.1	188.8	-63.3	62.4	18.6	-43.8	196.0	135.6	171.0	97.3
2000	271.4	201.6	-69.8	78.6	18.3	-60.3	211.0	144.8	215.3	95.6
2001	310.4	217.6	-92.8	86.0	18.3	-67.7	241.4	156.3	235.6	95.7
2002	356.5	234.5	-122.0	98.5	16.5	-82.0	277.2	168.4	269.9	86.4
2003	413.3	n.a.	n.a.	117.8	n.a.	n.a.	321.4	n.a.	322.7	n.a.
85-02	6.2	3.5		6.0	-1.0		6.2	3.5	6.0	-1.0
91-01	6.8	1.2		7.9	-0.8		6.8	1.2	7.9	-0.8
85-91	3.7	5.6		1.6	0.5		3.7	5.6	1.6	0.5
91-96	-0.4	-2.9		-4.6	-4.0		-0.4	-2.9	-4.6	-4.0
96-01	14.6	5.5		22.1	2.6		14.6	5.5	22.1	2.6
01-03	15.4	n.a.		17.0	n.a.		15.4	n.a.	17.0	n.a.

Notes: Period changes indicate average annual growth rates.
Sources: NCVER (2004) and Main Table 2.

In the early 1990s, the Department of Employment, Education and Training began initiatives to reform anew the apprenticeship system in Australia in the face of high youth unemployment (Ray, 2001). Previously, the apprenticeship system had been eclipsed by the development of the Australian Traineeship System (ATS), which attempted to supplement the apprenticeship system by providing subsidized, low wage traineeships to non-trade occupations with durations of approximately one year. Traineeships were designed to provide structured, entry-level training to a very broad group of occupations (NCVER, 2001: 56). However, participation in the ATS had not met the expectations of policy-makers and suffered low completion rates as a result of its image as a poor program for vocational training. Faced with this lack of success, policy-makers began discussions to alter the system in order to reform the traineeships system and integrate it with general apprenticeships.

Following recommendations made by a 1986 OECD report, initiatives shifted from "training based on timeserving and the acquisition of knowledge to one based on training for competency to undertake tasks to national standards set by industry" (Ray, 2001: 27; OECD, 1986). The newly established National Training Board (later the Australian National Training Authority (ANTA)) began a broad policy of creating national standards, which benefited from support from labour and industry. Inaugurated in 1992, the Australian Vocational Certificate Training System (AVCTS) brought

together these policies in the Australian Qualifications Framework (AQF), but also included other provisions such as greater industry participation and prior learning and assessment recognition.

The newly created AVTS underwent additional reform with the publication of a government white paper, *Working Nation,* which aimed at greatly expanding the traineeship system. In 1994, the National Employment and Training Taskforce (NETTFORCE) began substantial measures to advance the goal of increasing registration including changing wages, eliminating the academic portions of traineeships, and creating new traineeships specialized for sub-industries. The removal of restrictions limiting apprenticeship to youth that occurred in 1992 was also a great contributor to the subsequent expansion of the apprenticeship system, as it allowed significant numbers of older apprentices to participate.

In 1996, the incoming Howard government consolidated traineeships and apprenticeships under the auspices of the New Apprenticeship program. According to an NCVER report, the new apprenticeship system was "a national commitment to dispense with legislative and administrative distinctions between the formerly different training systems" (NCVER, 2001: 27). It effectively integrated traineeships and apprenticeships into a single program and skills qualification framework, allowing the creation of programs with high level skill qualifications and variable durations, as opposed to the dichotomy of one and four year programs under the previous system. These changes were implemented as 'training packages,' or combinations of training contracts, competency goals and assessment guidelines that balanced enhanced flexibility with national standards. Another important element of the reform was the principle of 'user choice,' where employers and apprentices could choose private training providers, ending the monopoly over training enjoyed by the Australian Technical and Further Education system (roughly equivalent to Canadian colleges) (Ray, 2001).

These reforms coincided with a dramatic increase in apprenticeship registration, which grew from 136.0 thousand in 1995 to 413.3 thousand in 2003 (Summary Table 2). However, it was not the improvement of the traditional apprenticeships[12] that drove this growth but rather the expansion of newly created apprenticeship programs targeted towards different occupational sectors:

> Most of the expansion in apprentice and trainee numbers has been the result of the belated roll-out of traineeships since the mid-1990s into areas of the labour market that encompass some of the largest occupations in Australia, but had previously not been covered by apprenticeships. This included areas such as clerical, retailing and the rapidly growing service industry occupations. For

[12] Traditional apprenticeships generally refer to apprenticeships of two or more years in a trades occupation which grant a high level skill qualification (level III or above). These traditional apprenticeships comprised almost the whole of the Australian apprenticeship system prior to the introduction of traineeships. Under the New Apprenticeship System, the distinction between traineeships and traditional apprenticeships was dropped in favour of the term 'new apprenticeships,' which refer to all contracts. However, policy-makers often find it expedient to distinguish between 'traditional apprenticeships,' as defined above, and 'other apprenticeships,' which encompass the old traineeships and newly created programs.

> instance, apprentice and trainee numbers in clerical, service and sales occupations increased from some 10 000 in 1995 to almost 82 000 by June 2000. (NCVER, 2001: 26)

While the administrative reforms of the New Apprenticeship system undoubtedly contributed to this success, it was clearly the adoption of new apprenticeships as a viable form of training in these new sectors for prospective labour market entrants that drove growth.

Commensurate with this new orientation of the New Apprenticeship system, traditional and other apprenticeships followed very different trends which drastically changed the composition of the apprenticeship system. Traditional apprenticeships, principally composed of trades apprenticeships, grew 3.5 per cent per year from 101 thousand in 1996 to 133 thousand in March, 2004 (Brooks, 2004: 6; NCVER, 2004). Growth in traditional apprenticeships, however, accounted for only 7 per cent of growth from 1996 to 2002 (Brooks, 2004: 6). Other apprenticeships grew at 20.9 per cent per year from 62 thousand in 1996 to 283 thousand in 2004, such that other apprenticeships increased over 4.5 times during that period (Brooks, 2004: 12; NCVER, 2004). By 2004, other apprenticeships accounted for 68 per cent of all contracts in the Australian apprenticeship system.

By definition, other apprenticeships are designed for occupations outside the trades and thus the share of registration by each occupational group changed dramatically over the 1996 to 2004 period. Summary Table 3 shows the growth of each occupational trade group from 1995 to 2004.

Registration growth was driven by intermediate clerical, sales and service workers,[13] which increased by 108.0 thousand registrations from 1995 to 2004, and intermediate production and transport workers,[14] which increased by 51.1 thousand registrations. If we add labourers and related workers, registration from these three groups alone increased by 192.6 thousand during the same period, accounting for 68.5 per cent of registration growth. These other apprenticeship programs also tended to be part-time (34 per cent), included programs of two years or less in duration (60 per cent) and also those that granted a lower skills qualification than traditional apprenticeship (26 per cent) (Brooks, 2004: 14).

---

[13] This category includes general clerks, sales representatives, hospitality trainees, personal care and nursing assistants, special care workers, waiters, children's care workers, other intermediate clerical workers, prison officers, education aides, motor vehicle and related products salespersons, retail and checkout supervisors, bank workers, hotel supervisors, personal care consultants, dental assistants, library assistants, fitness instructors and related workers, travel and tourism agents, and keyboard operators.

[14] This category includes storepersons, motor vehicle parts and accessories fitters, delivery drivers, textile and footwear production, machine operators, road and rail transport drivers, other intermediate stationary plant operators, mobile construction plant operators, plastics production machine operators, truck drivers, forestry and logging workers, printing hands, train drivers and assistants, and miners.

Summary Table 3: Registration Changes in Australia, By Occupational Group, 1995, 2004

Occupational Group	Registrations, thous. June, 1995* A	Registrations, thous. March, 2004** B	Average Annual Growth, 95-04	Share of Registrations (%) June, 1995* A	Share of Registrations (%) March, 2004** B	% Point Difference, 95-04
Managers, administrators and professionals	1.7	6.3	15.7	1.3	1.5	0.3
Associate professionals	1.3	30.5	42.0	1.0	7.3	6.4
Trades and related workers	120.2	147.1	2.3	88.4	35.3	-53.1
Advanced clerical and service workers	0.1	8.3	63.4	0.1	2.0	1.9
Intermed. clerical, sales and service workers	8.1	116.1	34.4	6.0	27.9	21.9
Intermed. production and transport workers	0.5	51.6	67.4	0.4	12.4	12.0
Element. clerical, sales and service workers	2.1	21.4	29.4	1.5	5.1	3.6
Labourers and related workers	2.0	35.5	37.7	1.5	8.5	7.0
Total	136.0	416.8	13.3	100.0	100.0	0.0

* - The earliest data for which these trade group aggregations are available

** - The latest data available

Sources: A - NCVER, 2000, Table 85

B - NCVER, 2004, Table 11

Another important change in the Australian apprenticeship system was the shift towards female and older apprentices that occurred as a result of these reforms. The female share of registrations has increased from 13 per cent in 1994 to over 37 per cent in 2004 (NCVER, 2001: xix; NCVER, 2004). These registrations were overwhelmingly concentrated in the clerical, sales and service groups, which comprised almost 65 per cent of female registrations (NCVER, 2001: 86). As a result of the removal of age restrictions, the registration share of apprentices older than 24 has increased, from 7 per cent in 1995 to one-third in 2001 (NCVER, 2001: xix). The new occupations introduced have been favoured by older apprentices, where nearly forty per cent of apprentices aged 25 and above were registered in the clerical, sales and service groups. Apprentices younger than 25 were concentrated primarily in the trades groups (nearly 65 per cent) and in the clerical, sales and service group (almost 25 per cent) (NCVER, 2001: 88).

As is evident from Summary Table 2, the number of completions has kept pace with increasing registrations, in contrast to trends in Canada. Assessments of true completion rates based on cohort methodologies showed that Australian apprenticeship non-completion rates are from 23-30 per cent, while non-completion rates in programs under two years are near 45 per cent. In total, these completion rates are superior to university completion rate of roughly two-thirds (NCVER, 2001: xx). In an analysis of completion rates, Grey, Keswick and O'Brian (1999) found that non-completion rates within a year of commencement are very similar to the rate of separation from jobs in the actual labour market, but lower than non-completion rates in other forms of post-secondary education. Non-completions were often matters of choice, where 55 per cent left voluntarily due to low wages, lack of training or poor workplace relations.

This suggests not only that completion rates are satisfactory, but reminds us that non-completions may reflect poor matches between apprentices and occupations such

that withdrawals may be positive decisions. Ray *et al.* (2000) found that attrition was highest in the first three months of training and that after six months, the rate of completion improves considerably. Other studies cited employment instability or poor workplace relations as the primary reason for discontinuation. Ray *et al.* (2000) found that the five most common reasons for non-completion were: "laid off" (17 per cent), "business broke/changed owner" (16 per cent), "personality clash/harassment" (14 per cent), "pay was too low" (11 per cent), and "job offer" (8 per cent) (accounting for 66 per cent of responses). Another study by Cully and Curtain (2000) found that the reasons for non-completion were: "dissatisfaction with the job or employer" (53 per cent), "employer-initiated reasons" (19 per cent), "dissatisfaction with the training of the job" (19 per cent), and "personal reasons" (11 per cent).

While these characteristics and developments in the Australian apprenticeship system are unlikely to be directly transposed to the Canadian experience, their similarity and the recent success of apprenticeship in Australia justify a serious look at whether the latter's practices could be imported to Canadian apprenticeship. An important dimension that is often discussed in the Australian literature is the key role of national standards in the system's success. This is an important lesson, as Australia and Canada are both federal governments which devolve substantial responsibility for training to lower levels of government.

The NCVER's evaluation of the success of apprenticeship reform, *Australian Apprenticeship: Facts, Fiction and Future*, argues that the expansion of the apprenticeship mode of training to other sectors of the labour market will play a key role in enhancing Australia's human capital and future economic performance. It advocates continued expansion into all sectors which do not require a university degree and will have strong employment growth in the future, particularly associated professional occupations such as computer support technicians and medical technical professionals (NCVER, 2001: 171). It maintains, however, that apprenticeship should not be extended to occupations with few skills requirements.

Australian scholarship also promotes a broad apprenticeship system as a crucial way of furnishing skills development, motivated by a national concern for skills similar to the Canadian debate described in the second section. The NCVER report argues that the academic component of the new apprenticeship program is crucial, if only to develop the 'soft skills' that analysts argue will characterize the 'new economy' (NCVER, 2001: 191). Analysts also argue that the apprenticeship system will be crucial in dealing with the aging workforce. Robinson (2000) argues that apprenticeship will have to be developed to support older apprentices because the demand for skills will evolve rapidly with technological change and require frequent re-skilling from workers. In addition, the aging of the workforce will shift strategies in skill development in favour of the adult workforce and institutions must exist to provide them with life-long training or 'continuous learning.'

g) Implications

In order to summarize this comparative examination of national apprenticeship systems, it is useful to generalize national apprenticeship systems into Anglo-saxon systems and Northern European systems (Summary Table 4). Anglo-Saxon system are market-driven, where firms are not committed to supplying apprenticeship sponsorship. In contrast, Northern European systems rely upon social partnership between business and labour interests where the supply of apprenticeship sponsor are based on industry consensus. With respect to education systems, Anglo-Saxon models do not emphasize vocational education in their secondary school systems and apprenticeship is generally less integrated with the formal education system than in Northern European models. Finally, the labour market outcomes for those who complete apprenticeship programs are clear in Northern European systems, where completers face substantial but narrow employment opportunities. In contrast, labour market entry into occupations in the Anglo-Saxon systems is not as restricted and thus apprentices have a broader range of employment possibilities.

This typology is important because it lays out the strategies other countries have pursued in promoting apprenticeship and training. The next section shows that Canada clearly falls within the Anglo-Saxon model of apprenticeship, with its emphasis on a market-driven supply of apprenticeship sponsors.

One implication of this typology is that the practices of the Northern European model are far removed from those of Canada. Policy-makers have often looked to the German apprenticeship system as an inspiration for reform. But the reality that the German system exists in a particular context of social and labour market institutions that are unlikely to arise in Canada cannot be ignored. The question remains whether the institutions and mechanisms employed in Northern European models are applicable in the Canadian case without the context of social partnership and regulated labour markets. As discussed above, however, the Irish case suggests that even limited institutional reforms can greatly enhance performance in registrations.

Summary Table 4: Typology of National Apprenticeship Systems

Feature	Anglo-Saxon Systems	Northern European Systems
Balance of General and Vocational Education in Secondary System	Emphasis on General education	Strong Vocational Training Systems
Linkages between Secondary Education and Apprenticeship	Weak; much more well-defined pathways to university.	Strong, with enhanced career counselling and labour market information.
Labour markets and industrial relations	Generally weak unions and de-regulated labour markets	Unions play an important, cooperative role
Supply of Apprenticeship Sponsors	Market plays a strong role	Industry consensus

Customization	Emphasis on modularity, where programs are divided into intermediate components	Well-defined long-term courses
Entry requirements	Less important	Clear requirements
Employment outcomes for Completers	Wide range of employment opportunities	Well-defined "good" possibilities, but in a narrow area
Firm Involvement and Commitment	Largely in public and private colleges, weak firm commitment	Strong firm commitment and more company-based training
Statutory powers of regulation	Weak	Relatively strong

Sources: Bertrand (1998)

In addition to recognizing differences between models, it is imperative to also recognize the differences within models. Both the British and Australian apprenticeship system resemble the Canadian system in some respects, but offer a breadth of apprenticeship programs in both trades and service occupations that do not exist in Canada. These experiments in adapting the provision of apprenticeship programs to emerging sectors have not occurred in Canada and should be examined as a serious area for policy reform.

V. Apprenticeship in Canada

a) Institutional Framework

The Canadian constitution largely assigns responsibility for education and social policy to the provinces, and responsibility for economic policy to the federal government The intersection of these three areas, particularly in the development of labour market policy, has been a source of contention between the federal government and the provinces. The federal administration of Unemployment Insurance in 1941, following the traumatic experiences of the Great Depression, solidified the basis for the federal government's intervention into the labour market. Federal government intervention has also included the 1967 Adult Occupational Act, the result of the development of national "manpower" policies in the 1960s justified on economic grounds. This legislation evolved into the National Training Act of 1982.

Through the past twenty years, increasingly active labour market policies financed out of the Unemployment Insurance programme were a source of contention in federal-provincial relations. In the mid-1990s, however, the federal government devolved much of the responsibility and funding for adult training to the provinces with the 1996 Employment Insurance Act and negotiated a series of Labour Market Development Agreements (LMDAs) with the provinces, Ontario excluded. The federal government retained responsibility for inter-provincial labour mobility, national youth employment programmes and other "pan-Canadian activity" (Marquart, 1998).

Despite enhanced provincial jurisdiction over adult training, the provinces have not made great progress in integrating the apprenticeship system into the education system. The marginalization of vocational education in secondary schools has continued since education was de-streamed in the 1960s, a reaction to the criticism that vocational streaming effectively differentiated students based on class and reinforced existing inequalities (Taylor, 2003). As discussed below, the disconnect between secondary education and the apprenticeship system is strongly reflected in the education system's academic bias, reinforcing the negative image of apprenticeship as a second-best option to university or college education. Recent provincial initiatives have begun to integrate apprenticeships into secondary schools, where apprentices accumulate learning experience through summer work, while completing secondary education.

Occupational designations for apprenticeship are determined by the provinces, but are driven primarily by industry without significant input from the secondary or post-secondary educational system, particularly in terms of general skills. Provincial advisory bodies for apprenticeship programs generally include an apprenticeship board, responsible for advising the appropriate minister on policy and sectoral committees composed of labour and employer representatives, who advise the board on apprenticeship policy, particularly the content of apprenticeship programs. Commensurate with the limited scale of apprenticeship, the number of apprenticeable trades is roughly 150, less than 1 percent of the total NOC occupations and approximately half of the designations from more extensive apprenticeship systems such as the German system. Of this limited number, approximately 75 percent of trades, containing 90 percent of registrations, are located in the "traditional" areas of construction, manufacturing and resource industries (Schuetze, 2003: 81).

Certification assessment varies widely across the provinces. A "common core" curriculum is currently being promoted to link all inter-provincial standards, but only two trades at this time have a common curriculum. In addition, differing apprenticeship standards are standardized under the Red Seal Program, which is an inter-provincial assessment that allows a journeyperson to practice nation-wide. To date, forty-five occupations have Red Seal assessments available, leaving many apprenticeship categories without inter-provincial standards.[15] The Canadian Council of Directors of Apprenticeship (CCDA), whose membership is comprised of each provincial apprenticeship director and Human Resources and Skills Development Canada (HRSDC) representatives, administers the Red Seal Program.[16] Given that Red Seal certifications may involve additional qualification assessments, only half of graduates in Red Seal applicable trades attain this certification for inter-provincial mobility (CSLS, 2001). It should be noted that in all provinces except Quebec and Alberta, the Red Seal examination is used as a final examination albeit with a higher past mark for Red Seal certification.

[15] http://www.red-seal.ca/english/redseal_e.shtml#administers, accessed 6/7/2004
[16] http://red-seal.ca/english/redcont_e.shtml, 6/7/2004

b) Government financial support for apprenticeship

The federal government in Canada contributes directly to apprenticeship training by providing income support through the Employment Insurance to apprentices enrolled in the classroom portion of their training. In 2002, $28.4 million dollars was transferred to the provinces for this purpose.[17] Kunin (2004) estimates that in 2002 the provinces contributed $252 million towards apprenticeship for administration of training programs and subsidization of training. Some of this total may include federal transfers through Labour Market Development Agreements provided under Part II of the EI Act. Van Walraven (2002) notes that public expenditures allocated to apprenticeship training account for around 80 per cent of all fiscal incentives for employer-sponsored training in Canada even through workers receiving apprenticeship training account for only a very small proportion (1-2 per cent) of the adults who receive employer-sponsored training.

It is interesting to note that government financial support for apprenticeship training in much greater in Canada than in the United States. Van Walraven (2004:Table 2) estimates that public subsidies in Canada are $1,288 Canadian per registered apprentice, over 10 times the US level of public support ($195).

b) Apprenticeship Registration

All data regarding apprenticeship trends have been acquired from the Registered Apprenticeship Information System (RAIS) maintained by Statistics Canada. The source of this data, however, is provincial and thus several caveats must be offered. First, data by occupation and gender have been protected in cases where registrations are few. For the purposes of this report, all aggregations of occupations subject to confidentiality protections will treat these confidential values as zero; the result is that statistics ordered by gender or occupation will be somewhat biased. Secondly, previous work on apprenticeship notes that the compatibility of this provincially-based data is occasionally suspect as the provinces administer their programs differently. In particular, measures of discontinued registrations may be underreported, as some provinces retain inactive apprentices in their records for some time; consequently, the numbers of apprentices may be overreported in some instances (Construction Sector Council, 2004: 9).

In 2003, Roslyn Kunin and Associates undertook for Human Resources Development Canada a study of the consistency of the data collected as part of the Registered Apprenticeship Information System. The study noted that there were differences in the requirements for apprenticeship completion across provinces, among other variables.[18] It recommended that consultations be undertaken among the relevant

[17] Van Walraven (2004) provides a detailed inventory of government incentives for employer-sponsored worker training in Canada and the United States, including apprenticeship training.

