Skills Research Initiative
Initiative de recherche sur les compétences

Rapporteurs' Comments: Summary of Roundtables

Dwayne Benjamin (University of Toronto)
Arthur Sweetman (Queen's University)
Craig Riddell (University of British Columbia)
Lorraine Eden (Texas A&M University)

Working Paper 2004

Human Resources Development Canada/Développement des ressources humaines du Canada
Industry Canada/Industrie Canada
Social Sciences and Humanities Research Council/Conseil de recherches en sciences humaines du Canada

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In the context of the federal government's innovation strategy, Human Resources Development Canada (HRDC), Industry Canada (IC) and the Social Sciences and Humanities Research Council Initiative on the New Economy (SSHRC-INE) are partnering to design and fund a multi-year skill-related research program–the HRDC-IC-SSHRC Skills Research Initiative (HISSRI). The research is grouped into four themes:

A. Labour Market and Skills Implications of Population Aging;
B. Employer-Supported Training;
C. Adjustments in Markets for Skilled Workers;
D. International Mobility of Skilled Workers.

Dans le cadre de la stratégie d'innovation du gouvernement fédéral, Développement des ressources humaines du Canada (DRHC), Industrie Canada (IC) et l'Initiative de la nouvelle économie du Conseil de recherches en sciences humaines (INE-CRSH) se sont associés pour concevoir et financer un programme pluriannuel de recherches sur les compétences, appelé Initiative de recherche sur les compétences de DRHC-IC-CRSH. Ce programme comprend quatre grands thèmes :

A. les incidences du vieillissement de la population sur le marché du travail et la main-d'oeuvre spécialisée;
B. la formation en entreprise;
C. l'adaptation du marché du travail aux travailleurs spécialisés;
D. la mobilité des travailleurs spécialisés dans le monde.

The HISSRI Working Paper Series provides a forum for the discussion of analytical issues related to the themes covered under the research partnership. Working Papers are circulated in the language in which they were written. The papers reflect the views of the authors and no responsibility for them should be attributed to HRDC, IC or the SSHRC. Comments on the papers are invited and may be sent directly to the authors.

La collection Documents de travail de l'Initiative de recherche servira de tribune où seront abordées plusieurs questions analytiques liées aux thèmes susmentionnés. Les documents de travail sont diffusés dans la langue dans laquelle ils ont été écrits. Les opinions qui y sont exprimées sont celles des auteurs et n'engagent pas DRHC, IC ou le CRSH. Le lecteur est prié de faire part de ses commentaires aux auteurs.

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Preface

The Skills Research Initiative is a multi-year initiative undertaken by Industry Canada (IC) and Human Resources Development Canada (HRDC), in partnership with the Social Sciences and Humanities Research Council (SSHRC). Designed to support the Innovation Strategy of the Federal Government, the research partners identified four skills policy-research themes. They are: labour market and skills implications of population aging in Canada; employer-sponsored training; adjustments in markets for skilled workers in Canada; and international mobility of highly skilled workers.

In the first phase of the project, papers reviewing issues for discussion were prepared on each of the four research themes and roundtables of experts from academia, the public and private sectors were held. The main goal of the roundtables was to discuss the knowledge gaps reported in the issues papers and identify promising research directions.

An expert from academia was selected as a rapporteur for the day's discussion at each roundtable. Following the roundtable, each rapporteur prepared a written report that reviewed the key messages of the participants and provide their own suggestions on future research directions. These reports were instrumental in the development of the request for proposals for each research theme administered by SSHRC. This working paper is a compendium of the four rapporteurs' reports.

Préface

L'Initiative de recherche sur les compétences est un programme pluriannuel mené par Industrie Canada (IC) et Ressources humaines et Développement des compétences Canada (RHDC), de concert avec le Conseil de recherches en sciences humaines (CRSH). Dans le cadre de ce programme, qui vise à appuyer la Stratégie d'innovation du gouvernement fédéral, les partenaires ont choisi quatre thèmes de recherches sur les politiques touchant le domaine des compétences : les incidences du vieillissement de la population sur le marché du travail et les travailleurs qualifiés au Canada; la formation parrainée par l'employeur; l'adaptation du marché du travail aux travailleurs qualifiés au Canada; la mobilité des travailleurs hautement qualifiés dans le monde.

Durant la première phase du programme, des documents portant sur les questions à discuter ont été rédigés pour chaque thème, et des tables rondes de spécialistes provenant des secteurs universitaire, public et privé ont eu lieu. Ces tables rondes avaient pour principal objectif de discuter des lacunes du savoir relevées dans les documents de fond et de définir des orientations prometteuses pour les recherches.

À chaque table ronde, un spécialiste universitaire a été nommé rapporteur des discussions de la journée. À la suite des tables rondes, les rapporteurs ont rédigé un rapport comprenant les principaux messages des participants et leurs propres suggestions quant aux orientations futures des recherches. Ces rapports ont servi à l'élaboration des demandes de propositions pour chaque thème, qui sont administrées par le CRSH. Ce document de travail est un recueil des quatre rapports des rapporteurs.

Theme A: The Labour Market and Skills Implications of Population Aging in Canada
Report from the roundtable on October 20, 2003 Ottawa, Ontario.

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1.0 Introduction and objective

The Canadian population is "aging": The average age of the population is rising as a consequence of the baby-boom generation growing older, without an offsetting increase in the number of the young. Prudent public policy demands anticipation of the potential impact of this trend on a variety of outcomes. Considerable attention has been paid, for example, to the fiscal implications of an older population, especially for public pension and old age security programs. Less attention has been paid to the potential consequences for the labour market. Should we expect skills shortages as experienced workers retire? Is an older workforce less "nimble", possibly leading to a more "rigid," poorer performing labour market? What policies need to be developed for the time when the population is older? Are there policies that should be adopted now?

While these general questions are of immediate and current interest, an important question is whether the "aging crisis" exists at all. Perhaps policy makers can comfortably turn their attention to other issues. Even if there is no "crisis", are there more modest, less alarming, but important (by usual standards) policy objectives that merit study and immediate attention. In order to address these questions, HRDC and Industry Canada plan to commission a series of papers to evaluate the policy implications of population aging, as concerns the potential impact on the labour market and the level of skills (and productivity) of the Canadian workforce.

To this end, HRDC-IC sponsored a one-day roundtable to discuss possible research topics that fit within a well-defined time frame pertinent for "medium-term" policy planning. Specifically, the objective is to commission papers that can be written by the end of 2004 or the spring of 2005, basically within 18 months. Obviously, this places constraints on the types of questions that can be addressed, and the methodologies that can be employed. These constraints were incorporated into the discussion at the roundtable.