[18] The study reported the following variables were largely consistently defined and reported: report year, identification number, province, sex, date of birth, trade identifier, date of registration, type of indenture, date certificate granted, and residence 12 months prior. It reported that the following variables were significantly inconsistently defined or reported: duration of program and hours per level, current year or level, registration status, registration status at end of reporting period, type of certificates granted, type of

provincial, territorial, and federal authorities including Statistics Canada to establish mutually acceptable consistent definitions where needed. Nevertheless, the study recommended that work be undertaken to calculate completion rates by trade area and province, taking into consideration of course the data limitations. It was felt that meaningful and useful information can currently be obtained from the RAIS that could aid in enhancing apprenticeship programs across the country.

This report strongly agrees with the Kunin recommendations. It is important not to let the perfect be the enemy of the good. Just because a data system based on completely consistent definitions and reporting has not been developed does not mean that the existing imperfect data system should not be used. It is true that there are inconsistencies in the RAIS and these deficiencies should be rectified. But to not make use of this data system complied by Statistics Canada, recognized as one of the world's leading statistical agencies, because of certain problems would mean than one must resign oneself to saying nothing about the state of apprenticeship in Canada. This seems unacceptable. In our view, it is much better to proceed cautiously recognizing the limitations of the data than to abandon empirical analysis because of data inconsistencies of unknown magnitude.

Total registration in the apprenticeship system shows that apprenticeship clearly occupies a subordinate position in the post-secondary education system in Canada. In 2002, total registration in apprenticeship programs was 234.5 thousand, or 2.13 per cent of the labour force aged 15-44[19] (Main Table 1A). In contrast, university enrollment in 2001 (the most recent year for which data are available) was 886.8 thousand, over four times greater than apprenticeship registration. Community college enrollment in 1998 (the last year for which data are available) was 403.5 thousand, over twice the number of registered apprentices in the same year. If we consider the post-secondary education system as a whole, apprenticeship registration comprised only 12.6 per cent of participants in 1998.

While the Canadian apprenticeship program has expanded substantially from 1977 to 2002, its importance as a form of post-secondary education has not increased significantly. Total registrations in the apprenticeship program grew 2.6 per cent per year from 1977 to 2002, exceeding the labour force's (aged 15-44) annual growth of 1.4 per cent during that period (Main Table 1A and Chart 1). Total registration growth was cyclical, with periods of expansion in 1977-1981, 1985-1991, and 1997-2001. Total registration contracted severely from 1991 to 1996, declining 2.9 per cent per year.

Relative to other post-secondary options, however, the data available suggest that the apprenticeship system has not increased substantially in importance. Apprenticeship registration as a percentage of total participation in post-secondary education programs

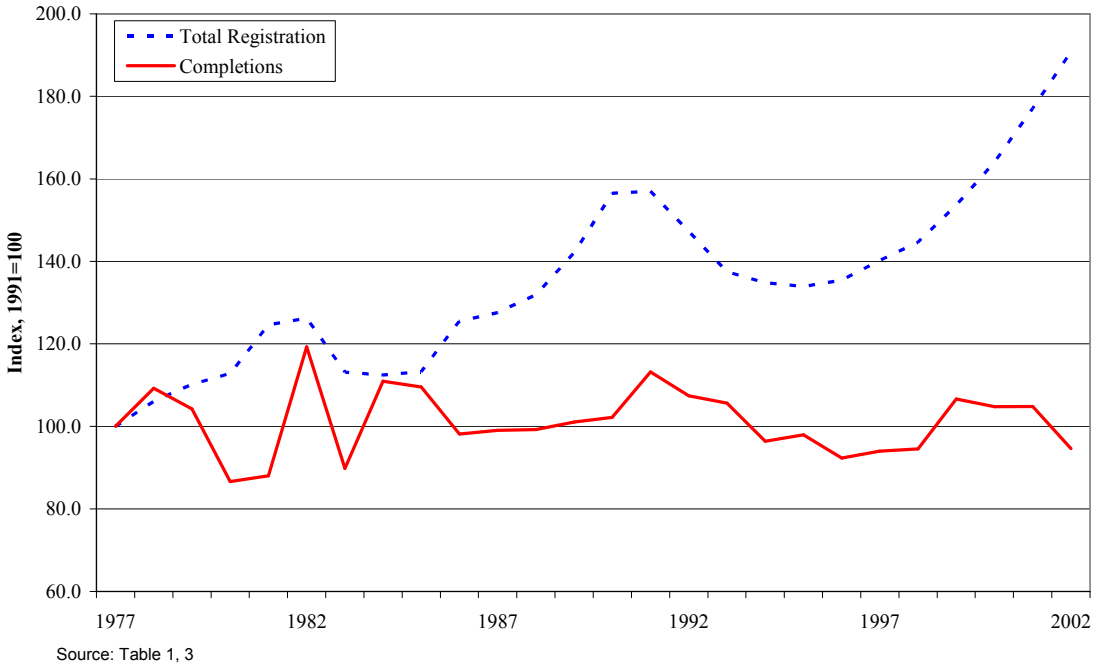
---

institutional training, expected time of completion, reasons for leaving program, in-school credits, on-the-job training credits, and prior trade certification.

[19] This choice of age range for the labour force is more appropriate in evaluating the use of apprenticeship than the 15-54 used in the OECD data. For completeness, however, Canadian registration equals 1.6 per cent of the labour force aged 15-54.

has increased only one percentage point, from 11.6 per cent in 1985 to 12.6 per cent in 1998 (Main Table 1A). Based on data on university enrollment, the share of apprenticeship in total post-secondary education was actually higher in 1977, at 12.9 per cent. The limited growth in the apprenticeship system's share of post-secondary education registration largely reflects the strong expansion of community college enrollment, which grew at 2.5 per cent per year from 1977 to 1998. In fairness, the discussion above does not take into account the recent strong expansion in the apprenticeship system since 1997. It is important to note that the strong growth experienced by community colleges coincides with the large contraction of apprenticeship registration following 1991, suggesting that the apprenticeship system and the community college system may be educational substitutes for each other.

Chart 1: Total Registration Index (1977=100), Canada, 1977-2002



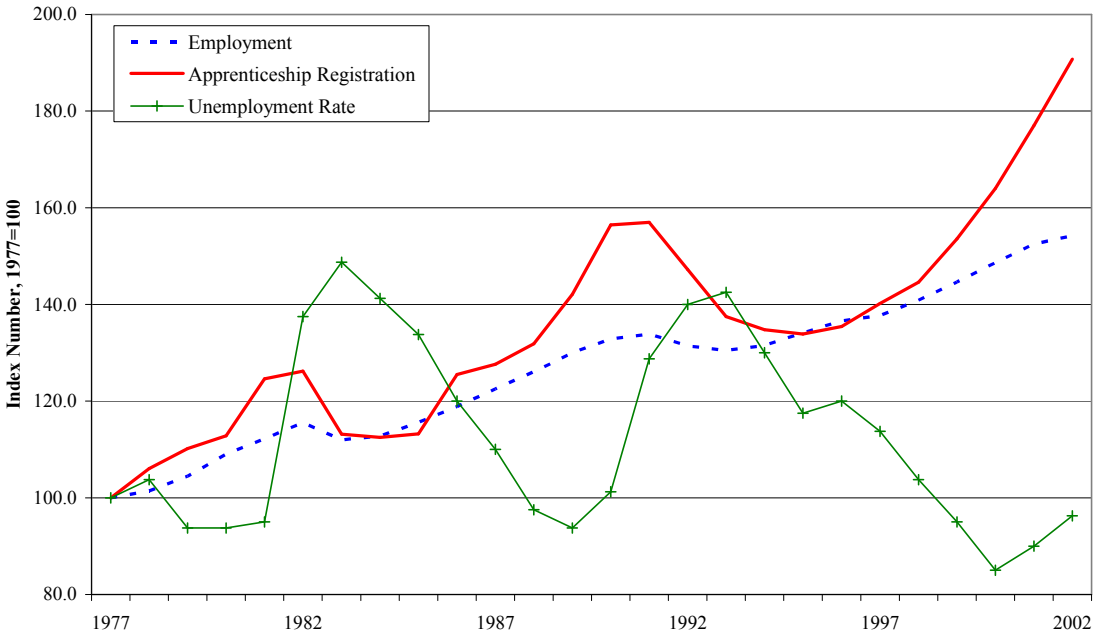
Source: Table 1, 3

These trends confirm the scholarly consensus that apprenticeship is strongly procyclical, expanding rapidly with economic growth and contracting during recessions. Chart 2 clearly shows that the expansions of the apprenticeship system in 1977-1981, 1985-1991, and 1997-2002, closely followed declining unemployment rates. This trend is linked not only to increasing demand for skilled labour during growth periods, but also to the characteristics of the apprenticeship system. Since apprentices must retain employment with a firm over the four years of apprenticeship, high unemployment rates will have a strong negative impact on registration trends. As discussed below, the four or more year duration of apprenticeship commitments make employers and employees sensitive to risk, as layoffs rob employers of their return on training investments and leave employees stranded, unable to complete their certification.

From this perspective, the strong growth in college enrollment that coincided with falling apprenticeship registration suggests the substitutability of community college for

apprenticeship programs during recessions. Thus, when economic downturn occurred in 1991, reflected in increasing unemployment, students reacted to the increasing difficulty of obtaining an apprenticeship sponsor by enrolling in community college. However, it should be noted that enrollment in engineering technology programs, which most closely resemble apprenticeship programs, grew by only 15 per cent from 1991 to 1998, whereas other areas such as engineering or natural sciences grew by three times that rate.

Chart 2: Apprenticeship Registration and Employment Indices, 1977=100



Source: Table 1, Statistics Canada, 228-0002

Another source of data on trends in apprenticeship is registration for the academic portion of apprenticeship training, drawn from Statistics Canada's publication *Education in Canada.* Although one might expect trends in apprenticeship registration and apprenticeship educational program enrollment trends to be very similar, given that educational training is a component of the apprenticeship program, a large discrepancy exists between registration and enrollment (Main Table 24). Fluctuations in both registration and enrollment are similar, but are not as close as the institutional linkages would suggest. Indeed, there has been a strong decline in educational program enrollment as a percentage of total apprenticeship registrations, from 48.9 per cent in 1983 to 30.8 per cent in 1997.

Several possible explanations exist for this large discrepancy. First, the data on apprenticeship enrolment in educational programs compiled by Statistics Canada may not be capturing all technical training courses that apprentices must take to complete their program. Second, in certain provinces apprentices may take examinations (challenge the exam) without participating in the regular academic educational courses, preferring independent study to facing the income interruptions associated with the yearly blocks of education release. Third, anecdotal evidence strongly suggests that actual apprenticeship durations are far greater than the official durations; consequently, apprentices who spend

additional time in the apprenticeship system would not be required to attend educational programs. Fourth, anecdotal evidence from interviews suggests that many apprentices in the construction trades simply do not attend their educational sessions (CSC, 2004: 13). These explanations sum to a significant deficiency in the functioning of the apprenticeship system, as educational courses are in place to ensure the acquisition of general skills required for employee mobility.

c) Apprenticeship Completions

Although the number of apprentices in the apprenticeship system is important, the efficacy of the system at producing certified journeypersons is of even greater importance. One way to estimate this efficacy is to examine the apprentices who succeed in their apprenticeship certification, which are referred to as completions. While total apprenticeship registrations grew 2.6 per cent per year from 1977 to 2002 for a total increase of 90.8 per cent, the number of completions actually decreased by 0.2 per cent per year during the same period for a total change of only -5.3 per cent (Main Table 2 and Chart 1). Thus, while registration in apprenticeship programs has grown considerably in the past twenty-five years, the number of apprentices actually receiving their apprenticeship certificates has not followed suit.[20]

Unfortunately, data at the national level do not exist to allow calculation of true completion rates by tracking a cohort that enters the apprenticeship system in a given year. Thus, completion rates are constructed based on the aggregate data available in order to estimate the share of registered apprentices who receive their certification. Aggregate estimates of completion rates may be less accurate and appear to have a downward bias, as cohort estimates of completion rates are generally higher. For example, the Alberta Apprenticeship and Industry Training Board reports a 76 per cent completion rate (within two years of the earliest possible completion date). However, this statistic only includes apprentices who complete their first year of technical training, excluding apprentices who withdraw within their first year, such that this estimate is upwardly biased (AITB, 2004:7). Based on unpublished administrative data on apprenticeship in Manitoba, on the other hand, true cohort completion rates are actually lower than those according to some methods using aggregate data.

Experience from Australian apprenticeship suggests that approximate or 'proxy' measures of completion rates may be deficient. The National Centre for Vocational Education Research argues that completion rates based on aggregate data are "completely misleading" for several reasons. First, they do not account for recommencement, where apprentices switch from one apprenticeship program to another, as these apprentices are recorded as drop-outs. Ray *et al.* (2000) found that almost half of Australian "non-completers" recommenced training at a later date, suggesting that non-completers often shift apprenticeship programs or suffer breaks in their progress. Second, evidence

[20] Underreporting of completions and overreporting of new registrations could account for these divergent trends in completions and registrations. But due to the administrative nature of the apprenticeship data, it seems unlikely that such underreporting and overreporting is taking place at any significant degree. An increased duration of apprenticeship programs could also have contributed to these trends

suggests that completions are under-reported, as apprentices may complete all the qualifications of their program without registering with the apprenticeship system administration. Previous research by the NCVER following up on expired contracts concluded that the completions increased 20 per cent when the latter group was included (NCVER, 2001: 105).

Despite the caveats outlined above, we feel that it is nevertheless useful to calculate completion rates from existing apprenticeship registration and completion data in order to obtain an approximate indication of rates on apprenticeship completion and trends in these rates. We define three ratios or rates that relate completions to registrations in different ways. The first is the ratio of the number of completions in a given year to total registrations in that year. If the number of new registrations remains constant over time and no apprentices withdraw from the program, this ratio would be the reciprocal of the program duration. As the majority of programs last four years, this figure under the above conditions would be 0.25 or 25 per cent. Thus, increases in registrations and longer program durations would introduce a downward bias independent of factors affecting the true completion rate. This ratio is not a completion rate as it does attempt to relate the number of new registrations in a program to the number of persons who actually complete the program after the normal length or duration of the program has lasped. For this reason, the term completion rate will not be applied to this ratio.

Completion rate 1 approximates the cohort methodology by taking the ratio of completions to new registrations four years earlier, which is the nominal lengths of many apprenticeship programs and is close to the actual duration of the program for completers.[21] Finally, completion rate 2 is similar to completion rate 1, but attempts to account for the fact that apprenticeship durations may be greater or less than four years by using the average of new registrations of three, four and five years prior to the year of completion rather than simply of four years ago.[22]

---

[21] According to the National Apprenticeship Survey (NAS) and NATS, the average program duration for the construction trades was 4.1 years (trade specific examples were 4.4 years for carpentry, 4.8 years for electricians, versus 4 years nominal length) and for non-construction trades 3.6 years. I would like to thank Paul Stoll for these estimates.

[22] Using unpublished data provided by Manitoba Advanced Education and Training (MAET), the Centre for the Study of Living Standards has compared CR1 and CR1 to true cohort completion rates for several trades in Manitoba. As was alluded to earlier, CR1 and CR2 are generally slightly higher than the MAET true cohort completion rates, although this is not the case for every trade. The differences, however, appear to be due more to data comparability issues than to some inherent inadequacy in the "simulated cohort" approach upon which CR1 and CR2 are based. For example, the Statistics Canada data used by CSLS to calculate CR1 and CR2 are affected by confidentiality restrictions while the MAET data are not; CR1 and CR2 are available up to the calendar year of 2002 while the MAET rates are available only for the fiscal year ending March 31, 2004; and different assumptions are made by CSLS and MAET regarding the typical duration of apprenticeship programs. Therefore, it appears that the CSLS completion rates are potentially reasonably good proxies for completion rates based on a true cohort analysis.

Completion/Registration Rate and Completion Rate Formula:

Completion/Registration Rate: $CR1_t = 100(C_t / R_t)$
Completion Rate 1: $CR2_t = 100(C_t / NR_{t-4})$
Completion Rate 2: $CR3_t = 100(C_t / \{ [NR_{t-3} + NR_{t-4} + NR_{t-5}] / 3 \})$

Where C = completions
CR = completion rate
R = total registrations
NR = new registrations

Regardless of the completion rate estimate used, it is clear that the share of apprentices completing their programs has greatly decreased over the past twenty-five years. Summary table 5 below shows the decline of each completion rate from 1982 to 2002.

Summary Table 5:Completion/Registration Rate and Completion Rates, Canadian Apprenticeship System, 1982-2002, Selected Years

	Completion Rate 1	Completion Rate 2
1982	63.6	62.9
1986	57.2	57.7
1991	44.2	47.5
1996	55.6	52.5
2001	45.8	46.9
2002	38.9	38.8
1982-2001	-17.8	-16.0
1982-1986	-6.4	-5.2
1986-1991	-13.0	-10.2
1991-1996	11.4	5.1
1996-2001	-9.8	-5.6

Source: Main Table 3
Note: Changes expressed above indicate percentage point changes, not annual growth rates

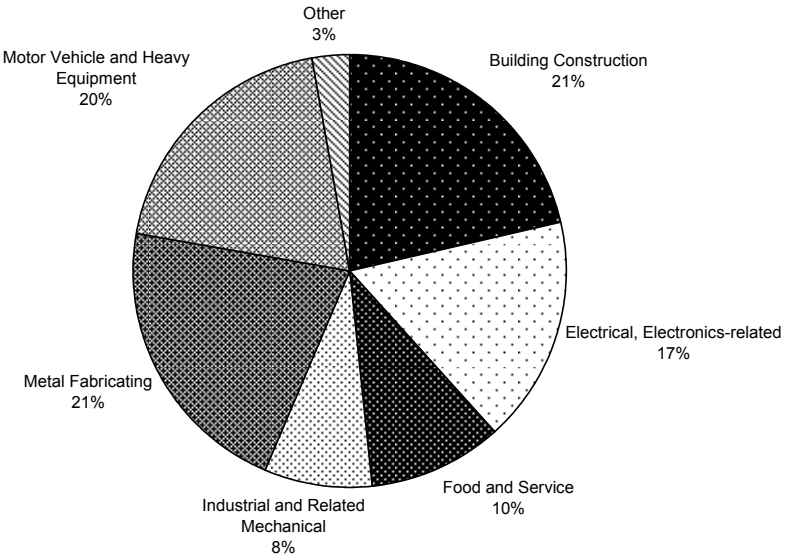
While each of the rate estimates has its advantages, completion rate 2 is perhaps the most appropriate, since it adjusts for longer program durations. Completion rate 2 decreased 16.0 percentage points, from 62.9 per cent in 1982 to 46.9 per cent in 2001 (and to 38.8 per cent in 2002[23]). The completion/registration rate shows a comparable decline of 6.4 percentage points, from 13.4 per cent in 1982 to 8.4 per cent in 2001. These rates are far lower than the rates calculated for other forms of post-secondary education. In 1998, the completion/registration rate in the apprenticeship system was 9.84

[23] The large drop in the completion rate in 2002 is explained by developments in Ontario where completions plunged by 2,160, more than accounting for the national decline of 1,770 (The Daily, Statistucs Canada, December 17, 2004). Accoding to Statistics Canada, "an important factor [in explaining the drop in Ontario] was the raising of the passing mark on final examinations from 60 per cent to 70 per cent. This had a major impact on individuals' decisions to write the final apprenticeship examinations, and on their success rate. In addition, a two-month public service strike in Ontario in the spring of 2002 prevented a large number of apprentices from writing examinations."

per cent, relative to completion/registration ratios of 22.8 per cent in community colleges and 24.1 per cent in universities (Main Table 19).

d) Apprenticeship by Trade

Chart 3: Trade Group Shares of Total Apprenticeship Registration, 2002



Source: Table 7

RAIS apprenticeship statistics are organized based on specific apprenticeship programs for RAIS occupations and on seven major trade groups. These groups are, in descending order of occupational shares of total registrations in 2002: metal fabricating trades (21.4 per cent), building and construction trades (21.4 per cent), motor vehicle and heavy equipment trades (19.7 per cent), electrical and electronics trades (17.0 per cent), food and services trades (10.0 per cent), industrial and mechanical trades (8.0 per cent), and other trades (2.7 per cent) (Main Table 7 and Chart 3).

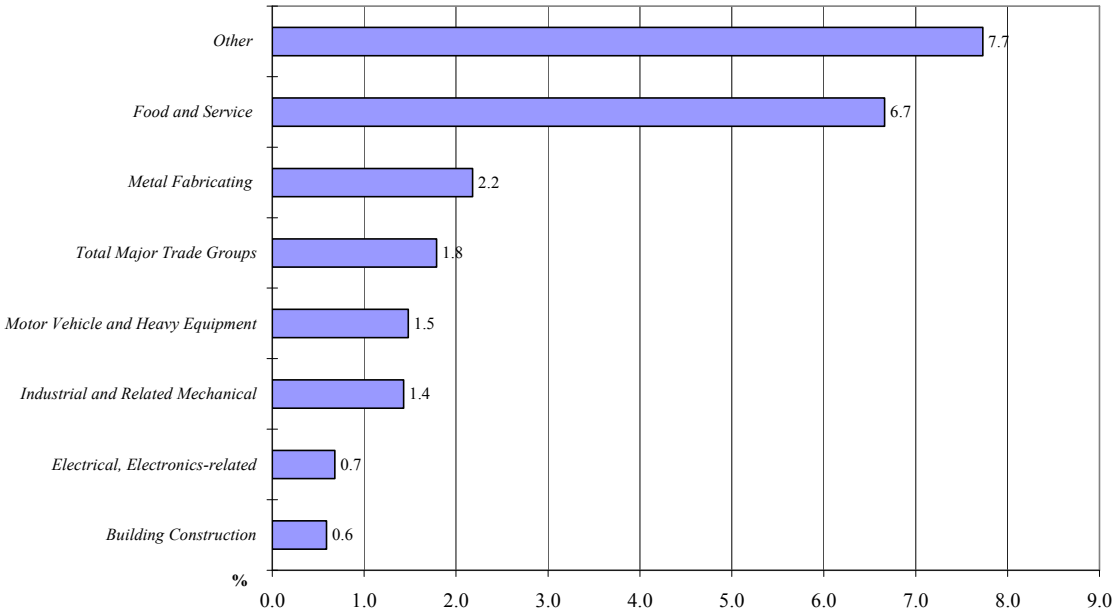
Summary Table 6: Completion Rates by Trade

	Completion Rate 1			Completion Rate 2		
	1996	2002	96-02*	1996	2002	96-02*
Electrical & Electronics Trades	58.36	48.30	-10.06	56.57	50.06	-6.51
Motor Vehicle & Heavy Equipment Trades	52.01	45.00	-7.00	48.82	43.53	-5.30
Industrial & Mechanical Trades	57.97	42.26	-15.70	59.58	42.13	-17.45
Metal Fabricating Trades	66.47	39.71	-26.76	61.43	40.70	-20.74
All Trades	55.52	38.85	-16.67	52.46	38.73	-13.73
Food & Services Trades	86.10	34.77	-51.33	77.05	33.84	-43.21
Other Trades	51.95	27.34	-24.61	47.15	29.55	-17.60
Building & Construction Trades	34.73	25.20	-9.53	33.49	24.59	-8.90

Source: Main Table 13
* - Indicates percentage point changes rather than growth rates

From 1991 to 2002, apprenticeship registration grew at significantly different rates across these major trade groups. Registrations in miscellaneous trades and in food and service trades more than doubled in this period, exceeding by a wide margin growth in the other trade groups (Main Table 7 and Chart 4). The largest trade group, the metal fabricating trades, also had above average growth at 2.2 per cent per year, compared to the average growth rate of 1.8 per cent per year for all trade groups together. Registration in building and construction trades and in electrical and electronics-related trades increased by just 0.6 and 0.7 per cent per year respectively over this period. Finally, registration growth in industrial and related mechanical trades and in motor vehicle and heavy equipment trades was close to average, at 1.4 and 1.5 per cent per year respectively.

Chart 4: Annual Growth Rate in Total Apprenticeship Registration, 1991-2002, by Trade Group



Source: Table 7

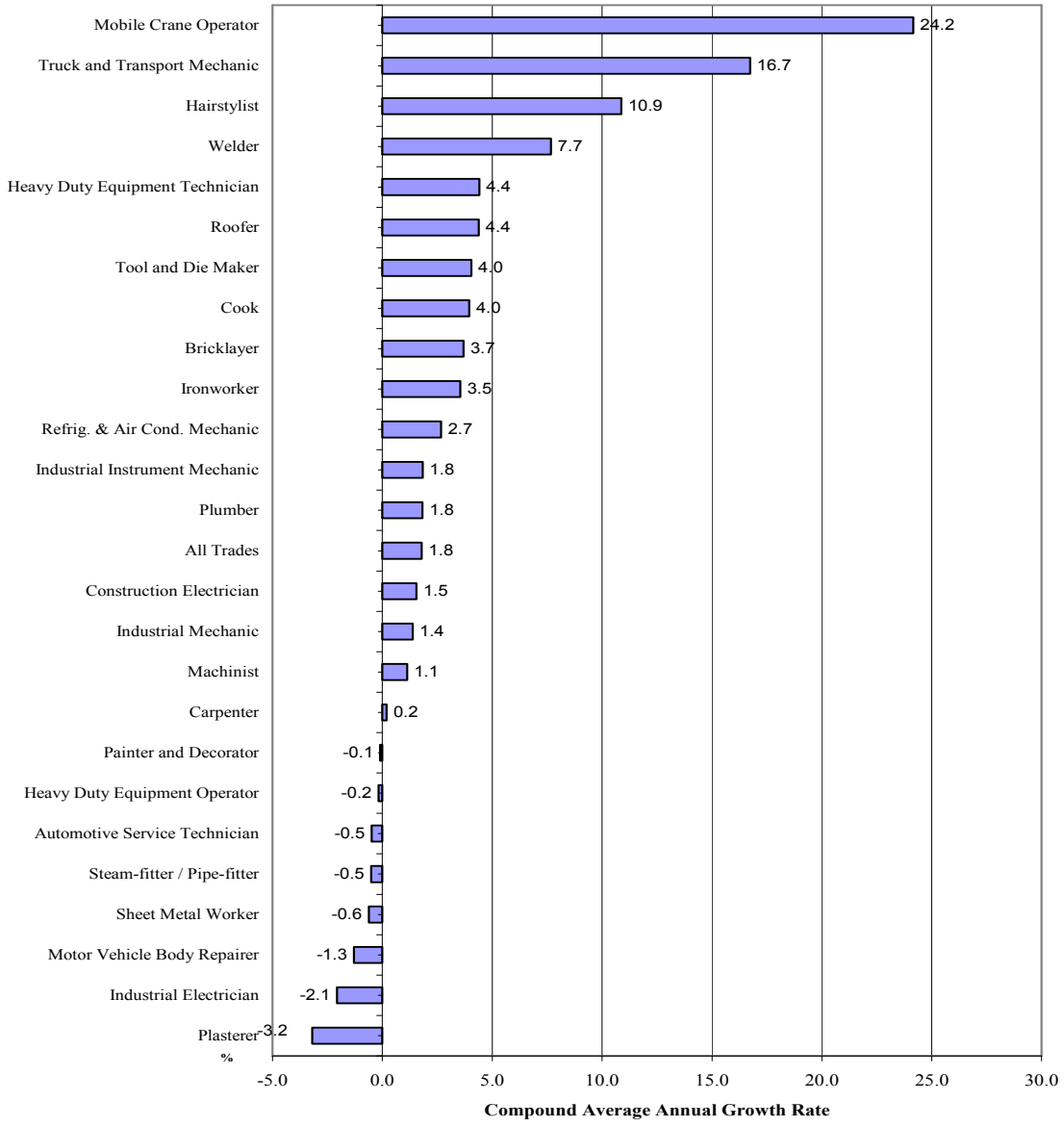
Summary Table 6 shows two estimates of completion rates by trade. Electrical and electronics trades and motor vehicle and heavy equipment trades have the highest completion rates in 2002 according to both measures, around 50 per cent in each case. Building construction trades and miscellaneous trades had the lowest completion rates, around 25 per cent in 2002 for both estimates. Both estimates of completion rates for all trades show that the completion rate has declined since 1996. The decline has been particularly severe in food and service trades and metal fabricating trades.

The apprenticeship system is dominated by a small number of large apprenticeship programs, such that groupings of the five, ten, and twenty-five largest apprenticeship programs comprised 41, 59 and 84 per cent of registrations respectively in 2002 (Main Table 14). This highly unequal distribution of registrations over apprenticeship programs makes it expedient to examine the twenty-five largest programs, as they capture the vast majority of apprentices. From 1991-2002, apprenticeship

registrations in certain trades grew very quickly, particularly mobile crane operators, truck and transport mechanics, and hairstylists. With the sole exception of hairstylists, however, this was the result of certain provinces introducing the apprenticeship program rather than growth in an already existing program.

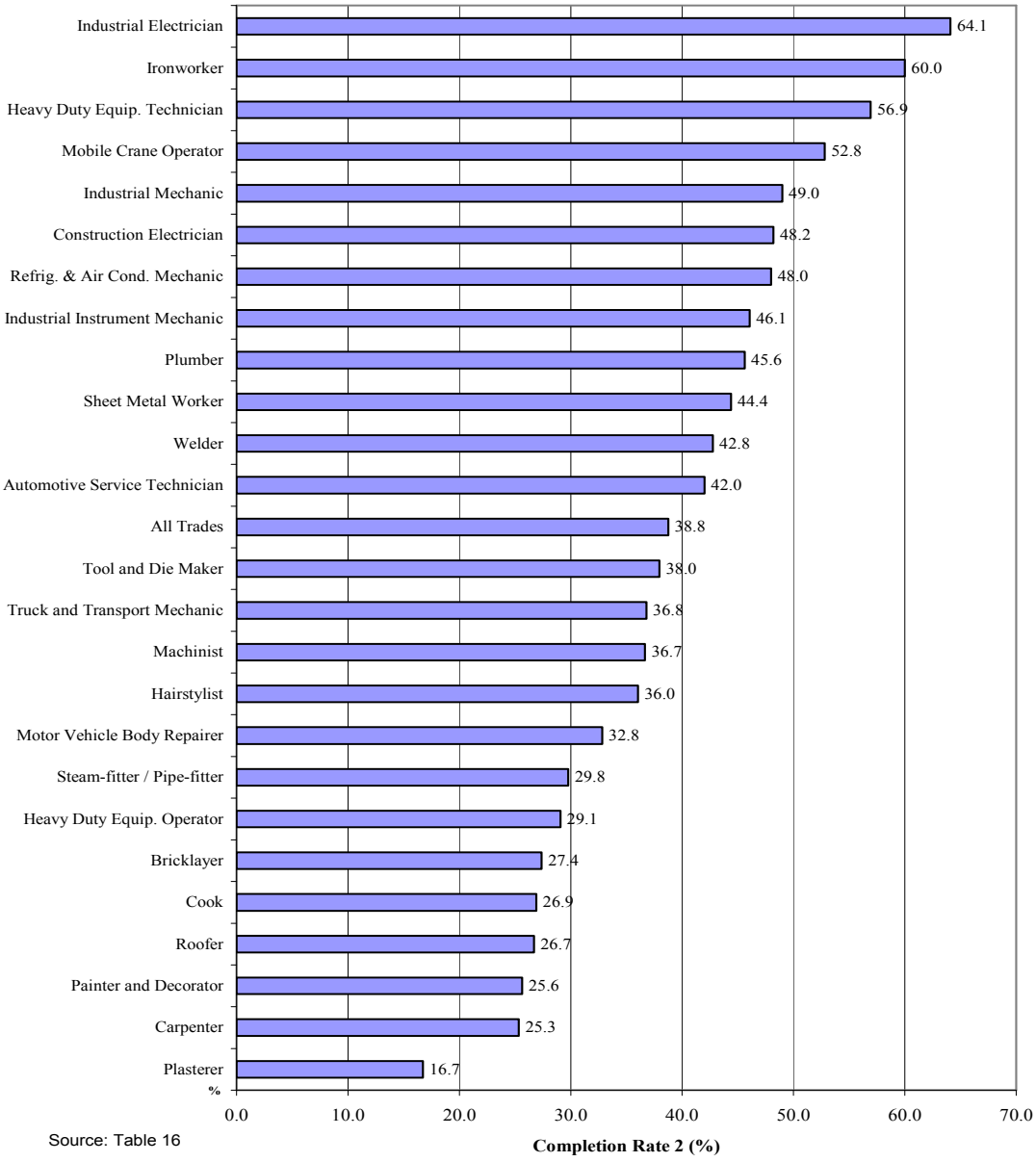
Eight of the twenty-five largest trades decreased in size in terms of apprenticeship enrollment, notably in the industrial electrician and plasterer trades, which saw registrations decrease at a greater rate than the average trade increase (Chart 5). It should also be noted that, over 1991-2002, automotive service technician registrations (the third largest program) decreased, while carpenter registrations (the second largest trade) stagnated at 0.2 per cent per year growth and construction electrician registrations (the largest trade) grew at a slightly below average rate.

Chart 5: Annual Growth Rate in Total Apprenticeship Registration, 1991-2002, By 25 Largest Apprenticeship Programs



Completion rates also differed considerably by trade. Employing completion rate 2, industrial electricians, ironworkers, heavy duty equipment technicians and mobile crane operators had the highest completion rates in 2002, with completion rates above 50 per cent. On the other hand, eight trades had completion rates of less than 30 per cent according to completion rate 2. The lowest of the trades with the lowest completion rates in 2002 were plasterers and carpenters (Main Table 16 and Chart 6). It is clear from these data that some trades have completion rates that are far higher than others, presumably because the value of completing an apprenticeship for both employers and employees is much higher.

Chart 6: Completion Rate 2, 2002, By 25 Largest Apprenticeship Programs



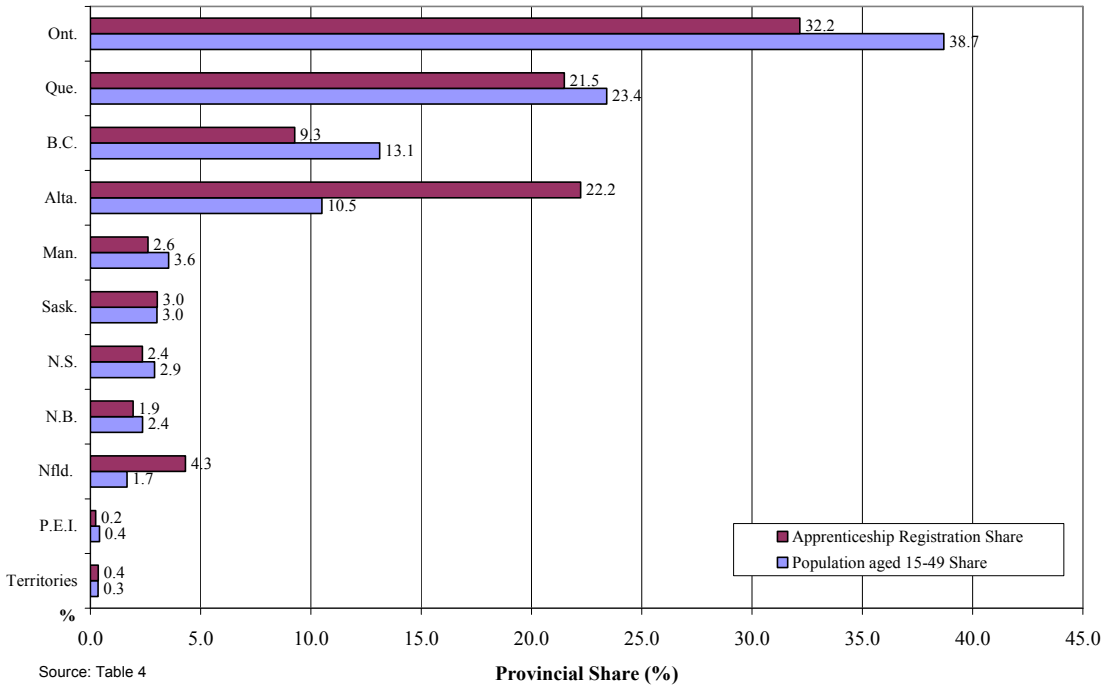
Source: Table 16

e) Apprenticeship by Province

The provincial jurisdiction of apprenticeship programs as well as the varied structures of the provincial economies creates the diversity of apprenticeship systems found throughout the country. The province of Quebec is an obvious example, in which the educational component of apprenticeship is completed first. However, other institutional variations include different assessment processes, program durations defined in terms of hours rather than years, and the lack of uniformity in compulsory trades.

Registrations have fluctuated considerably in Quebec in the past twenty-five years. Registrations as a percentage of the labour force aged 15-44 in Quebec were less than half those in the rest of Canada throughout the early 1980s, but increased up to 1.4 times that of the rest of Canada in 1991 (Main Table 20). Since the economic downturn on the early 1990s, registrations as a percentage of the labour force have once again fallen below that of the rest of Canada, down to 1.96 per cent in 2002, or 90 per cent of the rest of Canada.

Chart 7: Provincial Shares of Total Apprenticeship Registration, 2002



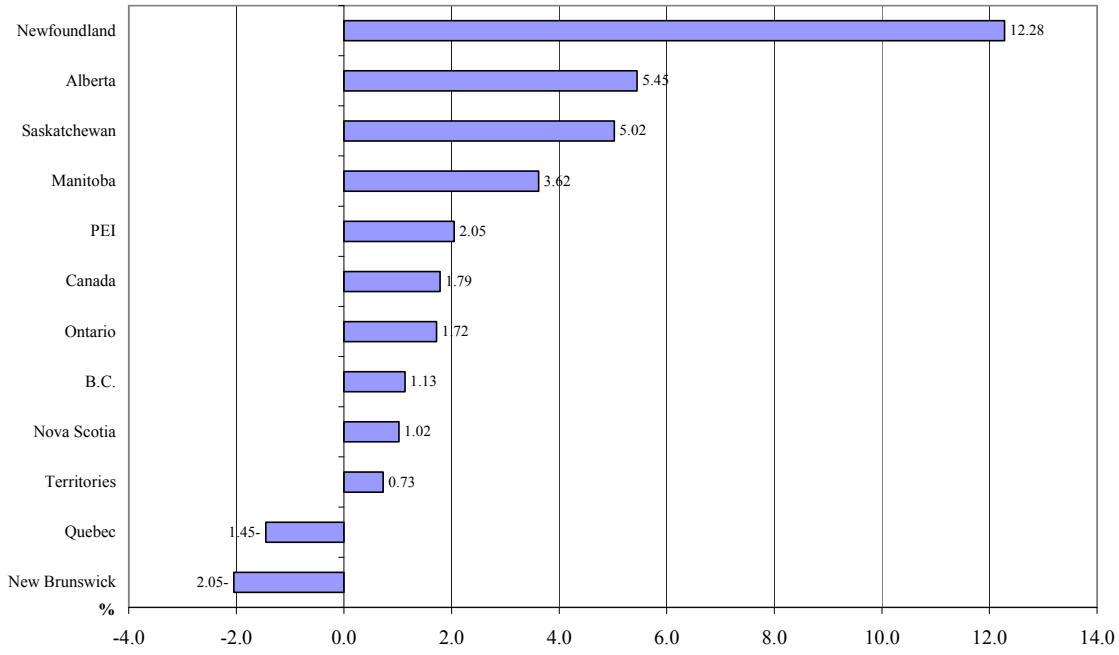
Source: Table 4

The size of provincial apprenticeship programs generally reflects the size of the labour force or population, but with several important exceptions. The registration shares of Newfoundland and Alberta are over twice that of their population aged 15-49 shares, while Prince Edward Island has a registration share just over half that of its population share (Main Table 6 and Chart 7). The provincial shares of total registrations in both Ontario and Quebec are also less than their population shares.

From 1991 to 2002, Newfoundland led total registration growth in Canada, with an average annual growth rate of 12.3 per cent (Main Table 6 and Chart 8). Alberta and

Saskatchewan also saw registrations grow at well over the national rate, at 5.5 and 5.0 per cent per year respectively. Newfoundland and Alberta, and likewise at the national level, began to experience strong growth in 1997. Newfoundland saw average annual growth in registrations of 31.0 per cent per year in 1996-2002, while Alberta saw a more modest but still substantial gain of 9.1 per cent per year. Manitoba also saw rapid registration growth in this period, of 10.3 per cent per year. On the other hand, registrations in New Brunswick decreased in 1991-2002 at a rate of 2.0 per cent per year, and unlike most other provinces, saw virtually no growth in 1996-2002. Quebec saw registration decline by 1.5 per cent per year over 1991-2002 despite growth of 7.9 per cent per year in 1996-2002.

Chart 8: Total Apprenticeship Registration Annual Growth, By Province, 1991-2002

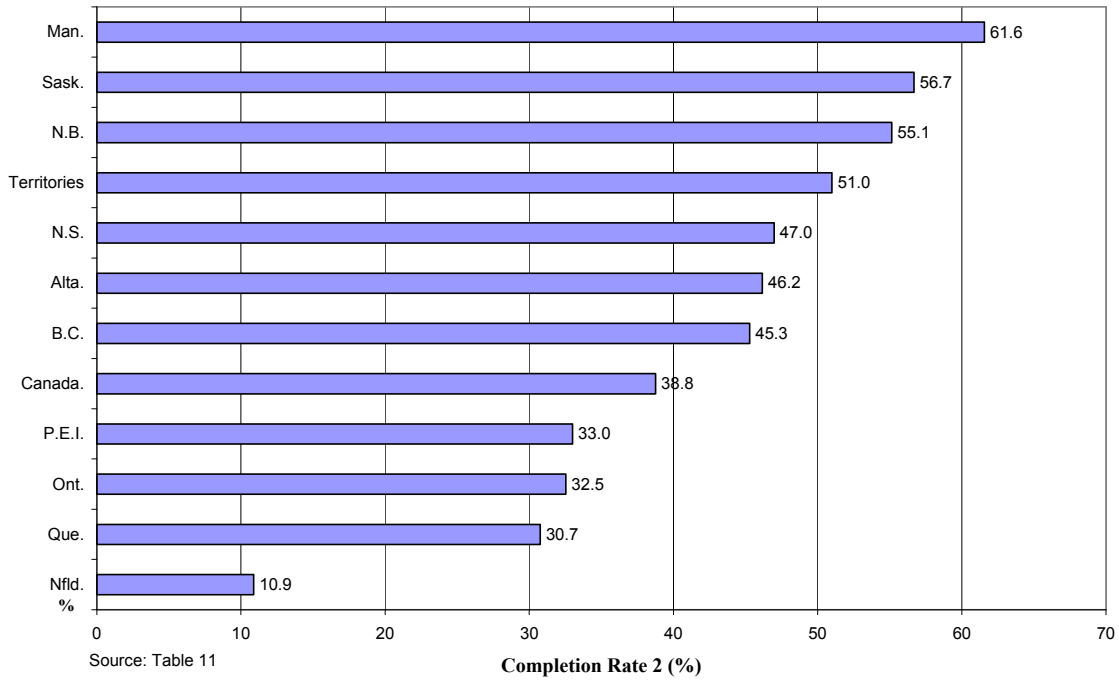


Source: Table 6

Completion rates also vary considerably by province, although the trade composition of each provincial apprenticeship system may affect comparability of these rates across provinces. Using completion rate 2, Manitoba, Saskatchewan, New Brunswick and the Territories had the highest completion rates in 2002, all above fifty per cent (Main Table 11, Chart 9). Prince Edward Island, Ontario, Quebec and Newfoundland had the lowest completion rates, below the national average of 38.8 per cent. Newfoundland's exceptional growth in registrations may account for its extremely poor completion rate of 10.9 per cent.[24]

[24] Increased registration tends to affect completion rates negatively. Although there is no complete explanation, it is likely that many apprentices stay in the apprenticeship program longer than its official duration, pushing down the number of completions within the time period considered.