Facilitating the day-long discussion were two background papers that identified potential avenues for research, highlighting existing gaps in our knowledge. Listed by author, the key starting points were as follows:

- *Peter Kuhn*: This paper focused on two aspects of the potential impact of aging on the labour market. First, demographic change might affect product demand patterns, which shifting labour demand across sectors, with resulting changes in employment and wages. Second, the adjustment process – the natural growth and decline of firms – may hit older workers especially hard. Not only is this important because of the welfare consequences for older workers, but adjustment itself might be impeded by an older workforce.
- *Daniel Boothby, Julie Dubois, and Bruno Rainville*: This paper provided a broad overview of issues pertaining to an aging workforce and aggregate employment and wages. Included in their discussion was an important delineation between supply and demand factors, which serves as a useful way to organize potential research topics. A key focus of their paper was the implications of workforce aging for the level of *skills* in the Canadian economy. Especially with rapid technological change, we need to understand whether technological

shocks will be more severe with skill shortages, possibly worsened by an aging workforce. As in Kuhn's paper, they also highlighted the importance of understanding the adjustment process, not just a comparison of long run equilibria.

The presentations based on these excellent papers drew our discussion towards feasible research topics, confined to labour markets and skills (as opposed to infeasible topics on general issues pertaining to aging).

The objective of this paper is to distill the discussion of the roundtable, with due attention to the existing background papers. However, rather than catalogue the details of discussion or repeat the arguments in the papers (themselves summaries), my objective is to draw together the themes of discussion, with an eye to suggesting a smaller number of topics that SSHRC should emphasize in its request for proposals (RFP). I begin by providing some background facts on population aging that were not presented at the conference, especially since one important theme of discussion was the need to define the extent of population "aging" in the first place. I then review a very simple supply and demand model that underlines the methodology that economists employ in studying such a question. While this model was not explicitly discussed at the roundtable, it turns out to be a useful way of organizing the subsequent discussion of research topics.

2.0 Context

The proposed research projects need to address the potential consequences to the Canadian labour market of the movement of the baby-boomers through their economic life-cycle. One of the first questions raised at the discussion was whether we should care at all: how big is the potential "aging effect", and won't the labour market absorb this shock anyway (at least in the "long run")? In order to set the stage for evaluating this question, and proposing critical auxiliary questions, I provide some simple "facts" and a correspondingly simple theoretical exercise.

2.1 Background Facts

How big a phenomenon is population aging in the first place? How does population aging over the next 15 years compare to other shocks to Canada's labour market? Figure 1 provides some simple background information on this question. It displays the share of the population (men and women combined) by age group for three years: 1990, 2003 (the present), and 2020. Each bar represents the percentage of 20-74 year old adults (a broadly defined potential labour force) comprised by 5-year age categories. The figure clearly shows the nature of population aging, as a "ripple" of the baby-boom generation through various ages.

For example, in 1990, the population was relatively young, with the most common ages being 25-29 through 40-44. The implied average age of a Canadian (between 20 and 74) in 1990 was 41.8.[1] By 2003, the average age rose to 43.8, with the most common age groups being about thirteen years older, in their forties and fifties. By 2020, population projections show a much flatter age distribution, as most of the baby-boom has left the 20-74 year old window. However, there is still a slightly higher fraction of 55-64 year olds than other age groups. Most striking is the high fraction of people over 54 compared to other age groups. The average age of the working-age population (broadly defined) in 2020 is 46.5 years, approximately 5 years older than in 1990.

[1] I calculate the average age as a weighted average of the population between 20 and 74, using the midpoints of the age-groups, and the shares depicted in Figure 1.

From this simple figure we see the complexity of population aging, and it's potential implications for the labour market. As time passes, the share of older (potential) workers (older than 55) rises, increasing the average age of a (potential) worker. On the other hand, if these workers retire, they may take with them considerable skills, leaving the relatively smaller number of young workers without "senior" skills.

2.2 Background Theory

Economists can legitimately be criticized for all sorts of sins of omission in their models, but the simple supply and demand model is nevertheless a powerful way to organize thinking. In fact, both background papers (especially by Boothby, Dubois, and Rainville) propose research topics than can be categorized as "supply-side" or "demand-side". Before we make such delineations, it is worth going through a simple "story-telling" exercise in order to conjecture the possible economic consequences of population aging. Whether or not the model is correct, it may underlie the intuition of the general public or higher-level policy makers concerning the "dangers" of population aging. Using such a model provides a means by which to understand or challenge the assumptions of opinion-makers. Furthermore, the model demonstrates how markets can accommodate "shocks," like population aging, tracing the effects on employment, wages, and implicitly income distribution.

In order to do this, I construct a model of an economy with two types of workers: old and young. Assume that labour is otherwise homogeneous, and that workers are paid a wage W_{OLD}, W_{YOUNG} (possibly different for old and young workers), determined in competitive markets. While there are two markets (for old and young workers), we can explore many of the absolute and relative outcomes by focusing only on the market for old workers, holding constant the operation of the market for young workers. The market for old workers is depicted in Figure 2. The supply of older workers is represented by the supply curve, S_0. This is drawn as an increasing function of the wage, under the assumption that as the returns to work rise for older workers, they are willing to work more hours. The demand for older workers is given by D_0, which is drawn as a downward sloping function of their wage: firms will substitute to cheaper (old) workers as their wage falls, holding constant the wage of the young. Clearly, the slope of this function depends (among other factors) on the degree of substitutability of older with younger workers. The equilibrium wage and employment level is given by E_0 and W_0.

Now imagine that demographic change leads to an increase in the number of older workers available at each wage rate. This can be represented by the outward shift of the supply curve to S_1. If wages fail to adjust, then there will be an excess supply of older workers at the original wage, W_0. The labour market would not be able to allocate all of the E_U older workers who would like to work at the prevailing wage. Firms would not find it worth retaining older workers, and displaced older workers would remain unemployed, by the amount $E_U - E_0$. However, if wages are flexible, then the wage of old workers falls, to the new equilibrium wage of W_1, and the higher employment level of E_1. In this new equilibrium, the market has accommodated all of the increase of the older workers who would like to work (at the lower wage, W_1). If there was no spillover to the labor market of young workers, then the *relative* wage of young workers (compared to old) would rise.[2]

[2] Of course, in general equilibrium (in the markets for young and old workers) we would expect the lower price of old workers to shift the demand for young workers, depending on the substitutability of complementarity of labour. This does not change the basic flavour of the simple partial equilibrium story.

Figure 3 addresses the opposite possibility (however remote) that population aging will lead to a *shrinking* in the number of possible older workers. This allows for the possibility that higher retirement rates will lead to a disproportionate *decline* in available old workers with population aging. There may thus be slippage between population aging (more old people) and workforce aging (fewer old people willing to work). The logic of the analysis is simply the reverse of Figure 2. With a reduction in supply of older workers from S_0 to S_1, there will be a shortage of older workers, unless wages rise to W_1. In equilibrium, there are no shortages of old or young workers.