Chart 9: Completion Rate 2, By Province, 2002



Source: Table 11

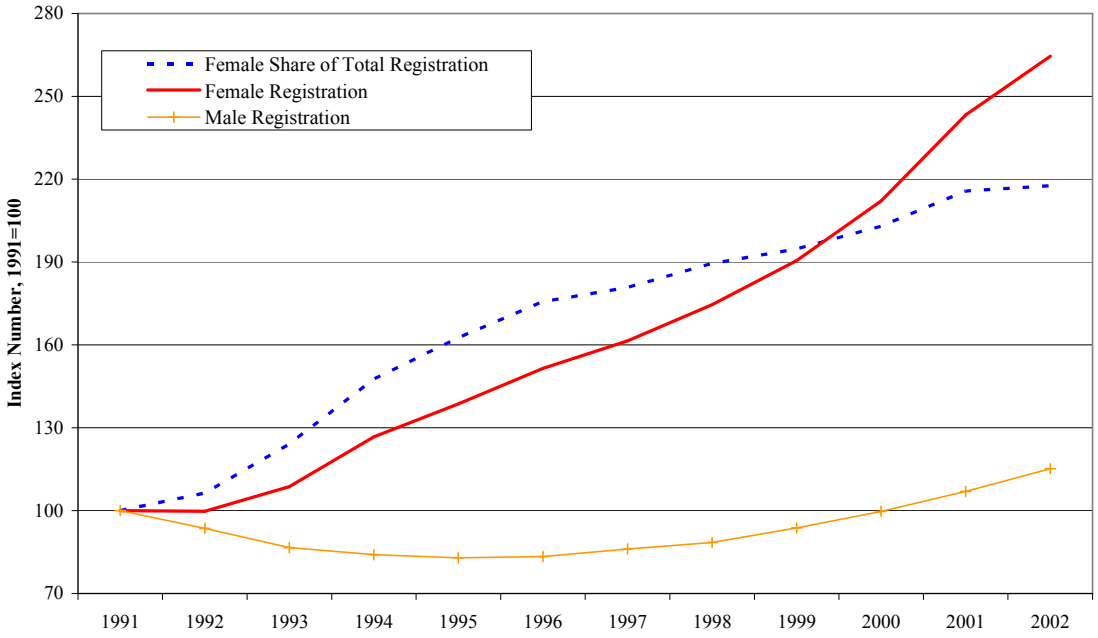
f) Apprenticeship by Gender

One of the most striking traits of the apprenticeship system is that it is characterized by great underrepresentation of women, particularly relative to other forms of post-secondary education. On one hand, it is perhaps not surprising that the apprenticeship system is male-dominated, given that trades in general are male-dominated as well. However, apprenticeship remains an important point of entry for females into the trades and could thus play a crucial role in decreasing gender inequality. This is particularly important within the broader context of redressing gender wage differentials for women who choose not to pursue a university or college education.

In 2002, female apprenticeship registration comprised only 9.3 per cent of all national registrations. While low in absolute terms, this figure is more than double the 1991 share of 4.3 per cent (Main Table 8, Chart 10).

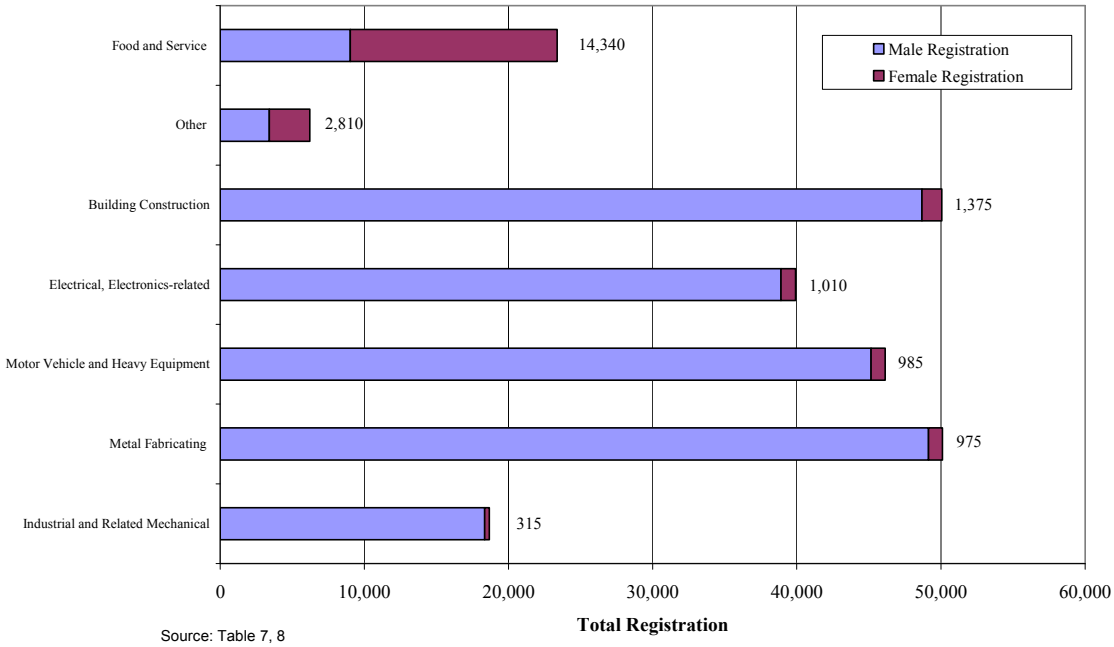
Female apprenticeship registration varies greatly by occupation and province. Female registration is greatly concentrated in food and service trades, which account for 65.7 per cent of total female registrations. When miscellaneous trades are added, these two groups comprise 78.6 per cent of all female registrations (Main Table 8). Food and services trades were the only major trade group in which female registrations were greater than male registrations, comprising over 60 per cent of total registrations in the group. In all trade groups except for miscellaneous and food and service trades, female registration comprised less than five per cent of total registrations (Chart 11).

Chart 10: Female Apprenticeship Registration Trends Index (1991=100), 1991-2002



Source: Table 7, Table 8

Chart 11: Male and Female Total Apprenticeship Registration by Trade Group, Canada, 2002



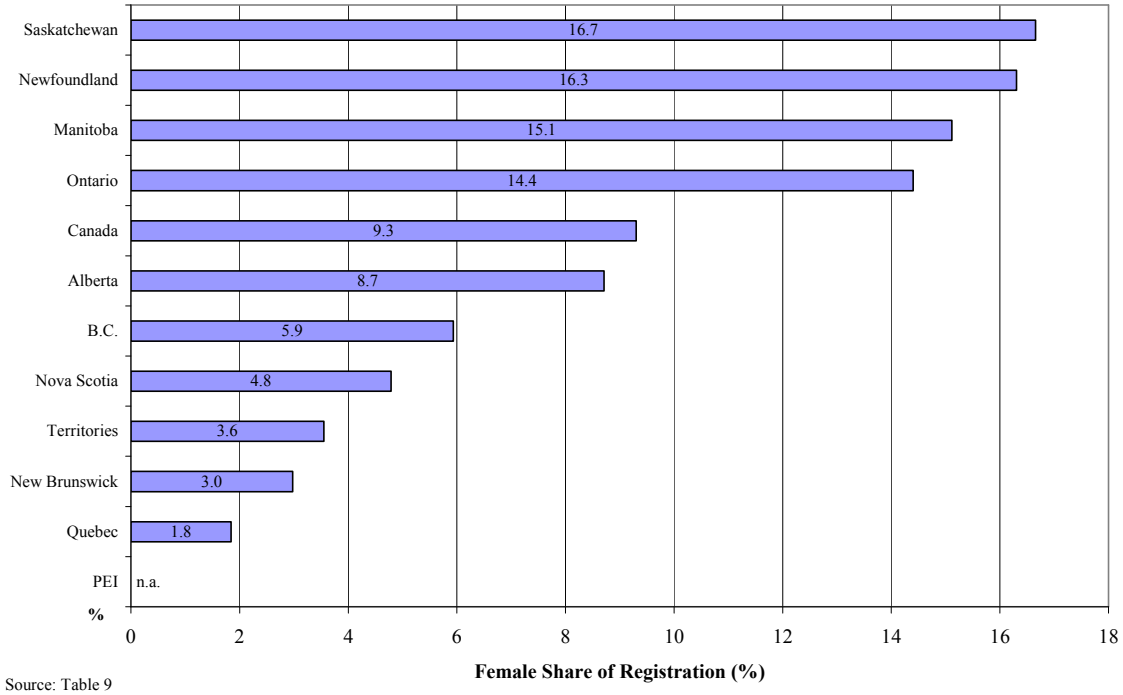
Source: Table 7, 8

Despite an increase in total female apprenticeship registrations, concern on the part of policy-makers about the underrepresentation of females in specific apprenticeship programs may still be justified. This is because female apprentices largely remained

within the food and services trade in the 1990s, without significant expansion into other trade groups. From 1991 to 1996, the share of total female apprentices in the food and services group increased, from 67.1 per cent to 72.7 per cent, although this figure fell back to 65.7 per cent in 2002. All other trade groups also saw decreased shares of total female registration over this period, with the exception of the "other" trades group, which increased from 6.6 per cent to 12.9 per cent, and the metal fabricating trade group, whose registration share was 4.5 in both 1991 and 2002 (Main Table 8).

Female registration by province also reveals significant differences in female registration shares. Saskatchewan, Newfoundland, Manitoba and Ontario had the highest female registration shares in 2002 by far, all exceeding the national average of 9.3 per cent by five percentage points or more (Main Table 9 and Chart 12). However, this did not reflect a higher proportion of female registration across all trade groups, but simply disproportionately large food and service programs. These provinces also had the largest share of food and service registrations in total registrations by a wide margin in 2002 across all provinces (Main Table 17). New Brunswick, Quebec and Prince Edward Island all had female registration shares of three per cent or less in 2002. However, these estimates may be biased in a downward direction due to confidentiality restrictions on estimates of female registration in food and service apprenticeship programs.

Chart 12: Female Share of Total Apprenticeship Registration, By Province, 2002



Source: Table 9

g) Age Composition of Apprentices

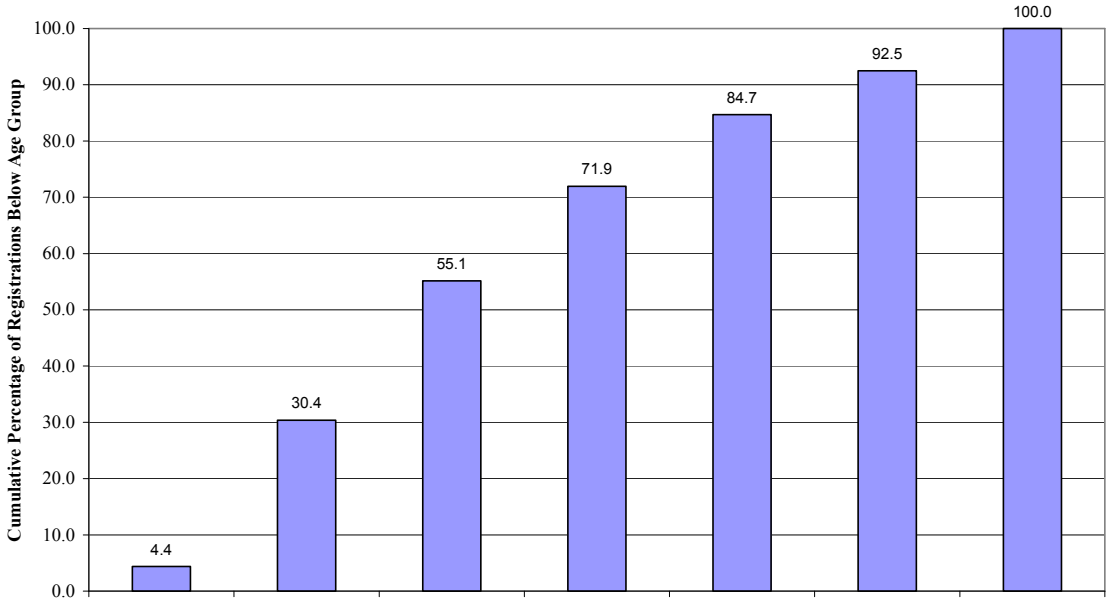
The age composition of apprentices in Canada differs considerably from that found in European countries, as apprentices are much older and typically have work experience. In 1999, 70 per cent of apprentices in Canada were older than 24 and only 4.4

per cent were under 20 (Main Table 5 and Chart 13). The median age at the time of entry was 27, according to the National Apprenticed Trade Survey (NATS) (Stoll and Baignee, 1997: 3). As John O'Grady argues, these data clearly show that the Canadian apprenticeship system does not serve the same function as the European systems, which primarily train young people to enter their first real job:

> *Apprenticeship in Canada is not chiefly about the school-to-work transition of young workers.* Rather, apprenticeship is a means by which individuals without post-secondary training, and often without an affinity for classroom-based learning, get back into the training system and thereby are enabled to make a significant investment in their skills and in their long-run employability (O'Grady, 1997: 1, emphasis in original).

This insight is supported by the experiences of apprentices prior to entering the apprenticeship program. Sixty per cent of apprentices in the NATS survey were aware of apprenticeship programs while they were in high school, but the most common reason for a gap between school and apprenticeship was "a good job" (Stoll and Baignee, 1997: 3). Many respondents had significant labour market experience, such that over half held more than three jobs before entering into the apprenticeship program.

Chart 13: Cumulative Distribution of Age for Canadian Apprentices, 1999



Source: Table 5

It is also possible that the age composition reflects the preferences of employers. O'Grady argues that the preference for experienced tradespeople is based on the wage compression inherent in apprenticeship, such that employers blend experienced and semi-experienced apprentices but pay the semi-experienced apprentices the lower wages. Younger apprentices also face higher risks of accidental injury, which could translate into high costs for employers through worker accident compensation premiums. From this

perspective, apprenticeship is not an investment in training but rather a strategy by which employers profit from reduced wages. Given this strategy, there will be an employer preference towards over-recruitment and thus journeypersons[25] to apprentice ratios are important regulatory components to ensure training (O'Grady, 1997: 3). To the degree that Canadian apprenticeship is industry-driven, government intervention to promote apprenticeship as a school-to-work institution will not be effective because of employer demands (O'Grady, 1997: 2).

VI. Determinants of Registration and Completion Trends in the Apprenticeship System in Canada

Given the statistical picture presented above, several issues stand out regarding the Canadian apprenticeship system. First, the apprenticeship system remains a small although stable part of post-secondary education. Although recent efforts and increasing apprenticeship registration are encouraging, community colleges have had superior growth in registrations and remain an attractive post-secondary education option with entrance requirements below those of the university system. Second, completion rates have dropped substantially by all estimates. Finally, gender inequality remains severe. The following section examines factors that may account for these weaknesses in the system.

a) Awareness of the Apprenticeship System

A consensus exists that raising awareness about the apprenticeship system would translate into higher registration levels, particularly youth registration. The Registered Apprenticeship Survey of participants of the apprenticeship program in 1994-1995 showed that even among participants of the apprenticeship program, nearly forty per cent were not aware of the apprenticeship program in high school. This number is likely to be significantly higher in the general population, as the participants clearly selected themselves into the program based on experience not available to everybody. Participants of the apprenticeship program tend to have developed an interest in apprenticeship through contact with a tradesperson, knowledge of the trade through a previous job or through a hobby (Stoll and Baignee, 1997: 4).

Many studies criticize the educational system for not effectively promoting apprenticeships as an educational option, as well as having little knowledge of the trades and particularly, the apprenticeship system. The Canadian Apprenticeship Forum's (CAF) 2004 report suggested that a lack of institutional networks may be responsible, particularly institutions linking guidance counsellors to provincial apprenticeship authorities and strong national institutions that effectively market apprenticeships (CAF, 2004: 19). Scholars agree that there is a clear bias towards academic rather than vocational education within secondary schools, where career counsellors are unfamiliar with the apprenticeship system and view it as a career route for students with poor educational attainment.

[25] Journeypersons are workers with apprenticeship certificates.

Evaluated as a school-to-work institution, the apprenticeship system's performance is severely constrained by its lack of integration into the education system and the failure of the trades to promote themselves independently. The result is that the public has relatively little knowledge of the apprenticeship system and that information is not readily available. In addition, the provincial registration requirements are sometimes considered more cumbersome for apprenticeship than for university, acting as a deterrent to both prospective apprentices and employer sponsors (CAF, 2004: 51). The outcome is that the pathways from secondary school to apprenticeship are not clearly articulated, where potential apprentices may lack the knowledge or confidence to enter into the program (CAF, 2004: 19).

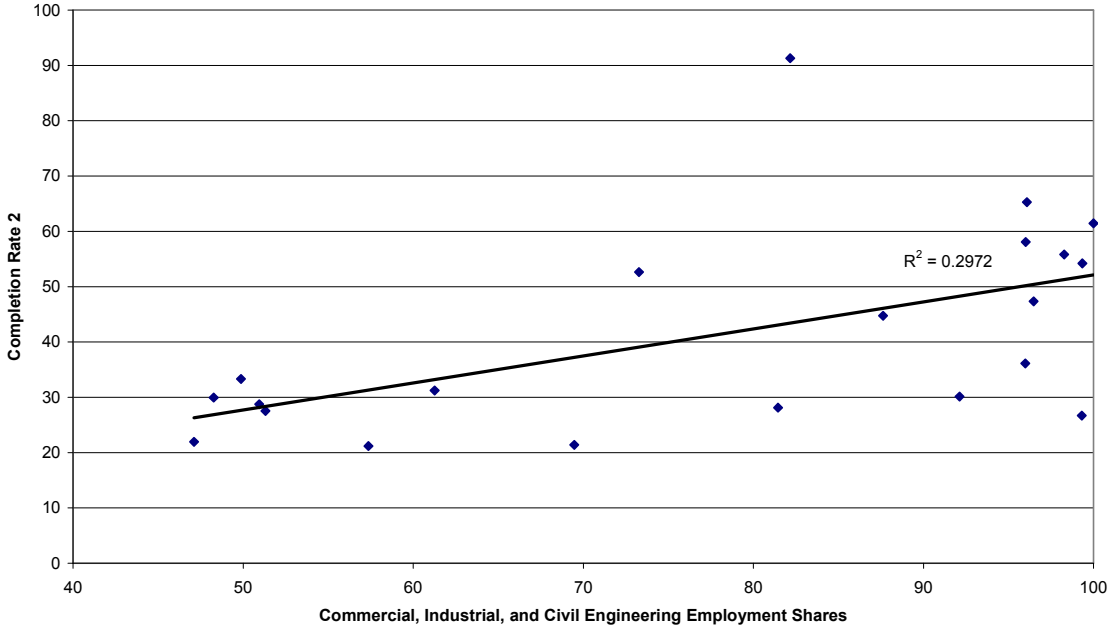
b) Apprentices' Expected Value of Training

As discussed above, the choice to invest by registering in an apprenticeship program will depend on its expected benefits. Attitudes towards apprenticeship capture some of these expectations in terms of expected earnings, job satisfaction and career mobility.

There is a strong consensus a negative image of trades persists with the public that significantly inhibits apprenticeship registration. This is reflected both in low apprenticeship registration relative to other educational options and the fact that many apprentices already have substantial employment experience and use apprenticeship as a means to re-skill. Respondents to the CAF report observed there is a widespread image of trades being inferior to other occupations in terms of challenge, required aptitude, compensation and social status: "trades were perceived as 'second-class' careers or 'dead-ends,' with little career-advancement potential." Labour groups noted that many tradespeople do not hold their own trades in high esteem, in contrast to the social value of being a tradesperson in Europe. A survey of Ontario showed that only four per cent of respondents choose skilled trades as the best career for youth (CAF, 2004: 12-13).

Commensurate with this negative view of career outcomes was a clear preference for university and college education over apprenticeships. The Select Standing Committee on Education in British Columbia suggested that "there is some indication that students who opt for non-university-related programs are viewed to somehow have failed" (CAF, 2004: 12). Multiple studies concluded that parents view trades programs as an acceptable education system, but prefer university to apprenticeship as an educational option (CAF, 2004: 13). With its "second-best" connotations, it is not surprising that youth enrollment in other post-secondary options is much greater than apprenticeship registration. Interestingly, attitudes have not adjusted to the mismatch between educational choices and the positions available in the university system, accounted for by a third of youth that do not enter tertiary education (Schuetze, 2003). It is likely that the cultural emphasis on university education has led youth to choose university paths in a "number disproportionate to their probable destinations" (Taylor, 2003: 5).

Chart 14: Commercial, Industrial, and Civil Engineering Employment Shares versus Completion Rate 2, 2001



Source: Table 27

Clearly, higher expected earnings for the completion of an apprenticeship program would provide more of an incentive for completion. Unfortunately, detailed earnings data are not available for completers versus non-completers on an apprenticeship program basis. However, outcomes from the construction sector suggest that higher expected earnings do have a positive impact on completion rates. Jobs in the residential construction sector tend to pay less and be less stable that jobs in the industrial and civil engineeering sectors, and to a somewhat lesser degree, the commercial sector. Main Table 27 shows the share of residential, commercial, industrial and civil engineering employment for various trades in the construction sector. Industry publications confirm that residential construction has the lowest expected earnings in the construction sector. The correlations shown in the table confirm that trades that have a high share of employment in the commercial, industrial and civil engineering sectors, and a low share of employment in the residential sector, tend to have higher apprenticeship completion rates than trades that have a low share of employment in the commercial, industrial and civil engineering sectors, and a high share in the residential sector (Chart 14).[26]

c) Costs of Apprenticeships to Apprentices

Controversy exists among studies about the extent to which cost discourages entry into apprenticeship training. Indeed, one of the advantages of the apprenticeship system is the wages paid throughout,[27] in contrast to the debts that are often incurred in the

[26] The CSLS would like to thank George Gritziotis of the Construction Sector Council for this insight.
[27] It should be noted that the wage paid to apprentices is "managed" and a floor price.

university system. Respondents to the CAF study noted that apprentices may face considerable costs associated with block release training, particularly when travel is required to reach training centers. Tool costs may also be considerable, dependent on the industry. Income interruption due to block release was frequently stressed by studies as a major cost, particularly for apprentices supporting families, as it could last for up to six weeks (CAF, 2004: 32). Respondents also noted that government services were often not responsive, such that EI payments for block release were often delayed and in most jurisdictions, apprentices were not eligible for student loans (CAF, 2004: 31).

In addition, older apprentices, particularly relative to European apprenticeship programs, generally have higher opportunity costs of participation. The fact that half of apprentices had three or more jobs prior to entering the apprenticeship program suggests older apprentices have better job prospects than younger apprentices outside the employment they have in apprenticeship programs. The fact that 35 per cent of women and 40 per cent of male apprentices had dependents suggests that older apprenticeship may be less willing to accept low wages during apprenticeship even with the expectation of higher wages after completion (Stoll and Baignee, 1997: 3).

d) Costs of Apprenticeship to Employers

The cost of apprenticeship to employers is cited as a major barrier to expanding the apprenticeship system. As discussed in the third section, incentives must exist for employers to provide the costly training involved in apprenticeship. Richard Marquart argues that the costs of apprenticeship are a major determinant of apprenticeship's decline in the past decade in Canada, as employers pay more than three times the cost for apprenticeship as employers in Germany due to longer terms and a higher minimum wage (Marquart, 1998: 12).[28]

Survey results suggest that poaching externalities are a major barrier in hiring apprentices (CAF, 2004: 31). Recalling the discussion on apprenticeship and collective action, employers are unlikely to take a long-run view on the public benefits of apprenticeship if regulatory regimes are not in place. The CAF points out that while research has identified the costs associated with apprenticeship, there is little evidence on the net costs to convince employers that apprentices may be a worthy investment. Research suggests that small firms may find apprentices particularly costly, especially when collective agreements increase wages and decrease flexibility. One government representative interviewed by the CAF noted that "many employers associate apprenticeship with 'getting saddled with organized labour' and a system of training that is over-regulated and inflexible" (CAF, 2004: 30).

[28] As noted by one reviewer of the preliminary version of this report, a solution to the problem of high direct employer cost of employing apprentices may be to beef up the wage of trainees through a public program that is financed through a uniform levy on firms operating in sectors or industries using apprenticeship trades. This would solve the poaching issue, as firms would then face the "right" price when making decisions to hire. Such a program may however be difficult to design and to administer efficiently.

There also exists a consensus by employers that the personal attributes and capability of apprenticeship candidates negatively affected this attitude to apprenticeships. Employer concerns included "inadequate essential skills, including literacy and mathematics… poor work ethic, interest in learning, workplace discipline and confidence" (CAF, 2004: 42). These observations are supported by educators, who note that many apprenticeship candidates have low educational attainment relative to their peers (CAF, 2004: 42). It is likely that this reflects the academic bias in the secondary education system, such that lower quality candidates self-select themselves into apprenticeship. Data from the Registered Apprenticeship Survey modified this picture, however, as sixty-six per cent of respondents found their apprenticeship training in the workplace easy or very easy while thirty-one per cent found it difficult or very difficult (Stoll and Baignee, 1997: 6). This suggests that only a portion of apprentices are ill-prepared for apprenticeships, while the majority do not find their preparation for training inadequate.

e) Employment Instability

Employment instability is a central problem for all stakeholders in the apprenticeship system. Unemployment in the past decade caused a substantial decline in apprenticeship registrations, due to the simple fact that apprentices must have employers to complete their programs. In economic downturns, apprentices are vulnerable and often the first to be laid off. From an employer's perspective, employment instability is a serious threat that greatly increases the risk of their investment. If laid-off, apprentices will pursue employment at other firms, who will capture the firm's investments in human capital (Schuetze, 2003; CAF, 35).

However, employment instability is an even greater concern for apprentices. Unemployment not only removes employee income, but it may also have a negative impact on the advancement and the completion of their training. Thirty-seven per cent of NATS respondents reported that they had experienced temporary unemployment during their apprenticeship program. Temporary unemployment was particularly high in the building construction trades, in which 52 per cent of apprentices had been unemployed (Stoll and Baignee, 1997: 5-6). Apprentices also cited unsteady or insufficient hours as a major factor in discontinuations. Twenty-four per cent of respondents indicated that lack of work made continuation of apprenticeship programs difficult and 41 per cent of male non-completers indicated that the lack of work was the principal reason for their discontinuation (Stoll and Baignee, 1997: 6). Certain unions have responded to this issue by shouldering this risk, where apprentices are indentured to unions who ensure employment continuity (CAF, 2004: 35).

f) Program Structure

The inflexibility of the block release component of apprenticeships is cited as a significant structural deficiency in the apprenticeship system. Block release refers to the period in which apprentices attend the academic portion of apprenticeship training, often for two weeks at a time, which causes income interruptions for apprentices and

productivity interruptions for employers. The call for more flexible training arrangement was universal across both occupational sectors and stakeholders, such that apprentices could fulfill their vocational training in the evenings or on weekends (CAF, 2004: 45).

The lack of articulation bridging apprenticeship with other educational pathways is also an important deficiency of the system. Few arrangements exist bridging apprenticeship and technologist programs, which limits the entry of technologists into apprenticeships but more importantly limits the career mobility for those who complete apprenticeships (CAF, 2004: 45). Additionally, many apprenticeship programs do not easily recognize prior experience, which would encourage entry from semi-skilled labour (CAF, 2004: 47). A debate exists over whether the apprenticeship curricula should be modularized. On one hand, modularized training renders apprenticeship more flexible in the context of employment instability and accurately signals the skill level of apprentices. On the other hand, labour representatives object on the basis that modularized training based on skills-competence may weaken apprenticeship standards (CAF, 2004: 54). This is reminiscent of the move towards competency-based assessment in the UK, as discussed in the fourth section, which was criticized on the same basis.

g) Training Quality

Various stakeholders have cited other structural weaknesses that impact training. The lack of training and incentives for journeypersons in delivering training experience has been cited as a limitation in providing quality training (CAF, 2004: 46). This does not appear to be an endemic problem, however, as the NATS data indicate good rates of apprentices satisfaction with on-the-job training experiences: "a large majority of respondents rated their on-the-job training as good or excellent in regard to quality of supervision received (74 per cent of respondents), to the relation of skills taught to the basic requirements of the trade (81 per cent), to the variety of duties related to the trade (80 per cent), and to the adequacy of equipment and facilities provided for learning the skills of the trade (80 per cent)" (Stoll and Baignee, 1997: 6).

Many employers have expressed the concern that apprenticeship with a single firm often leads to an overly narrow skills set, particularly when smaller firms might specialize in a specific aspect of the trade. Indeed, this possibility is mentioned in the scholarly literature, where a single firm may invest in overly specific skills that are not socially optimal. NATS data confirms that the majority of apprentices (62 per cent) had only one employer during their apprenticeship (Stoll and Baignee, 1997: 5).

Other criticism included academic training that was outdated or employed antiquated equipment (CAF, 2004: 46), which might be due in part to the lack of funding for college programs, which often run apprenticeship modules at a financial loss (CAF, 2004: 38,39). Provincial regulatory differences are frustrating for stakeholders, particularly those who operate in multiple provinces, as standards set by national sector councils are not necessarily adopted by the provinces. Because of this difficulty in

dealing with multiple regulatory regimes, sectoral organizations have incentives to promote informal apprenticeship-like programs (CAF, 2004: 53).

h) Gender Equity

The most frequently cited obstacles to gender equity were women's perception of the apprenticeship program and discrimination in the workplace. As discussed above, women's participation in the apprenticeship system tends to be minimal and centered around traditional female trades: "[Analysis] of women's participation in the largest trades categories (those with more than 3,000 registrants) revealed that fewer than 4 percent of apprentices in the non-traditional trades were women, while the proportions in cooking and baking trades and in hairdressing and related areas of aesthetics were 25 and 75 percent respectively" (Sweet, 2003: 263).

This composition may be partly explained by a lack of encouragement for women to enter non-traditional apprenticeships. Attitudes towards trades are clearly conditional on gender, where trades are systematically considered "man's work," leading to both female self-selection into other career avenues and influence from family or the educational system to do so (CAF, 2004: 14). Other powerful influences include the satisfaction of parents' or spouses expectations, either in terms of career choice or in terms of having a role that is not the "breadwinner" of the family (CAF, 2004: 14). Additionally, gendered differences in informal networks may play a role. Much of apprenticeship recruitment depends on informal contacts and women may have poorer informal networks to acquire employer sponsorship than men, limiting their opportunities for entry (CAF, 2004: 20).

However, CAF's report on barriers to entry into apprenticeships noted that discriminatory hiring practices, stereotyped perceptions of women's abilities, isolation or segregation of women, unequal pay, and sexual harassment were also significant deterrents for apprenticing in the trades (CAF, 2004: 25). Studies suggested that in some cases employers viewed hiring women as a risk, including concern about their aptitudes in the trades (CAF, 2004: 26). More disturbing still is the fact that NATS female respondents cited sexual harassment or discrimination as the greatest challenge to continuing apprenticeships, above employment instability. Indeed, only 17 per cent of discontinuations indicated that their choice was motivated by lack of work, in contrast to 41 per cent in male respondents (Stoll and Baignee, 1997: 6).

i) Apprenticeship Training Outcomes

i) Employment

Participation in an apprenticeship program has a substantial impact on employment outcomes. The majority of NATS respondents (72 per cent) worked in the trade of training within 12 months of leaving the program. However, apprentices who completed their programs had a 93 per cent rate of employment versus the 35 per cent

rate of employment for those that did not complete (Stoll and Baignee, 1997: 7). Results were similar for the percentage of respondents engaged primarily in work 12 months after leaving their apprenticeship program: 92 per cent for completers and 78 per cent of non-completers. Thus, participating in the apprenticeship program had a positive impact on employment regardless of completion, but completers were much more likely to work in their trade of training. Although these statistics initially support the conclusion that the apprenticeship program may be superior to university or college post-secondary programs in terms of school-to-work transition, it must be recognized that apprentices typically possessed work experience prior to entering the program.

ii) Income

Completion of an apprenticeship program also substantially improved income. Sixty-one per cent of completers earned over $30,000 per year compared to only 31 per cent of non-completers (Main Table 25). The increase in income associated with completing an apprenticeship program differed according to trade group substantially. Using a rough approximation of average income, completers in the food and service group earned only 5 per cent more than non-completers. Similarly, the wage differential between completers and non-completers was also relatively low in building construction trades (22 per cent) and motor vehicle trades (22 per cent). Wage differentials in the other trade groups ranged between 30 to 40 per cent, where the industrial-mechanical group had the greatest difference at 40 per cent (Main Table 26).

In addition to apprenticeship surveys, census employment income data can be used to estimate the returns to apprenticeship training, as Boothby and Drewes (2004) have done in a recent study. They point out however that "we have very little information on the dynamics of the returns to trade education that would assist in diagnosing the skilled shortages problem."

Boothby and Drewes find that trades certification generates fairly low earnings gains compared to high school graduates, and only when coupled with completed high school. Trade certification produces larger gains for men than women. For example, in 1995 male workers with a trade certification who had completed high school earned on average 11.4 per cent more than those who had only completed high school. (Men with a bachelor's degree enjoyed a 45.8 per cent earnings premium.) Male workers with a trade certification without high school only earned a 4.3 per cent premium. The premium for female workers with a trade certification who had completed high school was a meager 3.5 per cent and was actually negative (-3.8 per cent) for female workers with a trade certification without high school completion. The estimates for earnings premia for trade certification for men and women for 1980, 1985 and 1990 were similar to the 1995 estimates.

The premium associated with a completed college diploma is appreciably larger but still less than half and often as little as a third of the earnings advantage associated with university completion at the Bachelor's level.

Boothby and Drewes note that the existence of labour market shortages in the skilled trade sectors should not be surprising given the low earnings premiums to workers with trade certification, but argue that what is interesting and worthy of further research is why the earnings premium for trades education appear not to have respond to labour market imbalances.

VII. Institutional Innovations

a) Federal Institutional Reform

The federal role in the apprenticeship system has diminished in the past decade due to the aforementioned devolution of training responsibility to the provinces and the dissolution of the Canadian Labour Force Development Board (CLFDB) in 1999 which ended the Apprenticeship Committee. The CLFDB had been created in 1991 by the federal government to endow its social partners, including business, labour, education and "equity" groups, with "an unprecedented degree of influence over national and provincial labour market initiatives" (Haddow and Sharpe, 1997: 3). The focus of this advisory power had been social cooperation and engagement in the development of policy specifically targeted at skills development, directly implicating apprenticeship. The experiment, however, went awry with the persistent cleavages between business and labour interests. Business representatives in the board proposed a major reform of the organization's structure and activities as a condition for their continued participation. As the proposal was unacceptable for labour representatives, the board was dissolved (International Reform Monitor, 2000).

The dissolution of the CLFDB both contributed to and is illustrative of the weak institutional framework for labour market policy in general and apprenticeship specifically. Partially, this weakness reflects the historical marginalization of training institutions in Canada that have been substituted with a long-standing policy of relying on the supply of skilled immigrants for human capital (Marquart, 1998). Educational institutions also supplied skilled workers, but the inflow of skilled labour eased the frictions between the rapidly shifting labour demands due to technological change and the slow adaptation of educational institutions. As the OECD observes: "Such a system inevitably rested on an assumption that employers' skill needs would be relatively stable over time and that changes could be predicted well in advance… This approach to skill supply is becoming less efficient in unstable and unpredictable labour markets" (OECD, 1999: 31).

Given the linguistic and regional cleavages in Canada, federal-provincial and inter-provincial coordination on existing apprenticeship policy has also been difficult. The policy approach of the provinces has tended towards decentralization rather than centralization of responsibilities, focusing on local groups and partnerships between economic actors and the education system. As noted by the OECD, the large number of actors has led to significant coordination failures, a "maze of initiatives and programs" (Taylor, 2003: 4). Schuetze (2003: 88) notes that the aforementioned skills initiatives by

the federal government (and indeed any major initiatives in apprenticeship promotion) are a new role, one "which it has not played very efficiently in the past."

In addition to governmental divisions is the tension between business and labour interests evident from the dissolution of the Canadian Labour Force Development Board (CLFDB). There is a broad consensus that the weak tradition of social partnership or corporatism is a major impediment to institutional solutions to training issues. Obviously, this reflects the aforementioned linguistic and regional cleavages and the fragmentation of both business and labour organizations (*International Reform Monitor*, 2000). The low rates of unionization create severe tensions in any organizations which feature equal representation, which contributed to the Prince Edward Island's inability to form a Labour Force Development Board (Haddow and Sharpe, 1997b). In Schuetze's assessment of the prospects for social cooperation on apprenticeship:

> On the whole, the decline in apprenticeship training and the low incidence of employer-provided training can only be understood against the background of the highly decentralized and adversarial system of industrial relations in Canada. The abolition of the CLFDB, which had been created to strengthen the commitment of both the trade unions and business to training and provide a forum for exchange, collaboration, and the building of mutual trust, meant a clear weakening of the infrastructure, already fragile in Canada, that is needed for a coherent and stable system of industrial training. The result is further marginalization of apprenticeship training, which the recent reform initiatives by individual provinces cannot really overcome. (Schuetze, 2003: 83)

The federal government re-established a limited role for itself in the apprenticeship system with the establishment of the Canadian Apprenticeship Forum (CAF) in June 2000. The CAF's goal is to promote apprenticeship, integrating key stakeholders throughout the Canadian apprenticeship system. Its organizational structure is similar to that of the CLFDB, comprised of representatives of business, labour, the Inter-Provincial Alliance of Apprenticeship Board Chairs (IPA), educators, persons with disabilities, members of visible minorities, aboriginal persons, women, and Human Resources and Skills Development Canada (HRSDC).[29] In addition, however, it includes a number of the members of the Canadian Council of Directors of Apprenticeship (CCDA), which is a powerful stakeholder in the development of apprenticeship policy. In addition to their efforts in consultation, the CAF has taken on the task of promoting registration, largely through information campaigns, and defining the meaning of a "common core" curriculum to support the efforts of industry stakeholders that may wish to advance work in this area. Despite these efforts, Schuetze (2003: 83) argues that the CAF has not attained the same profile as its predecessor, the CLFDB, nor has it had the same impact.

Although vocational training in general is often characterized as industry-driven, it is important not to underestimate governmental influence. As the Construction Sector Council's 2004 report argues, the policy decisions, particularly related to budgets, are the most important determinant of training supply for the construction industry. Not only is

[29] http://www.caf-fca.org/english/about.asp, accessed 6/7/2004

the configuration of the education system a key linkage in the provision of training, but also the provincial regulatory regimes governing certification and safety regulations (CSC, 2004: 6).

b) Provincial Institutional Reform

i) British Columbia

Recent reform of the apprenticeship system in British Columbia has focused on competency-based qualifications and devolving much of the administration from government to industry. A discussion paper entitled "A New Model for Industry Training in British Columbia" was published in 2002 to outline the new model envisioned and public consultations followed. The proposed model has been controversial, with two petitions of more than 600 names calling for the maintenance of apprenticeship and trades qualifications in B.C (MAE, 2003). The new system, initiated with the establishment of the Industry Training Authority (ITA) in August 2003, proposes four major reforms.

First, the assessment of certification will be purely competency-based, replacing the former system that required a minimum training period. Second, certification will be broken down into component modules that stand independently and can be achieved through not only the traditional apprenticeship system but also other post-secondary education programs. This approach is sometimes called progressive credentialization. Third, the provincial government has devolved much of the responsibility for the apprenticeship system to industry, including the design of academic curriculum, responsibility for promotion and some responsibility for funding. Finally, the old Industry Training and Apprenticeship Commission (ITAC) has been replaced by ITA, which is composed of nine board members drawn from employers rather than a larger, more representative ITAC board that included four stakeholder vetoes. Each of these reforms will be discussed in depth below.

The new model, as laid out in the discussion paper referenced above, refocuses assessment from being based on both competency and the completion of a fixed program duration to only competency. The removal of fixed program durations is aimed to "allow workers to be tested when they are ready," taking into account that worksite experiences will vary considerably (MAE, 2002: 19). The administration of assessment has yet to be specified, although it will likely include "a variety of mechanisms that involve trainers, industry and workers." In the public consultations that occurred, apprentices and trades-workers indicated their concern about shortening the duration of on-the-job learning, arguing that it would erode training quality (MAE, 2003: 8). Additionally, apprentices argued that industry should not be given the responsibility for the regulation of training quality; rather, it should remain with the government and journeypersons.

A crucial part of competency-based assessment is the modularization of apprenticeship, such that the full trade certification would be broken down into smaller modules. The 2002 discussion paper uses the following example:

> Under the old system, carpentry apprentices were required to have a job before they could gain access to training. Once registered via an apprenticeship agreement, apprentices began a four-year, on-the-job training program that included four ITAC-scheduled sessions of in-school technical training, usually one session per year. They were also required to receive practical training in all facets of the carpentry trade. In order to acquire the skills and knowledge to achieve journeyperson certification, an apprentice employed by a *forming* contactor might be forced to quit their job to find work with a *framing* contractor and then change employers again to gain experience with a *finishing* contractor.
>
> There was no opportunity under the old system *for progressive credentials such as forming carpenter, framing carpenter or finishing carpenter*. There was no opportunity either for apprentices to have access to training deemed part of another trade, even if those skills were required for an individual's job. (MAE, 2002: 14)

Modularization or progressive credentiaslization, is designed to recognize skills incrementally, in order to prevent the large losses that are associated with heavily investing in an apprenticeship but being unable to fully complete it. It is also designed to permit "multi-skilling," such that tradespeople can acquire skills sets outside their apprenticeship program designation but that might be needed in a particular work environment. It also allows tradespeople to change trades much more easily, as it allows common skill sets already acquired by a tradesperson to be recognized.

The reforms in modularization are also designed to permit multiple pathways to acquiring apprenticeship certification. Skills set modules may be challenged by already experienced trades-people who can demonstrate their proficiency, allowing foreign-trained trades-people to have their skills recognized. In addition, other forms of post-secondary education such as community college-based trades programs will be able to provide training for particular skills modules. These reforms will be part of a broader system of "laddered" education, where community college programs can fulfill co-op programs to work towards both apprenticeship certification and an applied degree (MAE, 2002: 15).