These simple models can then be used to map increasing numbers or shares of older workers, to key labour market outcomes like employment and wages. With a more elaborate model, we could more precisely link the markets for young and old workers, permitting a complete analysis of the absolute and relative levels of wages (for both young and old workers), as well as the distribution of earnings (the product of employment and wages) across age groups.

2.3 Why Figures 1, 2 and 3 are not enough.

The simple thought-experiments reflected in Figures 2 and 3 are quite powerful, and illustrate an important insight of economics that markets can adjust to shocks like population aging. Indeed, in this case markets (possibly) do an extraordinary job of accommodating slowly evolving supply shocks like those associated with population aging. Combined with a "half-empty" interpretation of Figure 1 (down-weighting the magnitude of population aging), the equilibrium story could be used to dismiss the need for any policy response (in the labour market) to aging.

Even if the model is correct, however, there are limitations to using these arguments alone to dismiss concerns with population aging:

- *What is the link between population age structure and age composition of labour supply*: How can we trace the aging of people to increases in the supply of older or younger workers? This pertains to broader questions of labour supply and participation, and the impact of age on this decision.
- *What is the slope of the labour supply function*? Are the supplies of workers really sensitive to wages? If old workers are "scarce" (as in Figure 3), can we expect wage increases to entice more young workers in their place? Or is the supply curve essentially vertical (independent of wages). In that case, all adjustment occurs through quantities.
- *What is the slope of the demand curve*? How substitutable are older and younger workers. If they are perfect substitutes (for example), then the demand curve will be relatively flat (older and younger workers must be paid the same wage).

Without answers to these questions, it is not possible to correctly calibrate the impact of an aging labour force, or dismiss out of hand the possibility that "aging matters", even within this simple model. However, the model itself has several potential shortcomings, even if it serves a useful role in underlining shortfalls in logic:

- The model restricts the impact of aging to operate entirely through *supply*. What about the demand side? Are there any reasons to believe that labour demand itself might be shifted by aging?
- Is it reasonable to restrict ourselves to two types of labour? Of course, there are many types of workers, in many markets: but is there something *misleading* about the simple equilibrium story? Possibly (for example) there are different implications by skill level. Here, we could imagine there are "high skill" and "low skill" workers of different age groups, with possibly

complex substitutability of these various types of labour. What if older workers have scarce skills that the young failed to acquire? Would this change the flavor of our "don't worry" conclusions? What are the implications of casting the model in a dynamic setting, with technological change and possibly different "vintages" of human capital?

- What if wage (or other institutional) rigidities exist so that labour surpluses or shortages persist, and markets do not adjust (or clear). Without a price mechanism, there may be a need for government policy to either facilitate adjustment, or provide an insurance role for non-voluntary losers.
- Even if wages adjust well, and the labour market efficiently accommodates the aging labour force, there may be adverse distributional impacts. For example, the wages of older workers are depressed in Figure 2. Should we care? What about the incomes of those who do not work: while the participation decision is voluntary, which older workers are working (and earning wages) while the rest do not? Is there room for redistributive policies? The simple model helps highlight the "price" changes that would feed into a distributional analysis, but more information is required.
- How applicable is a competitive market model anyway? Certainly, in unionized settings, the model may not be 100 percent informative? What about the public sector?

We now relax the constraint of viewing potential research question exclusively through the lens of Figure 2 (or 3) to a more general discussion of research topics highlighted at the roundtable.

3.0 Research Questions

There are many potentially important research topics. For all topics, however, there were a number of important "themes" or distinctions to be maintained:

The distinction between aging at the individual and aggregate levels:

Even in a steady state, with a stable age-structure, individuals are getting older, and there would be an interest in the "economics of aging." Irrespective of whether the upcoming change in age structure represents a "crisis," there are several important economic and policy questions pertaining to individual aging. For example, the original motivation for Old Age Security and the Canada Pension Plan was the precarious economic position of Canada's elderly, and the changing nature of work (factories instead of farms), *not* the fact that they were numerous. A secular decline in the age of retirement may have implications for firm behaviour and aggregate productivity, independent of the size of the baby boom.

The shifting age composition can then have different consequences. In the simplest world, a higher fraction of older people can just amplify the importance of "aging issues" in a mechanical way: whatever problems old people have, there are simply more of them. Alternatively, the change in age composition may change prices (as in Figures 2 and 3), in which case the young will be affected by population aging. One important implication of this possibility is that research on "aging" cannot be confined to the "old." This also underlines the importance of considering "spillovers" or "general equilibrium" consequences.

Policy relevance and the evaluation of policy

While "basic research" on questions pertaining to aging, the behaviour of older workers, and the performance of markets provides an important foundation for policy discussion, ideally the proposed research should not be conducted in a policy vacuum. Proposed projects do not need to consider every conceivable policy that may be relevant to a given economic question, but

it is reasonable for researchers to consider the implications of their research on broad policy "tools." For example, in skills-based research, is there room for government subsidies or assistance in skill acquisition? What are the efficiency and equity considerations involved in such a policy, in light of specific research results? In addition to general "policy tools" (like taxes, subsidies, or the provision of public goods), what are the connections between existing specific policies and economic behaviour? For example, it is relatively easy to discuss the potential impact of CPP, OAS, and GIS on decision-making, whether to evaluate how these programs affect behaviour, or how individual behaviour might affect the operation of the programs themselves. How do programs targeted at the elderly interact with EI? What about the traditional distinction between "active" and "passive" labour market policies? Might RRSP's and other savings programs be expanded to facilitate skills investment, or income insurance for older workers? It will certainly be helpful to policy makers to have precise examples of potential linkages between any piece of research and public policy.

What follows is a list of potential research topics that arose for discussion at the roundtable, either directly, or indirectly through the background papers. After the list of topics, we turn to possible research methodologies that could be exploited. While researchers can be creative in developing their own methodologies, in order to assess the possibility of meeting the 18 month research deadline, it seems reasonable to "imagine" the types of projects that could be completed, in order to evaluate the feasibleness of various projects.

3.1 Demand Side Projects

These projects focus on firms, and the impact of aging on labour demand:

Product markets and aging: A shift in the age structure of the population can be expected to shift the composition of demand for goods and services, tilting demand towards goods consumed by the elderly. Peter Kuhn carefully evaluates the various channels by which we might expect these shifts in product demand to affect the labour market. In an open economy like Canada, it is unlikely that local demand shifts will significantly affect local production patterns. Thus, Kuhn argues, this is not likely a fruitful area of research. An exception to this concerns local production of non-traded goods and services, like health and education. Especially given that these are provided (largely) by the public sector, we might not expect the usual separation of supply and demand to hold.

Old and young workers in production: How substitutable are old and young workers? The impact or potential for "shortages" of young or old, skilled or unskilled workers depends to a large extent on the ease with which firms can substitute various types of workers (as seen to some extent in Figure 2). If there are no real differences in human capital or productivity across workers of different ages or vintages, then clearly, the impact of aging on productivity and firm performance will be minimal.

Age discrimination: Do employers "discriminate" against older workers? This is not the same as asking whether they are indifferent to hiring old and young workers, as there are many good reasons why a firm should prefer one or the other (differences in productivity, human capital, or time horizons over which to amortize firm-specific investments). However, it would be helpful if we could identify whether firms "underutilize" older workers for non-economic reasons that we might deem as discrimination. If we could identify such behaviour, is it consistent with "statistical" discrimination (mis-attributing average characteristics of older workers to individuals), consumer attitudes (e.g., a preference for young bond-traders, younger

sales clerks, or older pilots), or some other explanation. Clearly, the appropriate policy response would depend on the nature of discrimination.

Workforce age and firm performance: Are firms dominated by older workers less "nimble"? Does the age composition of a firm have any correlation with its behaviour or performance? In order to anticipate the costs of workforce aging, it would be helpful to know whether there is any evidence that firms with greater shares of older workers are at a disadvantage (or have an advantage). This is also related to the role of young and old workers in production.

3.2 Supply Side Projects

The following projects focus on individual work decisions (labour supply), especially as pertains to retirement:

Retirement and labour market participation: Whether a policy objective is to encourage older workers to stay in the labour force (to exploit their human capital, or reduce the burden on public pension plans), or to encourage them to retire (to "make room" for younger workers), it is important to know how workers respond to incentives, both private (like wages) and public (like policy parameters). Is the standard "life-cycle" labour supply model an appropriate lens through which to view retirement and work decisions? Do people retire gradually, moving first to part-time work, and when they stop, do they stop working "forever"? In other words, what are the dynamics of the retirement process? What role is played by wealth and savings? Are there different retirement propensities by skill level (and education). This is an important topic independent of population aging, and it is also an area that has been studied extensively by labour economists. It would be difficult, however, especially in a Canadian context to summarize this area as "settled."

Role of the family: An important extension of the labour supply model is to cast decisions in a family context, so that the husband's and wife's retirement decisions are interconnected. Especially given the role of family versus individual earnings in some income transfer programs (like the GIS), it is important to know how family decisions differ from individual ones. A related subtext is the changing economic role of women. We cannot expect women 10 years from now to behave the same as they do in 2003 (for a given age), because they will have followed different career trajectories, had different labour market experiences, and fewer children. Thus, any study of the labour supply of women/men, or families will have to be aware of the pitfalls of distinguishing age from cohort effects.

Time-use: For good reason, labour economists focus on paid working time and aggregate remaining time into "non-market time" or leisure. As we are interested in the allocation of labour in production, and the earnings that flow from this work, it makes sense to look at levels of participation and returns to this activity. However, there are important elements of "non-market time" that may merit further study, especially of the elderly. For example, are retired individuals likely to divert their energy to volunteer work? Are partially retired individuals actively engaged in volunteer work, or other activities? How important is family care, and do family responsibilities affect the retirement decision? While we think of older workers as being at the end of their working lifecycles, this does not preclude the possibility that this age group is most squeezed by family commitments: from elderly parents (in their eighties), to children, and even grand-children. The skills of the elderly might simply be transferred from paid activities to unpaid ones, and our calculations of the aggregate cost of aging should reflect this possibility.

Pensions and labour supply: Most studies of labour supply of older workers focus on the incentive effects of public pensions. There is probably room for more work on this topic. However, the most interesting frontier is evaluating the impact of private pension plans on the timing of retirement. Of course, this is a difficult area of research, as individuals (to some extent) jointly determine private pension plans with expected trajectories of work. For example, someone expecting to retire at age 55 will probably plan accordingly, and choose a job with a pension plan that makes this feasible.

3.3 Evaluating Market Efficiency

How do supply and demand interact? Is it reasonable to expect the labour market will smoothly accommodate the "bulge" of additional older workers?

Rigidities: Do labour markets operate smoothly (as depicted in Figures 2 and 3), or are there various rigidities that impede adjustment. Some of these rigidities may be due to underlying market imperfections, or they may be the consequence of government policy. For example, do EI or CPP/QPP regulations or payroll tax structure encourage firms to favor hiring full or part-time workers? Do these (potential) rigidities affect the elderly? Are displaced elderly workers re-employed reasonably quickly? Does the presence of mandatory retirement impede firm adjustment to an aging workforce?

Regional issues: Is there a regional dimension to market inefficiencies or rigidities? Even if not really a market failure, the well known negative relationship between age and mobility may diminish the ability of the labour market to efficiently reallocate older workers from one region in Canada to another. This will have welfare, and possibly political economy consequences, as regions with older, less mobile workers will see their living standards fall. Moreover, the less mobile older workers may depress the returns to younger workers in the regions, so that younger workers migrate.

Human resource practices: The labour market is not a daily spot market as depicted in Figure 2. Workers are attached to firms for long periods of time, working under implicit or explicit contracts. Perhaps this is of no consequence. However, to the extent that the human resource/contracting practices of firms limit mobility, or impede adjustment, then we are more likely to see shortages or surpluses of workers. Similarly, the age structure of a work force may affect the types of human resource practices or benefits/incentive structure of firms. This is one avenue by which older workers may reduce firm firm performance. Perhaps younger workers prefer riskier compensation schemes that allow firms to make adjustments less expensively. Or perhaps, there is no linkage between age and the way a firm chooses to manage its workforce.

Other institutional issues: A significant fraction of private sector workers are still unionized in Canada, and we do not expect adjustment to occur as quickly at these firms. This is especially the case (for example) with seniority-based lay-off rules, and other common practices that favor older workers. Possibly, the age-dimension of unionized firm behaviour is so small as to be negligible. One objective of this research is to establish how important rigidities like these actually are.

Displaced workers: As emphasized by Kuhn, displaced older workers experience more difficult adjustments after losing their jobs than do younger workers. If a greater fraction of workers are older workers, AND the probability of displacement by age is unchanged, then an increasing fraction of displaced workers will be older. What is the appropriate policy response for such workers? How much will a higher fraction of older workers inhibit firms from layoffs, or otherwise making optimal adjustments to employment?

3.4 Heterogeneous labour and skill

As emphasized by all participants in the roundtable, it is not helpful to focus only on aggregate employment and wages. We expect the impact of aging to vary across markets, and especially across different types of workers. Probably the most interesting dimension to explore is skill, as this dove-tails with independent concerns about the average level of skill in the Canadian labour market.