There have been considerable criticisms of the modularization reform from apprentices and unions. Apprentices are concerned that small business employers might abuse the modularization system, pidgeon-holing semi-skilled apprentices and discouraging full training (MAE, 2003: 4). Unions argue that modularization may result in de-skilled apprentices, creating a group of urban workers specialized in a single skill set.

The administration of BC apprenticeship system has been substantially devolved to industry, including the responsibility for the promotion of apprenticeship, development of training programs and strategic planning (MAE, 2002: 10). Under ITA, employers work closely with training institutions and the secondary education system and design the new skills sets described above. ITA retains its responsibility for maintaining quality standards and credentials for provincial and inter-provincial trades, including the Red Seal program. The government is also responsible for providing labour market

information, including apprenticeship outcomes, described as the Labour Market Information Network (LMIN) in the new ITA service plan (MAE, 2002: 9; ITA, 2003: 11). While the provincial government will continue to fund training delivery based on available jobs, part of the responsibility for funding will fall to apprentices and employers (MAE, 2002: 18).

The discussion paper itself noted that the major risks for the new model are embedded in the new division of responsibilities. Specifically, the new model "puts additional responsibility on the learner to fund and for the learner to make employment connections" (MAE, 2002: 8). In addition, the new model "relies extensively on coordination of action being undertaken by the main participants," on the basis that it is preferable to the costs of keeping administration in the hands of ITAC (MAE, 2002: 8). However, consultation indicated that some stakeholders were concerned about the prospects for coordination. Both unions and trainers were concerned that employers would not be able to effectively promote apprenticeship (MAE, 2003: 4).

Finally, the apprenticeship's administrative body has been substantially changed with the creation of ITA. Formerly, ITAC had a much more complicated decision-making process, with a 25-member board and four stakeholder groups having individual vetoes (MAE, 2002: 8). The administrative body also included 115 public servants, which interacted with two government ministries. Advisory committees were highly structured and based on trade. In contrast, ITA is a body responsible to, but independent of government. It is composed of a nine-member board composed of only employers. Commensurate to its decreased responsibilities, ITA's staff is composed of only ten persons, hired by ITA's CEO. Trade unions groups criticized the fact that no labour representation was included in either the ITA board or guaranteed in its advisory committees.

The new direction charted by the BC apprenticeship system is in many ways similar to the reforms that took place in the British apprenticeship system described earlier in the report. However, the shift from duration and competency-based to solely competency-based assessment provoked considerable concern about the declining quality of training in the UK. In particular, the actual duration of apprenticeships in some programs dropped considerably, in some cases to only one year (Steedman, 2001: 5-6). Additionally, the decentralization of assessment mechanisms was heavily criticized, as its implementation by employers created moral hazard (Steedman, 2001; Ryan, 2000).[30] Thus, the success of the new model may rely on the quality assessment mechanism, whose specification has been limited in the publications available.

ii) Ontario

In 2000, the Ontario provincial government introduced the Apprenticeship and Certification Act, in an effort to reform the apprenticeship system's institutional framework. Absent from this reform was the construction sector, which remained under

[30] Ryan points out that if only employers assessed the quality of their own training, they would have an incentive to provide poor training and simply take advantage of the apprentice's cheap labour.

the governance of the previous Trades Qualification and Apprenticeship Act. The focus of the legislation was to de-regulate substantial aspects of apprenticeship agreements, such that they could be regulated by industry committees.

Similar to the BC reforms, regulation of the apprentice-trainer agreement was devolved to industry. Whereas previously apprenticeship programs had been a minimum of two years long, the duration of apprenticeship programs is no longer regulated except by industry guidelines. Similarly, apprenticeship wages and apprentice-to-journeyperson ratios are no longer regulated by the government but rather according to industry guidelines. Industry committees are also expected to set the criteria for certification and minimum educational entry requirements.

Commensurate with these new responsibilities to the regulation of apprenticeship, the role of industry in apprenticeship administration has been strengthened. The previously existing Provincial Advisory Committees (PACs) have been given an explicit mandate to promote high standards in apprenticeship (OMTCU, 1998b). In addition, Directors of Apprenticeship are required to seek the recommendations of the industry committees prior to approving a new apprenticeship program.

Unlike the BC system, however, legislation guarantees the composition of industry committees, which divides representation equally between employer and employee representatives (OMTCU, 2000c). In addition, certification is awarded only for the completion of a full apprenticeship program, as opposed to the modularization of apprenticeship programs in the BC model. However, several key aspects of the system were deregulated. The new bill allows any party (rather than simply a private employer) to sponsor an apprenticeship agreement,[31] including one based on part-time work. It also allows apprentices to pursue their academic training on a flexible basis (rather than block release) at any approved training institution, as well as allowing credit for past work experience (OMTCU, 1998a).

The Ontario government has also engaged in numerous initiatives over the past five years to promote apprenticeship. These initiatives have been mostly financial rather than institutional, designed to support different stakeholders in the apprenticeship system. Summary Table 7 outlines these initiatives.

Summary Table 7: Ontario Apprenticeship Initiatives, 2000

Program	Description
Ontario Co-operative Education Tax Credit (OCETC)	In January 1998, the Ontario Co-operative Education Tax Credit was extended to employers training apprentices in specific skilled trades. Eligible trades include computer-aided design and automated manufacturing, as well as telecommunications and information technology. In 1999, the eligible period of support was extended to 24 months.
Loans for Tools	In May 1998, the government introduced the Loans for Tools program that

[31] This provision allows not only private firms to sponsor apprenticeships but also government and local apprenticeship committees.

Program	provides loans to new apprentices to cover part of the cost of buying tools.
Ontario Youth Apprenticeship Program (OYAP)	In June 1998, the Ontario Youth Apprenticeship Program (OYAP) was provided with new funding and a more accountable framework to help students begin working towards an apprenticeship while completing high school.
Women in Skilled Trades Initiative (WSTI)	The 1999 provincial budget announced a $3.8 million investment in the Women in Skilled Trades Initiative to recruit and train women through pre-apprenticeship programs for the automotive manufacturing industry.
Apprenticeship Innovation Fund (AIF)	Announced in the 2000 budget, the Apprenticeship Innovation Fund provides $5 million annually over three years to support the expansion of the apprenticeship training system to new skilled trades and will help maintain high quality and consistent standards for training. This year, support for the Fund was extended for another two years.
2001 Budget Initiatives	The 2001 budget announced support to double the number of entrants to apprenticeship programs. As part of this initiative, Ontario will establish a pre-apprenticeship program, encourage experienced skilled workers (journey-persons) to update their skills and launch a campaign to promote careers in skilled trades.
Apprenticeship Enhancement Fund (AEF)	Through the Apprenticeship Enhancement Fund, the government is providing $50 million over five years to modernize equipment and facilities in colleges for apprenticeship programs.

In 2004, the McGuinty government, in its first budget, announced new support for apprenticeship. The budget indicated that the government would introduce "a One-Stop Training and Employment system to increase responsiveness to employers and better serve apprentices, immigrants, unemployed individuals and youth in transition from school to work" (OMF, 2004: 30). The budget also laid out the McGuinty government's goals of increasing new registrations by 7,000 apprentices to reach 26,000 annually by 2007/08. In total, the budget allocated $11.4 million dollars in annual investment by 2006/07.

On August 5, 2004, the McGuinty government launched several initiatives outlined in the 2004 budget. First, an Apprenticeship Training Tax Credit would refund 25 per cent of apprenticeship wages up to $5,000 per apprentice and 30 per cent if the employer was considered a small business. Second, the government initiated scholarships targeted to persons without a high school diploma to complete such a diploma and enter into an apprenticeship program. Finally, $6 million will be invested in 2004/2005 to create a Co-op Diploma Apprenticeship Program, integrating college diplomas and apprenticeship certification.

iii) Alberta

The Alberta apprenticeship system initiated its reforms much earlier than Ontario or BC, prompted by the 1996 discussion paper "A Vision for the Future." Similar to the BC experience, the government consulted stakeholders and released a follow-up document "A Vision for the Future: Keeping You Informed." In 2000, the Alberta Apprenticeship and Training Act was amended to fit these new changes. Similar to Ontario reforms, the new model shifted the regulatory responsibility from the Act itself to

a network of industry committees. Unlike the Ontario model, however, the Act continued to regulate apprenticeship wages and journeyperson ratios (AML, 2000).

The Alberta apprenticeship system is explicitly founded on a network of industry committees which advise the Apprenticeship and Industry Training Board (AITB). This network is composed of Local Apprenticeship Committees (LAC) and Provincial Apprenticeship Committees (PAC), which exist for each of the 50 regulated trades and Occupational Committees, which advise on an occupational basis for each of the 4 regulated occupations.[32] Each of these committees has equal representation by employers and labour. The AITB is composed of 12 members, with equal representation from employers and the trades, who advises the Minister of Learning on apprenticeship policy. The PACs make recommendations to the Board on apprenticeship training and certification, including the content of training. The Alberta Industry Training Division (AITD) represents the Alberta provincial government and provides the administrative support for the system, including registration and interaction with trainers. The AITD also develops training standards in conjunction with industry committees, provides labour market information and creates initiatives supporting the apprenticeship system.

The Alberta apprenticeship system features several key programs that distinguish it from other provinces. In addition to its successful program connecting high school students to apprenticeship, the Registered Apprenticeship Program (RAP), it is piloting the Youth Apprenticeship Project (YAP), which introduces youth aged 12-15 to work in the trades. It has also created the Aboriginal Apprenticeship Project, which works to support First Nations entry into apprenticeship programs. Other notable features include regular worksite visits by Alberta Ministry of Learning staff, close to 14,000 in 2003/2004, in order to monitor the quality of training. Finally, the Achievement in Business Competencies (or Blue Seal) program offers journeypersons additional qualifications in business (AITB, 2004).

iv) Quebec

The Quebec apprenticeship program is considerably different from other provincial programs, principally because of the different organization of Quebec's secondary school and college system. Post-secondary education is divided into college (CEGEP) and university level education, where college education is a requirement for entry into university. Thus, the two year pre-university program of CEGEPs is mandatory rather than a substitute for university education. However, CEGEPs also offer technical programs, which last an additional year and generally lead directly to entry into the labour market, although they may also lead to university under certain conditions. Vocational education, in contrast, is offered at the third and fifth years of secondary school, geared towards entry into the labour market after high school.

Vocational education and the apprenticeship system underwent considerable reform during the 1990s, as part of renewed concern about technical training (Tremblay and Le Bot, 2003). The *Estates Generale on Education* findings in 1995 criticized the

[32] These are construction craft labourer, gas utility operators, steel detailers and warehousing.

vocational training system as the weak link in the education system's approach to school-to-work transition issues. Similar to the rest of Canada, vocational education is commonly viewed as an inferior option for substandard students. Enrollment had decreased substantially from 1985 to 1993, but began to increase with institutional reforms, including the promotion of the apprenticeship system and co-operative education programs (Tremblay and Le Bot, 2003: 32).

After 1996, the apprenticeship system began its reform under these policy initiatives concerning vocational education. Three institutional creations resulted in the current apprenticeship system. First, the Labour Market Partnership Board (LMPB) was created with Emploi-Québec in 1998, the product of the Canada-Québec labour market agreement (CAF, 2004: 2002: 12). Second, legislation was passed in 1995 that compelled employers with wage bills over $250 000 to invest a minimum of 1 per cent of that budget towards training or be taxed the difference. Similar to the French system of wage levies, the proceeds of that difference were directed towards the National Human Resources Training Fund, managed by the LMPB. Finally, 26 sectoral committees have been funded by the LMPB, which include representation from employers, labour and educational associations and which advise the LMPDB on labour market policy.

Following a disappointing implementation of a previous apprenticeship system directed at youth, the LMPB began to develop a broader apprenticeship system (Tremblay and Le Bot, 2003). In 1998, the LMPB published a report entitled *Régime d'apprentissage: perceptions des principaux acteurs, constats diagnostiques retenus et mesures prescriptives recommandées*, which outlined structural deficiencies and made several recommendations. These recommendations included that the LMPB be given full responsibility for the system (previously under the Minister of Education), that a separate skill certification regime be implemented and that the program be directed at participants in the workforce rather than secondary school students (CAF, 2004: 2002).

In 2001, the LMPB adopted a Skill Training and Recognition General Framework, which integrated the former Qualification Program directed by Emploi-Québec. Thus, the framework appropriated existing qualifications already recognized by the labour market. The framework was also designed to be flexible and driven by the sectoral committees, similar to other provincial reforms, which determine the standards for occupational skills. Similar to the Albertan system, the LMPB is supported administratively by Emploi-Québec, which also has an important role in co-determining apprenticeship policy.

VIII. Key Issues

In the introduction, a number of questions were posed drawing from the different approaches to evaluating apprenticeship systems. While many of these questions have been addressed above, this section will discuss these issues and integrate the numerous aspects of the research.

a) **Challenging Microeconomic Constraints on Apprenticeship Registration**

The question of whether the principal constraint on apprenticeship registration is on the demand or supply side is a crucial consideration for reform. If the number of apprentices is limited because of employers' unwillingness to bear the costs of training, policies encouraging youth entry into apprenticeship will be ineffective given a fixed minimum wage. Evidence on the cyclicality of apprenticeship registration strongly supports a demand-side constraint on apprenticeship registration. The strong association of unemployment rates and total registration suggests that it is employers who determine registration (at least during economic downturns) by controlling the number of jobs available to apprentices. Additionally, survey evidence of a 1994-1995 cohort of apprentices indicated that 37 per cent of apprentices had experienced temporary unemployment during their program and 41 per cent of male non-completers cited unemployment as their principal reason for exiting the program (Stoll and Baignee, 1997). This strongly suggests that registration is closely tied to the employment opportunities offered by firms. If this perspective is correct, the primary policy response should be directed at making it worthwhile for employers to take on apprentices.

The most obvious policy-response is to alter the relative costs of hiring apprentices. In the current political environment, a training levy following the French model is unlikely. The other option is subsidization of training wages, an approach recently taken by the Ontario apprenticeship system with its tax credit initiative. Clearly, Ontario firms will be much more willing to engage apprentices when their wages are subsidized by twenty-five to thirty per cent.

However, employers may be more willing to take on apprentices if they face less risk about the quality of labour provided. Ensuring greater quality of apprentices in terms of aptitude and basic skills would increase the value of apprentices relative to their costs. The difficulty is that an improvement in the quality of potential apprentices must either draw higher quality students from other forms of post-secondary education or provide superior training to the current quality students that enter into apprenticeships. The latter solution could be achieved by creating greater linkages between apprenticeship programs and secondary education. However, the focus would not simply be the promotion of apprenticeship but rather to increase the transparency of the apprenticeship system. Thus, potential apprentices would be better prepared for the academic requirements of apprenticeship as well as the necessary experience and skills. Already, numerous provincial initiatives exist to allow high school students to begin apprenticeships before graduation. The question remains whether this will improve their preparatory training and thus value to employers.

The second option for improving the quality of apprentices, drawing higher quality students from other forms of post-secondary education, is a more contentious option. Clearly, an attempt to move higher quality students into apprenticeship would either have to increase the material benefits of entry or change the academic bias that results in a disproportionate amount of students expecting university or college education.

While the skills deficit in the trades is an important concern, much of the skills deficit debate has centered on emerging sectors of the knowledge economy that require a university education and thus its proponents may be wary of actively dissuading students from entering these areas. However, the education-skills mismatch proposed in the literature must also be considered. It is possible that reorienting the emphasis of secondary career preparation to include vocational training could promote a more efficient match between education aspirations and skills without detracting from the supply of skilled labour for emerging sectors.

In addition, a "laddered" apprenticeship system that integrates apprenticeship certification into more advanced degrees would increase the benefits of entry considerably. A more flexible system in this respect would remove barriers between forms of post-secondary education and allow ambitious students to match their skills to education without sacrificing higher education options. The impact of these reforms in France has been extremely positive in encouraging high quality students to enter into apprenticeship. Recent provincial initiatives in Ontario had taken a step towards this, creating a Co-op Apprenticeship Diploma program that integrates apprenticeship and community college diplomas.

b) Collection Action Problems and Apprenticeship Registration

While the cost of training to individual firms is an important consideration in the employer's decision to take on apprentices, poaching externalities also play a role in this decision.[33] If all firms could credibly commit to equally invest in training, the costs of that training would decrease because individual firms would no longer be threatened by "poaching" firms who could refuse to train and then hire the available skilled labour, capturing the benefits of other firms' investments. One of the advantages of the French levy system is not only that it alleviates the costs of apprenticeship but also forces all firms to bear the burden of training.

As detailed in the review of national apprenticeship systems, many Northern European countries have solved this collective action problem within the context of a "joint, multi-layered regulation [system] along neo-corporatist or 'social partnership' lines" (Ryan, 2000: 43). The dissolution of the CLFDB is a clear statement that such a system is not a possibility in the immediate future. Despite this trend, the recent provincial apprenticeship reforms have actually moved towards the Northern European models in several respects. Industry-led models have replaced statutory regulation of

[33] As noted by Johansen earlier in the report, a case can be made that from a theoretical perspective poaching may in fact lead to a situation of underinvestment in training. Employers may not want to train someone and then lose their investment when that person leaves. In a free society, employment contracts that compel a worker to remain a certain time with the employer after receiving training are generally not enforceable (the military may be an exception). Thus a free or competitive labour market with poaching may in fact be less efficient in the sense of generating less employee training that a non-competitive labour market that constrains labour mobility between firms. This does not mean that such a non-competitive labour market that leads to more employee training is more desirable from the perspective of societal or worker welfare.

program curricula, apprenticeship wages and certification assessment, employing sectoral committees similar to those in Europe.

The key difference, however, is that Canadian committees were designed as a means to increase the institutional flexibility of the apprenticeship system, with the goal of making it more responsive to changing labour markets. Increased flexibility not only improves employment prospects for apprentices, but also increases demand for apprentices by employers who have greater control over program content. However, while the new reforms may encourage greater firm participation, they do not hold much regulatory power over the amount or quality of training as in the European models. While labour is guaranteed representation on such committees (with the notable execption of British Columbia), they simply do not have enough bargaining power to pressure employer associations into taking on more apprentices. Indeed, the committees themselves are weak relative to their European counterparts. While they do determine curricula and assessment, they are generally not responsible for the inspection of employers' training programs (with the exception of Alberta) or the crucial leverage of being able to withdraw permission to recruit apprentices from employers who offer substandard programs.

By design, recent provincial reforms will not lead to the solution of collective action problems that might enable employers to take on more apprentices. Recent developments in the European apprenticeship systems suggest that this may not be a failure, however. The success of the Irish system touted by some proponents (e.g. Ryan, 2000) is more likely due to its exceptional economic growth of over eight per cent per year. Similarly, the apprenticeship system in Germany has faced severe difficulties in creating sufficient apprenticeships due to an employment crisis. Government intervention to levy fines on German firms who do not meet an apprentice quota has been met with considerable resistance by employers, who object to bearing higher costs in a period of economic downturn (O'Brien, 2004). This development supports criticisms that this type of apprenticeship regulation is inappropriate for the vicissitudes of a new business climate characterized by fluid labour markets and more intense competition.

c) School-to-Work Transitions and Completion

The age composition of apprentices reveals that the apprenticeship system is not primarily a school-to-work transition system. In 1999, only 4.4 per cent of apprentices in Canada were under the age of twenty while over 45 per cent of apprentices were over the age of 29. Rather, it is a system that retrains workers who already possess labour market experience, such that in 1994-1995, the most common number of jobs held by apprentices prior to entering the program was three. Since 1999, however, provincial governments have pushed initiatives that allow high school students to enter into apprenticeship program and gain academic credit. However, enrollment in youth apprenticeship programs remains limited. In Alberta, for example, participants in the 2001 secondary school program numbered 748, or 1.7 per cent of total registration (AITB, 2004). However, the OYAP program in Ontario has been quite extensive, with over 12 000 participants in 2002-2003, roughly 15 per cent total registrations.

The fact that the apprenticeship program does not primarily serve the school-to-work transition constituency has a great impact on completion rates. Older apprentices often have family responsibilities such that they are more vulnerable to the income interruptions associated with unemployment during apprenticeship and the block release portion of education. Many provinces have shifted to more flexible academic training arrangements, but the threat of unemployment remains. Additionally, the labour market experience of older apprentices makes non-completion more attractive.

Thus, promoting the entry of younger apprentices into the apprenticeship system would not only increase registrations but might also increase the completion rate. Younger apprentices would not be so vulnerable to income interruptions and would have less attractive employment options relative to those upon completion. However, some scholars argue that the demand-side constraints of apprenticeship registration favour employer preferences for older apprentices. John O'Grady argues that employers prefer older apprentices with prior work experience, as they effectively receive semi-skilled labour for the same wage rate as youth unskilled labour. Thus, it is possible that the effectiveness of youth apprenticeship programs will be limited by this consideration.

Unfortunately, the lack of data prevents a discussion of the integration of first nations, visible minorities and disabled workers into the apprenticeship system. On the issue of gender equity, however, the apprenticeship program has made progress over the past ten years. Female registration has increased at 8.0 per cent per year from 1991 to 2001, such that the share of female registrations doubled from 4.3 per cent to 9.2 per cent. However, the majority of female participation has remained in traditional female apprenticeship programs in the food and service group, which increased its share of total female registrations during that period.

d) Assessing the Skills Deficit

As previously discussed in policy-maker's approaches to apprenticeship, the issue of skills formation often motivates evaluations of the apprenticeship system. It claims that investment in skills is necessary for competitive advantage in the 'knowledge economy' and that the aging of the workforce will aggravate these trends. On the surface, these claims mutually support a simple policy response: increasing investment in training. Yet prioritizing the sectors that have the greatest need for that investment requires a quantitative knowledge of the expected skills deficit. Scholarship on this issue, particularly in the skilled trades, has been divided between economists who perceive no objective indication of skills shortages and human resource analysts who claim that the skills shortage is clear to the point of being self-evident.