How much skill is embodied in older workers? There is no clear picture of how much skill older workers carry with them when they retire, yet the skill implications of aging depend on (at least) a crude senses of the distribution of skill across age groups. It is not clear how one could measure skill: is it years of formal schooling? Industry or occupational job experience (human capital). There is a large literature emphasizing the difficulty of measuring skill when so much training is informal. An obvious (economists') measure of "skill" is based on wages, and how much firms are willing to pay for the productivity of an older (versus young) worker. But there are competing theories as to the relationship between productivity and wages over the lifecycle, especially in the presence of firm-specific human capital. Whatever the answer, and despite the obvious limitations, it would be helpful to know how the distribution of skill might be affected by workforce aging.

Does it pay to teach old dogs new tricks? If older workers are less skilled, possibly because they have (optimally) not invested into new human capital, does it make economic sense to subsidize or encourage training them? Measuring the economic returns to training is quite difficult, but lessons from that literature may be appropriate here. Even back-of-the envelope calculations of the returns to high-value education, but amortized over a shorter investment horizon are worth doing. In addition, there may be insights from other disciplines on the ease/difficulty with which older workers learn.

Do older workers retrain? Aside from whether it pays off to train workers, a natural question is whether there ought to be a policy response. Presumably, if it is worthwhile doing so, older workers should make such investments themselves. The usual arguments about credit constraints for young workers are less likely to apply here. But what evidence do we have of older workers engaging in human capital investment, especially formal schooling (which is observable)? Do we see an increasing propensity of older workers to learn new skills as they age?

3.5 Aging and the Public Sector

To some extent, problems of aging in the public sector (government, health, and education) may be the subject of personnel policy, and of no interest to economists or policy makers more generally. However, given the size of the sector, it is difficult to ignore, especially as this sector interacts with the "market" sector of the economy. Furthermore, given the demands for high productivity at a reasonable cost, it is worth knowing whether the aging of the public sector poses a serious threat to Canadian prosperity, our ability to maintain universal health care, and accessible post-secondary education. Employment shortages of doctors, university professors, and civil service managers can easily spill over to the rest of the Canadian economy in the form of higher prices. Perhaps there are potential linkages between facilitating public service, and exploiting "retired" workers from the private sector, though these opportunities may be limited given the necessary skills (e.g., doctors and nurses). Nevertheless, it is worth

exploring the possible barriers (unions and credentials) that inhibit skilled workers moving between private and public sectors.

3.6 Aging, the labour market, and income distribution

Most of the discussion on aging and the labour market concerns economic efficiency: allocating workers across sectors, and evaluating whether the labour market can accommodate the "shock" of an aging work force. However, even a perfectly functioning labour market will produce winners and losers from this adjustment: some people's wages will rise; others will fall. If the market fails to work, the distributional consequences might be even more severe, with unemployment. As was the case with the rising returns to education (in the U.S. over the 1980s and early 1990's), changing market conditions can readily translate into significant changes in inequality. What are the potential distributional effects of population aging? Of particular interest to this roundtable are the linkages with the labour market, as opposed to intergenerational equity associated with public pensions. Research in this area would focus on likely changes in the distribution of income, depending on various scenarios of retirement behaviour, or differing changes of the relative wages of young and old workers.

On a related note, it is also worth exploring the impact of income distribution on labour supply and retirement. The baby boom generation is the richest in history, and subsequent cohorts have not done as well (as measured by earnings). How might we expect differences in cohort wealth to affect retirement profiles across cohorts? Given the distribution of income/wealth by age or cohort, does it make sense to revisit the use of "age" as a targeting characteristic for income maintenance programs (like OAS)?

4.0 Research Methodology

With no intention of tying the hands of creative researchers, participants in the roundtable offered a number of suggestions concerning research strategies for tackling the questions posed above. Given the short time horizon, there is no scope for developing new data sets or conducting household surveys. Indeed, it was emphasized that there were many underutilized data sets.

Pooled Cross-sections: Many of the leading questions require identifying the impact of age, and its interaction with a variety of covariates, on several outcomes like education, wages, and labour supply. This type of work is best suited for pooled time-series cross-section studies, where researchers can (in principle) disentangle age and cohort effects. While there are many very good examples, Card and Lemieux (2001) stands out, as they explore some of the questions posed here, and employ cross-country comparisons (also as suggested here).[3]

Cross-country studies: One of the most important questions policy makers need to answer is whether the aging of the population is "unprecedented", and whether it has mattered in any other jurisdictions. It therefore makes sense to exploit the experience of other countries, including research that has already been completed about their experience. Ideally, some cross-country studies could exploit pooled samples, comparing Canadian with foreign outcomes, with some rigourous attempt made to determine the applicability of foreign (e.g., European) experience to Canada. Even without formal statistical analysis, high quality comparative research would undoubtedly place the Canadian experience in a better context. It probably makes sense to request where possible that whatever the specific research topic or methodology, researchers

[3] David Card and Thomas Lemieux, "Can Falling Supply Explain the Rising Return to College for Younger Men? A Cohort-Based Analysis," *Quarterly Journal of Economics* 116, May 2001, pp. 705-46.

conduct extensive reviews of international evidence. There have been a few outstanding NBER volumes that explicitly emphasize the value of comparative work on aging.[4]

Historical: Is population aging a relative "blip" in Canadian history? Has the labour market absorbed larger or similar shocks in the past? For example, what was the impact of the baby-boom on the labour market when it first hit? To what extent was the high unemployment of the 1980's a transitory phenomenon, associated with a relatively young workforce? What was the impact on the age structure of wages of the Canadian baby-boom? How does this experience compare to other countries? How does it compare to other significant changes: the movement of Canadians out of agriculture over the twentieth century? The increase of women's labour market participation? Massive immigration early in the twentieth century, and sustained high levels through the past two decades? Placing population aging in perspective, by comparison with other episodes in Canadian economic history will serve an important role with policy makers. If population aging pales in comparison, then this will diminish concern. On the other hand, if past shocks caused difficulty, or at least predictable outcomes, then we can anticipate consequences of aging and better design policy. In the historical arena, it may also be valuable to take an international perspective (for example) comparing the impact of "demographic transition" on other countries.

"*Standard Approaches*": As important as comparative and historical work is in providing context, some of the research questions require conventional econometric analysis of readily available data, like the SCF, or SLID. This may be the case (for example) in studying the retirement/labour supply decision, and evaluating the validity of the life-cycle labour supply model. Similarly, underutilized data sets like the GSS, or Survey of Volunteering and Giving, can provide insights on time use. The WES may be ideally suited to evaluating the impact of the age of a workforce on firm behaviour and performance.

Institutional/Descriptive: While economists are generally not fond of institutional or descriptive work, it is also indispensable to a complete understanding of the policy implications of an aging labour force. What existing policies are even potentially related to the elderly? What assistance is available to a displaced older worker? How might the myriad of income maintenance programs interact to facilitate (or impede) adjustment to an aging population. For example, how do national pensions, private pensions, and disability insurance combine to affect work incentives? Does unemployment insurance (EI) cloud the picture? What human resource practices (like mandatory retirement) affect (or possibly affect) labour supply or employment decisions? Of course, there is nothing in this approach that precludes interaction with any of the others (historical, comparative, or "standard".)

Program Evaluation Studies: While there is no time for independent evaluation of possible programs, it is worth summarizing the existing training evaluation literature, with an eye on displaced and older workers. What do we know about the impact of income maintenance programs, and the covariation of this impact with age?

Displaced Workers: As well highlighted by Peter Kuhn, we can learn a considerable amount about the labour market by studying displaced workers. Of course, we learn about the experience of older displaced workers. But we also learn about the portability of human capital across firms, as well as the mechanisms that workers employ to deal with the adverse shock of being laid off. Clever researchers may be able to identify important aspects of the nature of "skill" as embodied in older workers.

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[4] Jonathon Gruber and David Wise, eds. *Social Security and Retirement Around the World*, Chicago: University of Chicago Press, 1999.

5.0 Conclusions and recommendations

Drawing together the research projects and methodologies described above, there was a strong sense of research priorities. Given the immediate and legitimate needs of policy makers for timely policy-relevant research, it probably makes sense to sub-divide potential projects into two groups: (1) Less academic overview papers; and (2) Research papers that can fill both policy and academic objectives. The incentive schemes for managing the RFP's are probably different for the two classes of paper.

In the first class, there was a consensus need for overview papers that place the challenges of the aging population into an accurate and broad context. One can imagine two such papers, one focused on employment, and the other on skills:

- *Employment overview*: What are the key "facts" concerning population aging and its potential ramifications for the labour force? What are the stylized facts about the size and age structure of the population, as well as key trends in hours and participation for men and women by age? How do these projected changes compare to past changes in the Canadian labour force (historical perspective)? How do these changes compare to other countries (international perspective)? What are the possible welfare (distributional) implications? Who are the likely winners and losers? This paper should also carefully document the relevant policy issues in Canada, including a discussion of existing policies that "interface" with labour supply and retirement, as well as the policy experience of other jurisdictions, especially where novel or dramatic policy changes occurred (as in France, for example).
- *Skills overview*: Are there implications of population aging for the aggregate skills level of the Canadian workforce? What are the stylized facts and projections for observable skills (formally educated workers)? Is there evidence that aggregate levels of skill affect aggregate productivity and living standards, and moreover, that aging may affect our current trajectory in this regard? This paper should also survey and evaluate the issues pertaining to the measurement of skill, especially since a great deal of what we mean by "skill" is not directly observable. Regarding formal education, there is a growing literature on skills acquisition by the baby boom generation, and the role played by market signals (the returns to education). What are the implications of this experience for the future? As in the employment paper, the author of this paper needs to precisely discuss the interplay of existing policies with skill formation, especially as it pertains to education levels by age.

Both of these papers involve more "conjecture" and interpretation than is normally acceptable in academic papers destined for journals. They also primarily involve surveying existing work. While this is actually a quite challenging task, it is less likely to have an academic payoff. However, these papers can provide a "bottom line" context for the formulation or evaluation of policies designed to address a potential "aging crisis".

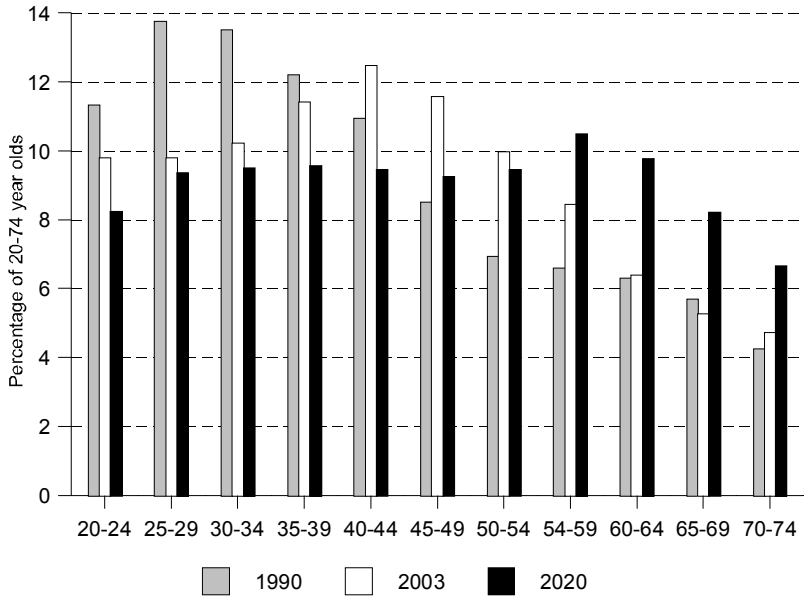
Concerning a broader list of more academic papers, there is no real need to eliminate any of the topics summarized above. Instead, I would suggest that authors be requested to include in their papers more than the usual amount of discussion of "context", including a literature review, and comparisons with other jurisdictions. I would also require authors to be specific about the potential policy implications of their research, especially concerning the mandate of the broader project. Vague generalities on policy relevance would not be enough, even though research that itself had nothing directly to do with policy would be acceptable (as I explain below). While there is no need to exclude proposals as long as they are broadly consistent with the labour

market and skills implications of aging, I think the following projects should receive highest priority (in no particular order):

- *Labour supply and retirement*: What do we know about the nature of labour market attachment of older workers. What are the labour supply dynamics, and are they changing. Does labour supply respond to public pension incentives, and/or other economic variables?
- *Families and Retirement*: While we need to know more about the individual behaviour of men (and especially women!), an important gap in the retirement literature is the possible implications of setting the retirement decision in a family model, and exploring interactions of husband's and wives' retirement decisions.
- *Firm behaviour and the age structure of the workforce*: This topic was emphasized by both background papers, and several participants at the workshop. A paper in this area would exploit matched firm-worker data (like the WES), and would probably have a high academic payoff, in addition to providing important background information about all sorts of firm-level characteristics that might be affected by workforce aging.
- *Population aging in historical and international context*: What role in economic history is normally played by demographic change? How have markets performed in similar circumstances?
- *Displaced Workers and Age*: What has been the experience of displaced older workers, in a variety of settings, and along several dimensions (e.g., re-employment, program participation, and skills investment).
- *Private Pensions and the evolution of Human Resource Practices*: This might be a more descriptive paper, but besides investigating how markets adjust to aging, it is well worth knowing how other institutional dimensions of the labour market (e.g. internal labour markets) have evolved with population aging.

These six projects – or research questions – can readily be cast into a traditional SSHRC financed research project, as planned by the organizers of the roundtable. The key will be to emphasize the timetable, the resulting need to exploit existing data sources, and the demand for more than spurious policy relevance.