Adapting Robert Solow's famous adage on the productivity paradox to the debate on the skills deficit, a Conference Board report (2002) noted that "the shortages of skilled trades is obvious except in the employment statistics." Studies by the Government of Canada have consistently failed to find evidence of skills shortages. Henson, Roy and Lavoie (1998) concluded that "despite often loud complaints about skills shortages, little

well developed and reliable information is available on the current or future occupational skill imbalances." Massé, Roy and Gingras (1998) support this conclusion, arguing that their "analysis of various indicators suggests that Canada is not suffering from a broad-based shortage of skilled labour." Most recently, the Report of the Expert Panel on Skills (Government of Canada, 2000) found no technical skill shortages in the five industries examined, but argued that workers often lacked 'essential' or 'management' skills.[34]

In contrast, human resources analysts from employer associations have repeatedly argued that skill gaps are not only imminent but currently exist. The Canadian Federation of Independent Business (CFIB) has repeatedly reported skill shortages from its member survey of small and medium sized enterprises (SME), which in 2002 reported that 26 per cent of respondents indicated vacancies in their business (CFIB, 2001). This amounted to 4.5 per cent of total employment for these businesses and by applying these figures to the total economy, the CFIB predicted that approximately 265 thousand jobs were vacant throughout Canada. In a subsequent SME member survey, the CFIB found that 58 per cent of respondents indicated that they would find hiring harder in the future, 64 per cent indicated that they had hiring difficulties due to a lack of skilled candidates, and 61 per cent indicated that SMEs should help by participating in co-op and apprenticeship programs (CFIB, 2003). Another source of evidence frequently cited is the age composition of skilled tradespersons. In Alberta, for example, the median age of tradespeople is 42 and logically many workers are approaching retiring age. Census data indicate that the number of workers with apprenticeship certification has decreased 3.8 per cent, from 1.34 million in 1991 to 1.29 million in 2001 (Statistics Canada, 2001a).

These stark differences in views can be explained by the theoretical and methodological approaches used by both groups. Economic researchers tend to examine labour market indicators that they consider unbiased, such as vacancy rates, unemployment rates and wage rates, in order to impute the existence of skills shortages. The human resource analysts, on the other hand, garner their data from employer surveys, which yield the subjective perceptions of employers about their level of concern about skills shortages, the number of unfilled positions in their firm, or how highly skilled labour ranks as a constraint on economic performance.

The difficulty with the evidence from human resource analysts is two-fold. First, skills *imbalances* always exist in markets to some degree. As the Expert Panel on Skills (2000) reports, "it is highly unlikely for an employer to be able to hire an experienced, world-class engineer at an entry-level salary. The price mechanism in the markets serves to ration goods and resources to those willing and able to pay the going price." Thus, it stands to reason that the factor price of labour will exist as a constraint to expanding businesses, for example, just as with any other factor of production. As Gingras and Roy (1998: 21) point out, one difficulty with employer surveys is that "employees are never sufficiently qualified according to their bosses. It is not surprising, then, that we obtain positive responses when we question the latter about shortage of skilled labour. Morever, since employers take little or no account of the reactions of their competitors or of the

[34] Boyer, Le Gallo, and Montmarquette (1999), a study done for the Expert Panel on Skills, was very critical of the claimed evidence of shortages.

impact of their decisions on the markets, they tend to overestimate their needs during periods of sales growth." Indeed, the aforementioned CFIB survey indicated that over 20 per cent of respondents were concerned with skilled labour shortages in 1993, when unemployment was at its peak of almost 12 per cent. Furthermore, the percentage of respondents indicating concern over skilled labour shortages in 2000 was equal to that in 1989, suggesting both that employer concern regarding labour shortages are counter-cyclical but that the current situation is no worse than it was a decade ago prior to current demographic challenges (CFIB, 2001: 1).

On the other hand, a persistent shortage of skills could negatively impact productivity if skilled labour were only available at wage rates above effective demand. Yet such evidence has yet to be reported by any research on labour market indicators. It must be recognized, however, that the positions taken by economists and human resources analysts on the existence of skilled labour shortages reflects their expectations of who should be responsible for training. As discussed in the literature review, publicly-provided education imparts general skills, with the expectation that it is up to individual firms to provide the specific skills relevant to their business. Employers, however, prefer to hire fully-trained employees, as training in-house entails both significant costs and risks, evident in the literature on apprenticeships. If employers have the expectation that government funded education will produce fully trained employees, it is logical that they will report skills shortages when no firms invest in training.

This is particularly true of the apprenticeship program, as training *requires* employers to invest substantially in apprentices as no substitutable training exists in many trades occupations. Relatively few institutional constraints exist on apprenticeship, as the number of apprentices trained by institutions are not regulated (as in medicine, for example) except in terms of tuition. Evidence from this report suggests that the market for apprentices is constrained by employer demand, or their willingness to invest in training. Despite advancing demographic trends, employer investment in apprentices has been largely pro-cyclical. Given that few structural barriers to employer investment exist, except collective action problems, employers arguing for support from government are essentially asking to have their own investments in training subsidized to meet expected demand. It is up to policy-makers to decide who should be responsible for these training costs and whether subsidization is a worthy investment.

e) Expanding the Breadth of Apprenticeships

Most discussion on apprenticeship reform has addressed improving the quality of current apprenticeship programs, which are almost entirely in trades occupations, rather than discussing whether the apprenticeship system should expand to other sectors. This reflects the fact that the concept of apprenticeship is firmly linked to the trades in Canada, rather than being a mode of learning with intrinsic benefits that happens to be applied to the trades. In part, this reflects the fact that it is the constituency of current apprenticeship programs which commissions most of the reports. It is also reasonable to argue that a skills deficit in the trades, if it exists, is an important challenge that would be neglected if

by initiatives to expand apprenticeship into untapped sectors of the economy were pursued.

From both the approaches motivating discussion and the theoretical work on apprenticeship, however, expanding the apprenticeship system into the clerical, sales and service sector is a possibility that should be discussed. Apprenticeship in the trades can only be expanded so far, as demand is forever constrained by the economic realities of the marketplace. Yet apprenticeship remains an important form of learning, with intrinsic benefits that have been effective not only in the trades but also in professional occupations. As discussed in the section on theoretical perspectives, it is more effective for learners who do not respond well to academic environments, which is important from a school-to-work transition perspective because it could be used to target the "forgotten half" of youth who do not obtain post-secondary education. From a skills formation perspective, it may also be more congruent with the needs of adult learners who wish to re-skill, as it not only situates learning in the workplace (with which working adults are more familiar) but also reduces income interruptions. These features could be important in increasing worker investments in training, as scholars of the "new economy" predict that in the future, demand for skills will be more variable and will require frequent re-skilling by workers.

The theoretical case for expanding apprenticeships is also supported by experience, as both the United Kingdom and Australia have successfully expanded apprenticeship programs into new sectors. New occupational groups such as clerical, sales and service sector occupations, production and transport occupations or associate professional occupations have been greatly expanded in Australia. These developments have been lauded by the Australian apprenticeship system, which claims that these structured training experiences have increased investments in training which formerly occurred solely within the firm.

However, it must be recognized that an initiative to expand apprenticeship into new sectors would require substantial resources and organizational commitment by the provinces. It is likely that such expanded apprenticeship programs would compete with the programs currently offered by community colleges, as they act as both complements and substitutes. These difficulties could be alleviated, however, by increasing the integration between community college programs and apprenticeship programs, which is already occurring in Ontario. Already, alternation education is a strong principle in community college career programs in the form of co-operative education terms (Gallagher and Kitching, 2003). An effectively integrated apprenticeship system could build on these types of career preparation programs by offering an option emphasizing workplace learning over classroom learning. As with the Australian experience, it would be necessary to render training arrangements more flexible, particularly with respect to program duration, if the apprenticeship model were to succeed in the new occupational groups. The potential remains for apprenticeship as an effective form of learning to be applied to new occupational groups, not only for the reasons discussed above but also because it would promote the integration and laddering of the existing trades occupation programs.

IX. Knowledge Gaps and Directions for Future Research

This objective of this report has been to provide an overview of key trends and issues related to apprenticeship in Canada, not to provide a comprehensive or definitive analysis of apprenticeship. The report has identified many knowledge gaps that merit further research. These gaps have been organized into four main areas: characteristics of apprentices; the labour market experience of apprentices; institutional factors affecting the apprenticeship system; and issues facing the apprenticeship system, particularly in Canada. This section of the report outlines a number of specific knowledge gaps in these fours areas.

Characteristics of apprentices

- It is known that apprentices tend to be older in Canada than in continental European countries. But we have little knowledge about the current age distribution of apprenticeships and age of registration, how this has evolved and is expected to continue to evolve over time, and the implications for completions and other aspects of the apprenticeship system. It would be useful to undertake a study of the age-related issues affecting apprenticeship in Canada, including the impact of the gradual retirement of the baby boom cohorts and implications for the demand for apprentices.

- The report provides some international comparisons of apprenticeship registrations at the all trades level, but no international comparisons by trade. It has been suggested that trade-by-trade comparisons across countries, (e.g. piping trades in Canada and Australia) on different issues (e.g. completion rates, length of program, etc.) might provide many policy relevant insights.

- The report contains limited analysis of the large provincial differences in apprenticeship registrations and completions and the factors behind them. A full examination of these differences would enhance our understanding of the nature of the apprenticeship system in Canada.

- The development of labour market profiles of apprencticeable and non-apprenticeable occupations and a comparison of the characteristics of each set of occupations would contribute to a greater understanding of the nature of the apprenticeship system.

- An examination of the success rates on apprenticeship examinations by trade at both the national and provincial level would provide useful information on the apprenticeship system.

Labour market experience of apprentices

- Basic information on the labour market experience of apprentices is generally lacking. This includes information on journeyperson earnings and annual hours worked, wages for apprentices, and employer costs in engaging apprentices. It would be useful to organize such data by trade and by province.

- Without employers to engage apprentices the apprenticeship system could not function. But we do not have a full understanding of the factors that affect the employer decision to participate in an apprenticeship program, the number of apprentices employers take on, and the conditions (e.g. wages, working conditions) employers set for apprentices, among others. Governments often wish to influence employer decisions related to apprentices so it is important to have a good understanding of employer motivation and decision-making processes and the factors that influence them. An international perspective of these issues would be particularly insightful.

- Anecdotal evidence suggests that during business cycle downturns when jobs are scarce, apprentices are laid off and cannot obtain the hours to complete their program. Equally, during booms when employers need workers, apprentices may not be able to take time off to complete the classroom requirements and thereby delay program completion. A knowledge gap is the actual importance of these two phenomena and the effects on completion.

- Labour market information about apprenticeship opportunities is important for the growth of the apprenticeship system and can affect the labour market experience of apprentices. However, the adequacy of these sources of information, both in absolute terms and relative to other types of education programs, is poorly understanding and worthy of further research.

- There is limited research in Canada on the outcomes of apprenticeship programs relative to other educational program. This knowledge gap merits for further research.

- As noted earlier in the report, Boothby and Drewes (2003) state that the existence of labour market shortages in the skilled trade sectors should not be surprising given the low earnings premiums to workers with trade certification, but argue that what is interesting and worthy of further research is why the earnings premium for trades education appear not to have respond to labour market imbalances. A detailed analysis of the actual dynamics of the operation of the labour market for apprentices and whether the current situation is one of imbalances would be valuable.

- Life-time income risks associated with specific or vocational training may be greater relative to those associated with more general types of training. Empirical

evidence of the importance and implications of this phenomenon represents a knowledge gap and is a topic for further research.

- Self-employment has grown rapidly in Canada and the link between growth of self-employment in certain industries and trends in apprenticeship enrolment and the labour market experience of apprentices is unclear and a topic for further research.

Institutional factors affecting the apprenticeship system

- The adequacy of the institutional support for apprenticeship in Canada, including counseling and guidance in high schools and other educational institutions for persons potentially interested in apprenticeship, and the matching of apprentices with employers by public and private placement agencies, is poorly understood and merits further research.

- Unions play an important role in the apprenticeship system. But many (if not most) apprentices work in non-unionized environments. A detailed critical examination of the actual role of unions play in the operation of the apprenticeship system in Canada, both quantitatively and qualitatively, is currently not available and would greatly contribute to our understanding of the strengths and weaknesses of the apprenticeship system.

Issues facing the apprenticeship system in Canada

- A detailed and rigorous assessment of the different rationales for the apprenticeship system based on both theoretical and empirical evidence would provide a useful basis for an comprehensive assessment of the strengths and weaknesses of the apprenticeship system in Canada.

- The most obvious area for further work is to enhance our limited understanding of low completion rates in apprenticeship programs. Does this situation represent a serious shortcoming of the apprenticeship system? Why have completion rates fallen in recent years? What explains the variation in completion rates across trades and across provinces? What policies would be most effective in raising completion rates?

- A key issue facing the apprenticeship system in Canada is whether steps should be taken by industry and government to expand apprenticeship coverage to more occupations, particularly in the service sector. The advisability of such a policy thrust is not known. Further research is needed on the advantages and disadvantages of a broader application of alternation training relative to those of current and potential alternatives.

- Given the underrepresentation of women in the apprenticeship system in Canada, the issue of the participation of women in apprenticeship trades, and the barriers affecting this participation, is an important one and merits more attention than provided in this report.

X. Conclusion

Based on the analysis presented throughout the report and more thoroughly in the discussion section above, this conclusion puts forth a number of suggestions that should be considered to improve the functioning of the apprenticeship system in Canada.

a) The core strategy in promoting the apprenticeship system should be to increase its transparency and improve the preparation of incoming apprentices.

Promoting the trades as rewarding professions will no doubt increase the number of potential apprentices and consequently registrations by decreasing matching frictions. These efforts also have intrinsic value in showing that the trades are valuable to society. However, the major constraint on apprenticeship registration seems to be employer demand for apprentices, not willing individuals to enter, as seen recently by increased apprenticeship registration following strong economic growth.

Increasing the transparency of the apprenticeship system will allow apprentices to be better prepared for apprenticeships and thus be of higher value to employers. Clearer institutional signals must be sent to potential apprentices about the high level of essential skills and appropriate work experience required. The marginalization of vocational education options in secondary schools is an important deficiency that must be addressed. In addition, information about the expected earnings and employment prospects must be available, both to illustrate the benefits of completed apprenticeship certification but also to make apprentices aware of the difficulties of keeping employment through the program.

b) The apprenticeship system should be "laddered," or integrated into the post-secondary system to improve the potential advancement of apprentices and the flexibility of their credentials.

In his influential book on educational reform, *Making the Grade*, U.S. Governor John McKernan argued that negative perceptions of the trades will persist until there is effective career laddering (McKernan, 1994). Recognizing apprenticeship certification as credit towards other college or university education would not only promote apprenticeship by greatly increasing the potential advancement of apprentices but also affirm the value of apprenticeship training relative to its better-regarded counterparts in post-secondary education. Laddering would also allow apprentices to broaden their skill base, addressing concerns about essential skill deficits and enabling skilled tradespeople

with relevant experience to move into emerging sectors. Ontario's recent initiatives in integrating college diplomas and apprenticeship programs are an important development to follow, particularly as the program also stresses entrepreneurship as part of the diploma.

c) While older apprentices should not be neglected, new programs should keep targeting young apprentices and focus on improving their quality.

Commensurate with the previous two recommendations, the promotion of apprenticeship should target young apprentices. This strategy would not only address school-to-work transition issues, but would also improve completion rates. Younger apprentices are less vulnerable to income interruptions because of less attractive competing wages and less financial responsibility, which should improve completion rates. This may be difficult, as employers may well have preferences for apprentices with work experience. However, improving the preparation and quality of potential apprentices may balance these considerations. Further, to the extent that broadly based skills shortages are looming, it is younger workers that will need to fill these positions, providing an additional reason to increase youth participation in apprenticeships.

d) Financial incentives will be more effective directed towards firms than towards students

While financial incentives supporting students will obviously increase registration, a case can be made that they are better targeted towards employers.[35] First, apprentices are in a much better financial situation than their counterparts in college or university education as they receive wages during the majority of their study. Second, if apprenticeship registration is principally constrained by insufficient demand (partly determined by the cost to the employer), then financial incentives will be most effective when targeted to employers. The exceptions to this recommendation are programs that alleviate for apprentices the upfront cost of purchasing tools. Finally, lowering the cost of investment in apprentices for employers will lower the costs of poaching externalities and encourage collective investment in apprenticeship training by firms. Ontario's 25 per cent tax credit towards apprenticeship training is an admirable step in this direction, but more effective still is Quebec's training levy, which is more effective in alleviating poaching externalities (although less politically feasible).

e) Sectoral committees should be strengthened and given the responsibility not only of determining program content but also of promoting apprenticeship with firms

Currently, the supply of apprenticeship training is reactive, as firms adjust their supply of apprenticeships in response to economic conditions. Strong sectoral committees should shoulder responsibility for promoting a proactive response to training, particularly in the face of predicted labour shortages. The core strategy would be to alleviate

[35]The counterargument is that if wages are not fixed, giving the subsidy to trainees may encourage some competition among employers for trainees. This could lead to better programs for trainees.

poaching externalities, allowing firms to invest in apprentices in response to expected labour scarcity. Possible policies would include informal pressure, but also more tangible incentives for engaging apprentices. An excellent example is the Construction Owners Association of Alberta, who award points on contract tenders for the number of apprentices that are engaged on a project (CSLS, 2001). Additionally, greater employer input into the content of apprenticeship programs will also improve the fit between the skills provided to apprentices and the skills demanded by employers. A significant stake in the administration of the apprenticeship system will also be necessary for greater employer cooperation in supplying apprenticeships.

f) Modularization or progressive credentialization policies should retain strong incentives for full completion of the apprenticeship program

Part of the strength of the apprenticeship system is that it provides training that is more general than that which would be provided by private firms alone. This improves the social returns to training, as employees not only have a broader knowledge of their trade but are also more mobile and can better respond to labour scarcity. Modularization or progressive credentialization policies by definition sacrifice incentives for deeper and broader training for better recognition of the training an apprentice has acquired. In the face of current completion rates, modularization policies have merit, as both employers and apprentices receive benefits from having partial training recognized. However, modularization policies risk creating an incentive structure that encourages employers to engage apprentices only for partial training and to employ only partially trained specialists. Poorly designed policies would not only decrease the social return to training but also make it difficult for apprentices to acquire full training, limiting their earning power. Strong regulation of training quality would limit the potential for undesired effects in modularization policies.

Evaluating the performance of the apprenticeship system depends on how one defines its role in the post-secondary education system and in the labour market. On one hand, the declining participation of the first half of the 1990s that provoked the policy debate on apprenticeship cannot be divorced from the economic downturn that also occurred during that period. The increase in apprenticeship registration in the second half of the 1990s that coincided with declining unemployment rates supports the view that the apprenticeship system should not be held at fault. Certainly, the industry-driven structure of the apprenticeship system in Canada makes it difficult for the supply of apprentices to be proactive, rather than reactive to the business cycles.

Indeed, the two sets of issues motivating the review of the apprenticeship system argue that the system should shoulder the responsibility of facing *new* challenges. School-to-work transition critiques argue that the apprenticeship system should deal with the difficulties youth have when facing increasingly demanding and complex labour markets. The skills deficit approach sees the apprenticeship system as a means to both invest in human capital needed for the "new economy" and smooth the effects of the approaching "demographic bomb." Consequently, many reviews are critical of the

apprenticeship system, but with respect to its ability to adapt to roles that it has not taken on before.

At the same time, the apprenticeship system cannot be portrayed as a perfectly functioning system that is being buffeted by outside events. Economic downturns merely highlight inefficiencies in the system, particularly with respect to program structure and administration. Positively, many provincial governments have initiated reforms that have great promise to increase the efficiency and flexibility of the existing role for the apprenticeship system.

This report has provided suggestions that address not only the efficiency of the apprenticeship system with respect to its traditional role, but also elaborate how it could move into these new roles. These suggestions are premised on a demand-constrained market for apprentices, such that many of the recommendations are designed to improve the quality and preparation of potential apprentices. However, this strategy demands that the apprenticeship system be further integrated into the education system, both at the secondary and post-secondary level. The implication is a redistribution of responsibility within that system, such that apprenticeship takes a more prominent position. Successful reform would not simply involve the apprenticeship system but would effectively reorient the education system in general, affecting its much broader constituency of stakeholders.

The suggestions also address collective action problems between firms, with the goal that employer associations shift from an essentially reactive supply of training to a proactive supply of training. This new orientation requires strong apprenticeship sectoral committees that can provide the incentives necessary for firms to overcome the risk of investing in apprentices. This is an extremely difficult task, as firms face very real costs in training.

The apprenticeship system is a promising means to address the new challenges of the Canadian labour market, both because of the inherent advantages in alternation learning and the strength of the existing institutions. However, it must be recognized that the apprenticeship system may not be the only way to address these challenges. Indeed, it may prove too difficult to adapt provincial apprenticeship systems to the new roles imposed by policy-makers. In any case, reforming the system to render it more flexible and responsive to market changes will benefit its existing role, regardless of its ability to address these new challenges.