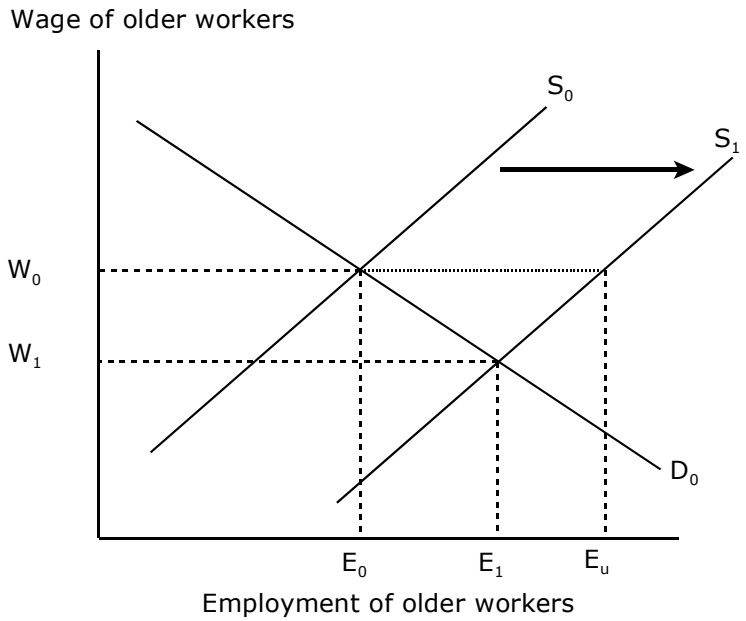
Figure 1: The age distribution of Canada's population, aged 20 to 74



Notes: This figure shows the percentage of individuals (men and women combined) in each age group, as a percentage of the total population aged 20 to 74. Numbers for 1990 are based on the actual age distribution, while those for 2003 and 2020 are based on Statistics Canada population projections.

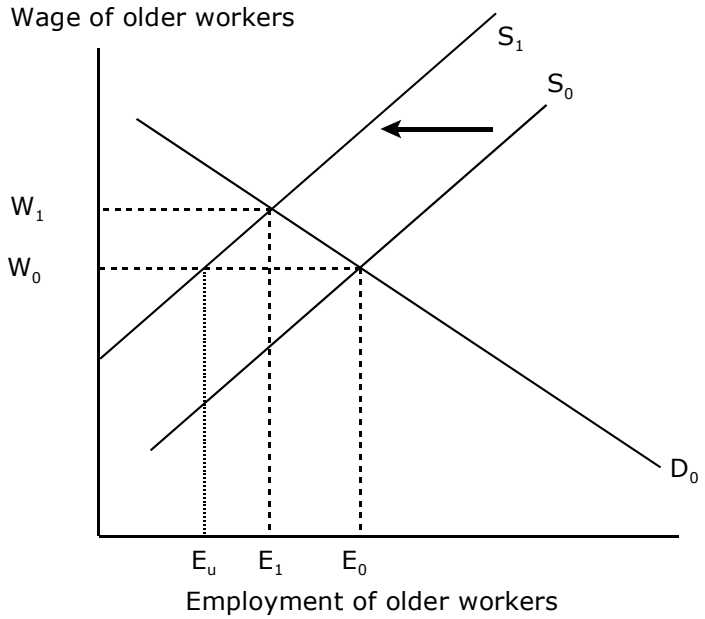
Source: Author's calculations based on Statistics Canada, CANSIM, various series.

Figure 2: What happens in the labour market with an *increase* in the number of older workers?



Notes: This figure illustrates the possible equilibrium effect of an *increase* in the supply of older workers on their wage and employment levels (holding all else constant). The initial supply of older workers is given by S_0, while the initial demand is given by D_0. Equilibrium employment and wages are indicated by E_0 and W_0. An increase in the number of older workers shifts the supply of older workers to S_1. If wages do not adjust, and stay at W_0, then there will be a surplus of older workers given by the difference $E_u - E_0$. However, if the wage of older workers falls to the new equilibrium level, W_1, then older workers are fully employed, with employment given by E_1.

Figure 3: What happens in the labour market with a *decrease* in the number of older workers?



Notes: This figure illustrates the possible equilibrium effect of a decrease in the supply of older workers on the wage and employment of older workers. The initial supply of older workers is given by S_0, while the initial demand is given by D_0. Equilibrium employment and wages are indicated by E_0 and W_0. A decrease in the number of older workers shifts the supply of older workers to S_1. If wages do not adjust, and stay at W_0, then there will a shortage of older workers given by the difference $E_0 - E_u$. However, if the wages of older workers rise to the new equilibrium level, W_1, then older workers are fully employed, with employment given by E_1.

Theme B: Employer-Supported Training – Summary Report
Report from the roundtable on October 03, 2003 Ottawa Ontario.

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There is a consensus among observers that investments in human capital are increasingly crucial to both improving social conditions, and the operation of a modern economy. At the national level, human capital investment is associated with increases in innovation, economic growth, and productivity. It is also apparent that facilitating human capital accumulation across the entire life-cycle (life-course) is necessary; formal education, taken in high school, colleges, and/or universities is insufficient. Employer-supported training is a central source of labour market related human capital accumulation beyond the "typical" end of formal education. Of concern is that Canadian workers may not be receiving sufficient employer-supported training.

Data for research

Empirical research looking at questions such as employer-sponsored training are only as good as the data available. There is some uncertainty surrounding whether the set of training related questions in the various existing surveys can satisfactorily support a broad and detailed range of relevant research. (For example, can classroom training inside the firm be differentiated from employer-subsidized training in colleges/universities? Do we know who - firms or workers - chooses the course of study in each situation?) Given the time lags in the development of survey questions, it is worth exploring this issue relatively quickly.

Background

Lin and Tremblay (2003) present results from the International Adult Literacy Survey that show that Canada has a mid-level ranking in terms of participation in labour-sponsored training relative to a selected set of comparator countries. However, "the participation rate of core-age workers (25-54) in employer-sponsored training was 34 percent in Canada, compared to 43 percent and 56 percent in the United States and the United Kingdom, respectively" (pg. 3). They further find that the gap in the incidence and hours of training between Canada and the US had US firms providing more in most, but not all, industries and worker education levels. This data source has the advantage of being consistently defined across the countries involved, most of whom belong to the OECD. Chaykowski and Slotsve (2003) report results from the same data set, but they provide estimates for a wider range of countries and tabulations from a broader question looking at training and education irrespective of the source of funding, which they label training. They similarly find that for those aged 25-65 Canada appears to be in the middle of the pack regarding incidence. However, they report that the Canada-US gap is statistically insignificant implying that any gap in this measure is too small to be observed in this data. Interestingly, conditional upon receiving training (using their broader definition) the hours per participant are greater in Canada compared to US. Chaykowski and Slotsve also report

differences in the distribution of training on a few fronts: in both countries increasing firm size is associated with increased training participation and hours; Canadian training participation is significantly higher than US participation for blue collar workers, but lower for white collar ones; relative to the US, participation at smaller firms (<100 employees) is higher in Canada and training hours are substantially higher, while both participation and hours at larger firms (>500 employees) is lower. Overall, Lin and Tremblay's tighter definition shows Canada to provide somewhat less training relative to the US, but the patterns are broadly similar.