Bibliography

Acemoglu, Daron and Jörn-Steffen Pischke (1998) "Why Do Firms Train? Theory and Evidence," *Quarterly Journal of Economics* 113 (1).

Acemoglu, Daron and Jörn-Steffen Pischke (1999a) "Beyond Becker: Training in Imperfect Labour Markets," *Economic Journal* 109 (453).

Acemoglu, Daron and Jörn-Steffen Pischke (1999b) "The Structure of Wages and Investment in General Training," *Journal of Political Economy* 107 (3).

Alberta Industry and Training Board (AITB) (2004) *Annual Report 2003-2004: Meeting the Challenges of the Future*.

Alberta Ministry of Learning (AML) (2000) "Alberta Apprenticeship and Industry Training Amendment Bill Introduced," Press Release, March 23, 2000.

Ashton, D. (1999) "The Skill Formation Process: A Paradigm Shift?" *Journal of Education and Work*, 12(3).

Australian National Training Authority (2004) *Australian Vocational Education and Training Statistics: Apprentices and Trainees*, March Quarter.

Becker, Gary (1964) *Human Capital*, Chicago : University of Chicago Press.

Berik, Günseli and Chihan Bilginsoy (2000) "Do Unions Help or Hinder Women in Training? Apprenticeship Programs in the United States," *Industrial Relations* 34(9).

Bertrand, Olivier (1998) *Trends and Issues in Vocational Education and Training: A perspective from Europe,* Seminar presentation for IBERFOP, http://www.oei.org.co/iberfop/mexico4.htm.

Blanchflower, D. and Lynch, L.M. (1994) "Training at Work: a comparison of US and British youths," in L.M. Lynch (Ed.) *Training for the Private Sector.* Chicago: University of Chicago Press.

Bonnal, Liliane, Sylvie Mendes and Catherine Sofer (2002) "School-to-work transition: Apprenticeship versus vocational school in France," *International Journal of Manpower* 23 (5).

Booth, Alison and Stephen Satchell (1994) "Apprenticeships and Job Tenure," *Oxford Economic Papers*, 46 (4).

Boothby, Daniel and Bruno Rainville (2003) "Adjustments in Labour Markets for Skilled Workers in Canada," *HRDC-IC-SSHRC Skills Research Initiative*, Working Paper 2003-C01.

Boothby, Daniel, Julie Dubois, Maxime Fougère and Bruno Rainville (2003) "Labour Market Implications of an Aging Population," *HRDC-IC-SSHRC Skills Research Initiative*, Working Paper 2003-A01.

Boothby, Daniel and Torben Drewes (2004) "Post-Secondary Education in Canada: Returns to University, College and Trades Education," paper presented at the annual meeting of the Canadian Economics Association, Ryerson University, Toronto, Ontario, May.

Bowlby, Jeffery and Katherine McMullen (2002) *At the Crossroads: first results of the 18 to 20 years old cohort of the youth in transition survey*, Ottawa: Statistics Canada.

Boyer, Marcel, Véronique Le Gallo, and Claude Montmarquette (1999) Analyse Critique des Méthodes et Instruments Actuels de Mesure et de Prévision de l'Offre et de la Demande de Main-d'oeuvre Hautement Qualifiée, rapport de projet RP-13, CIRANO, Montreal.

British Columbia Ministry of Advanced Education (2002) *A Model for Industry Training in British Columbia: A Discussion Paper,*

Brooks, Louise (2004) *Trends in 'Traditional' Apprenticeships*, National Centre for Vocational Educational Research: Adelaide.

Buchel, Felix (2002) "Successful Apprenticeship-to-Work Transitions: On the Long-Term Change in Significance of the German School-Leaving Certificate," Institute for the Study of Labor, Discussion Paper No. 425, February.

Canadian Apprenticeship Forum (CAF) (2004). *Accessing and Completing Apprenticeship Programs in Canada: Perceptions of Barriers,* Consultation Report.

Canadian Apprenticeship Forum (CAF). (2002). *Apprenticeship is the Future: Conference Concurrent Session Report and Executive Summary*. Vancouver, British Columbia, June 2002.

Canadian Federation of Independent Business (CFIB) (2001) *Help Wanted: Update,* CFIB Research Report, April 2002.

Canadian Federation of Independent Business (CFIB) (2003) *Labour Pains: Results of the CFIB Survey on Labour Availability*, CFIB Research Report, April 2003.

Canadian Labour Congress (CLC) (2002). *Policy on Apprenticeship*.

Canadian Labour Force Development Board (CLFDB) (1997) *Apprenticeship in Transition,* Ottawa: April, 1997.

Canadian Labour Market and Productivity Centre (1990) *Report of the CLMPC Task Forces on the Labour Force Development Strategy*. The Labour Market and Productivity Centre : Ottawa.

Centre for the Study of Living Standards (CSLS) (1999) *Apprenticeship in Canada: A Training System under Siege?* [http://www.csls.ca/reports/apprent.pdf]

Centre for the Study of Living Standards (2001) *Creating a More Efficient Labour Market: Reports and proceedings from the CSLS roundtable*, Ottawa, June 2001.

Chang, Chun and Yijiang Wang (1996) "Human Capital Investment under Asymmetric Information: The Pigovian Conjecture Revisited," *Journal of Labour Economics* 14(3).

Chaykowski, Richard and George Slotsve (2003) "Employer-Sponsored Training by Firm Size," *HRDC-IC-SSHRC Skills Research Initiative*, Working Paper 2003-B02.

Clark, Damon and Rene Fahr (2001) "The Promise of Workplace Training for Non-College-Bound Youth: Theory and Evidence from German Apprenticeship," *IZA Discussion Paper* no. 378, October 2001.

Conference Board of Canada (2002) *Solving the Skilled Trades Shortage*, Report to HRDC.

Conference Board of Canada (2004) *The Canadian Industrial Relations System: Current Challenges and Future Options,* Human Resource Management Report, April 2004.

Construction Sector Council (CSC) (2004) *Training Canada's Construction Workforce: Meeting the Industry's Needs,* Construction Sector Council: Ottawa.

Crouch, Colin (1997) "Skills-based Employment: The Latest Philosopher's Stone," *British Journal of Industrial Relations*, 35 (3).

Cully, M. and Curtain, R. (2000) *Reasons for new apprentice non-completion*, interim report no.1, NCVER, Adelaide, unpublished.

Dresser, Laura and Joel Rogers (1999) "Sectoral Strategies of Labor Market Reform: Emerging Evidence from the United States," *Labour Education and Training Research Network Working Paper Series*, no. 99-03.

Economic Council of Canada (1992) *Education and Training in Canada,* Ottawa: 1992.

Euwals, Rob and Rainer Winkelmann (2001) "Why Do Firms Train? Empirical Evidence on the First Labour Market Outcomes of Graduated Apprentices," Institute for the Study of Labor, Discussion Paper No. 319, June.

Frank, Jeff (ed.) (1996) *High School May not be Enough: An Analysis of Results from the School Leavers Follow-Up Survey*. Ottawa : HRDC.

Franz, W. and Zimmerman, V. (2002). "The transition from apprenticeship training to work." *International Journal Of Manpower* 23(5): 411-425.

Gallagher, Paul and Ann Kitching (2003) "Canada's Community Colleges and Alternation," in Schuetze, Hans and Robert Sweet (eds.) *Integrating School and Workplace Learning in Canada*, Montreal : McGill-Queen's University Press.

Georgetti, Ken (2004) "Speech to the 2004 Apprenticeship Summit Building on Commitments," Canadian Apprenticeship Forum, Halifax, Nova Scotia, June, posted at www.caf-fca.ca.

Gitter, Robert (1994) "Apprenticeship-Trained Workers: United States and Britain," *Monthly Labour Review*, April 1994.

Gospel, H. (1997) "The Revival of Apprenticeship Training in Britain?" *Centre for Economic Performance Discussion Paper*, No. 372.

Government of Canada (2000) *Stepping up: Skills and Opportunities in the Knowledge Economy,* Report of the Expert Panel on Skills, Ottawa: Advisory Council on Science and Technology.

Government of Canada (2001) *Ellis Chart*, Human Resources Development Canada Website, http://tableauellis.ca

Government of Canada (2002) *Knowledge Matters: Skills and Learning for Canadians,* Ottawa.

Greenhalgh, Christine (1999) "Adult Vocational Training and Government Policy in France and Great Britain," *Oxford Review of Economic Policy*, 15(1).

Greenhalgh, Christine (2002) "Does an Employer Training Levy Work? The Incidence of and Returns to Adult Vocational Training in France and Britain," *Fiscal Studies*, 23(2).

Grey, K., Beswick, W. and O'Brien, C. (1999), *Traineeship non-completion*, Research and Evaluation Branch report 1/99, Department of Education, Training and Youth Affairs, Canberra.

Haddow, Rodney and Andrew Sharpe (1997) "Canada's Experiment with Labour Force Development Boards: An Introduction," In Haddow, Rodney and Andrew Sharpe (eds.) *Social Partnerships for Training: Canada's Experiment with Labour Force Development Boards,* Caledon Institute of Social Policy and School of Policy Studies: Kingston.

Haddow, Rodney and Andrew Sharpe (1997b) "Labour Force Development Boards: A Viable Model?" In Haddow, Rodney and Andrew Sharpe (eds.) *Social Partnerships for Training: Canada's Experiment with Labour Force Development Boards,* Caledon Institute of Social Policy and School of Policy Studies: Kingston.

Hamilton, S. F. and K. Hurrelmann (1994) "The School-To-Career Transition In Germany And The United-States," *Teachers College Record* 96(2).

Harhoff, Dietmar and Thomas Kane (1997) "Is the German Apprenticeship System a Panacea for the U.S. Labour Market?" *Journal of Population Economics,* 10(2).

Henson, Harold, Richard Roy, and Claude Lavoie (1996) "A Primer on Skills Shortages: A Cross-Country Comparison," *HRDC Applied Research Branch Paper* R96-8-E.

Hofer, H. and Lietz, C. (2004). "Labour market effects of apprenticeship training in Austria." *International Journal of Manpower* 25(1): 104-122.

Human Resources and Skills Development Canada (2005) "News Release: Government of Canada supports Workplace Skills Strategy with Apprenticeship Advisory Committee," January 14.

Industry Training Authority (BC) (2003) *Service Plan, 2003/2004 – 2006/2007*.

International Reform Monitor (2000) "Abolition of the Canadian Labour Force Development Board." http://www.reformmonitor.org/index.php3?content=docview,980.

Johansen, Lars (2002) "Transferable Training as a Collective Good," *European Sociological Review*, 18(3).

Kuhn, Peter (2003) "Effects of Population Aging on Labour Market Flows in Canada: Analytical Issues and Research Priorities," *HRDC-IC-SSHRC Skills Research Initiative*, Working Paper 2003-A02.

Kunin, Roslyn and Associates (2003) "RAIS Data Gap Analysis Project," report prepared for Industrial Sector Strategies, Human Resources Development Canada, September.

Kunin, Roslyn and Associates (2004) "Provincial Funding of Apprenticeship Programs in Canada – How Much Are We Investing," report prepared for Human Resources Development Canada, March.

Lehmann, Wolfgang (2000) "Is Germany's Dual System Still a Model for Canadian Youth Apprenticeship Initiatives?" *Canadian Public Policy* 16(2).

Lin, Zhengxi and Jean-François Tremblay (2003) "Employer-Supported Training in Canada: Policy-Research Key Knowledge Gaps and Issues," *HRDC-IC-SSHRC Skills Research Initiative*, Working Paper 2003-B01.

Loewenstein, Mark and James Spletzer (1998) "Dividing the Costs and Returns to General Training," *Journal of Labor Economics*, vol. 16, pp. 142-169.

Malcomson, James, James Maw and Barry McCormick (2003) "General Training by Firms, Contract Enforceability and Public Policy," *European Economic Review*, 47(2).

Marquart, Richard (1998) *Labour Market Policies and Programmes Affecting Youth in Canada,* OECD Thematic Paper: Paris.

Massé, Philippe, Richard Roy, and Yves Gingras (1998) "The Changing Skill Structure of Employment in Canada," *HRDC Applied Research Branch Paper* R99-7-E.

McKernan, John (1994) *Making the Grade: How a New Youth Apprenticeship System can Change our Schools and Save American Jobs*. Boston : Little, Brown.

Merle, V. (1994) "Pedagogical Objectives and Organization of Alternating Training" in OECD (ed.) *Apprenticeship – Which Way Forward?* Paris : OECD.

Ministry of Advanced Education (BC) (2002) *A Model for Industry Training in British Columbia,* Discussion Paper, December 2002.

Ministry of Advanced Education (BC) (2003) *Consultation Summary of the New Industry Training Model for British Columbia,* May 2003.

Montmarquette, Claude and David Boisclair (2003) "Post-Secondary Educational Institutions' Adjustment to Labour Market Changes: Major Concerns and Key Research Issues," *HRDC-IC-SSHRC Skills Research Initiative*, Working Paper 2003-C02.

National Centre for Vocational Educational Research (2001) *Australian Apprenticeships: Facts, Fiction and the Future*. NCVER : Adelaide.

National Centre for Vocational Educational Research (2004) *Apprentices and Trainees March Quarter 2004*, NCVER : Adelaide.

Neal, Derek (1999) "The Complexity of Job Mobility Amongst Young Men," *Journal of Labour Economics*, 17(2).

Nova Scotia Provincial Apprenticeship Board (2002) *Apprenticeship in Nova Scotia: A Discussion Paper*, March.

O'Brien, Kevin (2004) "Lessons in Reality for Apprentices," *New York Times,* July 13, 2004.

O'Grady, John (1997) *Apprenticeship in Canada: Issues and Problems,* Paper developed from remarks to the Annual Conference on Vocational and Technical Education, October 18, 1997. [http://www.ogrady.on.ca/pdf/paper1.PDF]

OECD (1986) *Youth and Work in Australia*, OECD : Paris.

OECD (1999) "Thematic Review of the Transition from Initial Education to Working Life: Canada Country Note." OECD: Paris.

OECD (2000) *From Initial Education to Working Life: Making Transitions Work,* Paris : OECD.

Ontario Ministry of Finance (2004) *2004 Provincial Budget.* Toronto.

Ontario Ministry of Training, Colleges and Universities (1998a) "Reform of apprenticeship legislation to create thousands of jobs," Press Release, June 25, 1998.

Ontario Ministry of Training, Colleges and Universities (1998b) "If The Apprenticeship and Certification Act, 1998 receives Royal Assent in its current form an apprentice's experience in the future will be very different from that of an apprentice today,**"** Backgrounder, June 25, 1998.

Ontario Ministry of Training, Colleges and Universities (1998c) "*The Apprenticeship and Certification Act, 1998*: a framework for a more effective apprenticeship training system, " Backgrounder, June 25, 1998.
Ontario Ministry of Training, Colleges and Universities (2000) "Proclamation of the *Apprenticeship and Certification Act*, 1998," Backgrounder, January, 2000.

Ontario Ministry of Training, Colleges and Universities (2001) " Reformed apprenticeship training system strengthens economic growth," Fact Sheet, September 7, 2001.

Payne, Jane (1995) "Options at 16 and Outcomes at 24: a Comparison of Academic and Vocational Education and Training Routes"*, Youth Cohort Report* no. 35, Sheffield: Department for Education and Employment.

Pennings, Ray (2003) *Competitively Working in Tommorow's Construction*, Work Research Foundation : Mississauga, ON.

Philp, Margaret (2005) "Trading Up," front page Focus section F, *The Globe and Mail*, Saturday, January 28.

Raggart, P. (1998) "Quality Control in the Dual System of West Germany," *Oxford Review of Education,* no. 14.

Ray, D., Beswick, W., Lawson, C., O'Brien, C. & Madigan S. (2000), "Attrition in apprenticeships: An analysis of apprentices commencing between July 1994 and June 1996", *Research and Evaluation Branch report 1/00*, Department of Education, Training and Youth Affairs, Canberra.

Ray, J (2001) *Apprenticeship in Australia: A Historical Snapshot*, National Centre for Vocational Education Research : Adelaide.

Redding, Stephen (1996) "The Low-Skill, Low-Quality Trap: Strategic Complementarities Between Human Capital and R&D" *The Economic Journal*, 106.

Rieble-Aubourg, S. (1996). "Institutional arrangements of Germany's vocational education system - What are the policy implications for the US?" *International Journal Of Comparative Sociology* 37(1-2): 174-191.

Robinson, C. (2000) *New directions in Australia's skill formation: Lifelong learning is the key*, NCVER, Adelaide.

Royal Commision on Industrial Training and Technical Education (1913) *Report of the Commissioners*. Government of Canada : Ottawa.

Ryan, Paul (1998) "Is Apprenticeship Better: A Review of the Economic Evidence," *Journal of Vocational Education and Training,* 50:2.

Ryan, Paul (2000) "The Institutional Requirements of Apprenticeship: Evidence from Smaller EU Countries," *International Journal of Training and Development*, 4(1).

Ryan, Paul (2001) "The School-to-Work Transition: A Cross-National Perspective," *Journal of Economic Literature*, 39(1).

Schuetze, Hans (2003) "Alternation Education and Training in Canada," in Schuetze, Hans and Robert Sweet (eds.) *Integrating School and Workplace Learning in Canada,* Canada: McGill-Queen's University Press.

Schuetze, Hans and Robert Sweet (2003) (eds.) *Integrating School and Workplace Learning in Canada,* Canada: McGill-Queen's University Press.

Schuetze, Hans and Robert Sweet (2003) "Integrating School and Workplace Learning in Canada: An Introduction to Alternation Education Concepts and Issues," in Schuetze, Hans and Robert Sweet (eds.) *Integrating School and Workplace Learning in Canada,* Canada: McGill-Queen's University Press.

Sharpe, Andrew (1999) "Apprenticeship in Canada: A Training System Under Siege?" CSLS report prepared fort the Canadian Labour Force Development Board.

Sharpe, Andrew (2003) "Apprenticeship in Canada: A Training System Under Siege?" in Schuetze, Hans and Robert Sweet (eds.) *Integrating School and Workplace Learning in Canada,* Canada: McGill-Queen's University Press.

Shelby Smith, Chris *et al.* (2001) *The Economic of Vocational Training and Education in Australia*. National Centre for Vocational Educational Research: Adelaide.

Statistics Canada (2001a) "The Changing Profile of Canada's Labour Force," *2001 Census Analysis Series*.

Statistics Canada (2004) "Registered apprenticeship training programs," *The Daily*, December 17.

Steedman, Hilary (2001) "Benchmarking Apprenticeship: UK and Continental Europe Compared." *CEP Discussion Paper*, Centre for Economic Performance, LSE dp513.

Stevens, Margaret (1994a) "An Investment Model for the Supply of Training by Employers," *The Economic Journal*, 104(424).

Stevens, Margaret (1994b) "A Theoretical Model of On-the-Job Training with Imperfect Competition," *Oxford Economic Papers*, New Series, 46(4).

Stevens, Margaret (1999) "Human Capital Theory and UK Vocational Training Policy," *Oxford Review of Economic Policy*, 15(1).

Stevens, Margaret (2001) "Should Firms be Required to Pay for Vocational Training?" *Economic Journal*, 111.

Stoll, Paul and Allison Baignee (1997) *The National Apprenticed Trades Survey: An Overview of theApprenticeship experience,* Human Resources Development Canada: Standards, Planning and Analysis.

Sweet, Robert (2001) *Preparing for Work in the New Economy: A Comparison of College and Apprenticeship Transitions*, Report to the Sectoral and Occupational Studies. Ottawa: HRDC.

Sweet, Robert (2003) "Women and Apprenticeships: The Role of Personal Agency in Transition Success," in Schuetze, Hans and Robert Sweet (eds.) *Integrating School and Workplace Learning in Canada,* Canada: McGill-Queen's University Press.

Sweet, Robert and Zeng Lin (1999) "Union Membership and Apprenticeship Completion," *CRWS Working Paper* no. 99-06.

Sweet, Robert and Zeng Lin. (2000). "Consequences of Attrition in Apprenticeship: An Analysis of the 1994-95 National Apprenticed Trades Survey," *CRWS Working Paper,* no. 00-06.

Taylor, Alison (2003) "The Context of School-Work Transition in Canada," *Work and Learning Network Working Paper* #42.

Tremblay, Danielle-Gabrielle and Irène Le Bot (2003) "The German Dual Apprenticeship System: Analysis of its Evolution and Present Challenges." *Research Note* #2003-4A, Chaire de recherche du Canada sur les enjeux socio-organisationnels de l'économie de savoir.

van Walraven, Jack (2004) "An Inventory of Government Incentives or Employer-sponsored Worker Training in Canada and the United States," Skills Research Initiative, Working Paper 2004-B-3, Human Resources Development Canada/Industry Canada/SSHRC, draft 2.

Walsh, John (2004) "Opening Keynote Address: Shifting Societal Attitudes," 2004 Apprenticeship Summit Building on Commitments, Canadian Apprenticeship Forum, Halifax, Nova Scotia, June, posted at www.caf-fca.ca.

Winkelmann, Rainer (1997) "How Young Workers Get Their Training: A Survey of Germany versus the United States." *Journal of Population Economics*, 10.

Wolter, Stephan C., Samuel Muhlemann and Jurg Schewi (2003) "Why Some Firms Train Apprentices and Many Others Do Not," Institute for the Study of Labor, Discussion Paper No. 916, October.

Wright, Phillip C. (1997) Certification: A Policy Alternative for Developing both Traditional and Emerging Trades and Occupations," *International Journal of Manpower*, Vol. 18, Issue 3.