Lin and Tremblay (p. 10) also report results from national surveys looking at the same issue. The difficulty in comparing across national surveys is that the questions are not exactly the same, and the comparisons are more prone to measurement error. Nevertheless, they report that "the 1999 OECD Employment Outlook uses various data collected by member countries to analyse the level and distribution of adult worker training. The results show that Canada ranks in the middle of the pack both in training participation rates and volumes, but slightly behind that of the United States."

Government policy with respect to training can be used to overcome market failures, or to address equity issues. To justify taking policy action requires evidence on two issues: first, that an identifiable problem exists, and second, that the policy in question will improve the situation relative to no (new) policy. Research to produce evidence that addresses both of these issues is required.

Discussion

Exchange Rates, Price Shifts, and Physical and Human Capital Investment

Several issues arise in the analysis of the findings regarding the propensity for firms to train presented in the background materials. All of the data are from the mid- to late-1990s, which was a unique time in Canadian economic history. In this period, the Canadian dollar repeatedly hit record lows as it declined relative to some (but not all) trading partner's currencies, and in particular the US dollar. Labour productivity fell, which is one of the concerns prompting this focus on employer-sponsored training, however total factor productivity did not suffer this decline. The fall of the Canadian dollar, and the fact that much manufacturing equipment is imported, implies that the Canadian dollar price of capital increased substantially relative to the Canadian dollar price of labour. It appears that investment in equipment and machinery by firms also slowed over this period relative to the decades before, but the details of the process are largely unknown. Of course, this relative price change did not occur in the US. Unfortunately, the relationship between physical and human capital accumulation, exchange rates, and employer-sponsored training is not well understood. A substantial number of research questions follow from the abovementioned issues. For example, what is the relationship between human and physical capital investment by firms? How is training associated with innovation and/or technological change? How do shifts in the relative prices of physical and human capital affect firms' decisions to invest in training? Does training affect firm growth and/or sustainability? Additionally, since training is a means, not an end in itself, it is necessary to focus

on productivity increases and other results of training, not only the incidence or duration of training.

Training Platforms: Delivery, Types of Training and the End-point for Policy

Following from the background is also an obvious need to understand the relationship between firm-sponsored and other types of training/education, and firm productivity and other measures of the result of training. Canada has one of the most highly educated labour forces in the world. Although the university sector is smaller than that in the US, the college sector is arguably the largest in the world and the post-secondary total is one of the very largest (comparisons can be affected by the categorization of Québec's CEGEP system, and other countries apprenticeship programs, but this does not alter the basic conclusion). Further, the quality of Canadian education is currently quite high (though this appears not to have been as strong among older cohorts); Canada has higher average scores than the US in international tests in the last decade. This implies that the base upon which employer-supported training builds is potentially quite different from that in the US, or other comparator countries. Work is needed to explore the different mix of training requirements of individuals who differ by experience, education, industry and other characteristics. Moreover, training offered by employers in some countries is offered in community colleges in others, and employers occasionally fund training and education delivered by public-sector institutions such as colleges and universities. Some understanding of these types of international differences exists, but it is far from complete. For training that is not primarily firm-specific so that firms are reluctant to invest, then perhaps sector councils, unions or public institutions, perhaps in conjunction with firms, are best placed to deliver some aspects of training. The appropriate roles for each of these agents, which may vary across types of training, should be explored.

Understanding the differences in the nature and value of training supplied informally on the job, formally in classrooms in the workplace, and more formally again in education and training institutions is another research area. Relatedly, who is the most appropriate target for training interventions should they be required – firms, workers or sectors/industries? How efficacious are alternative training deliverers in providing each of various types of training? How should the relationships between employers and public and private sector education and training providers be structured? Related to this is the need to understand the different types of training provided by employers. Chaykowski and Slotsve (2003) report that most training is "orientation for new employees" (Table 7), although among large firms training on computer software is comparable. Questions such as the following arise naturally. How much training has a long-term focus? How much is tightly tied to the introduction of new capital investment in the workplace? How much is tied to the introduction of new human resource or organizational structures? How much is intended to develop a firm's "cultural capital"? What is the relative value over different time horizons of various forms of training and delivery mechanisms? Is formal training inferior to learning-by-doing in some contexts? How does the optimal mix and quantity of training vary by firm size, industry or other dimension?

Incidence versus Intensity

One of the key elements highlighted by Chaykowski and Slotsve is the difference between participation and hours of training. It is not clear how these two should be weighted in thinking about the total amount of training provided by firms. Is training two workers for eight hours each equivalent to training one worker for 16 hours in terms of productivity? Should any potential policy regarding training focus on total expenditures, incidence and/or duration?

Information Problems

One issue with training is that many managers, particularly in small firms, "may not know what they don't know". This may be especially relevant for information and computer technologies, and obtaining knowledge regarding factor and product markets that are geographically distant from the firm. An alternative information problem is that workers with low levels of education may not appreciate the economic value of training. There is some economic evidence (see Card 1999; Oreopolous 2002, 2003) that individuals who terminate their education at young ages may in fact have extremely high rates of return to education. This could be an important source of market failure. Investigations into these types of information problems have the potential to be quite useful. A related issue is that within firms there may be information problems such that senior executives do not understand what is actually being delivered "on the front lines". Quantifying the importance of these potential information problems would be useful in considering alternative types of policy interventions.

Relationships between Training and Government Social Programs

There is a clear relationship between social programs, especially Employment Insurance but also some aspects of income assistance programs, and training inside the firm. Relatedly, some have posited that minimum wage legislation negatively impacts individuals' incentives to train (minimum wage increases are known to be associated with increases in high school drop out rates). HRDC and the provinces operate special programs that focus explicitly on training. Multiple research questions exist in this broad area. For example, one might think that the optimal time to pursue long-term training inside the firm might be at points of low product demand (i.e., training should be countercyclical). However, in the Canadian context temporary layoffs are frequently used as a vehicle to reduce costs during periods of low demand, and workers are restricted in their activities while receiving EI benefits. Interactions of these type of institutional features with employer-sponsored training would be well worth investigating. (This particular feature may also help explain some international differences since the practice of temporary layoffs supported by the unemployment insurance system is almost exclusively a North American phenomenon, and the system in Canada is over five times larger than that in the US.) With respect to income assistance, valuable preliminary work on evaluating alternative forms of training is provided by Warburton and Warburton (2002) who observe substantial differences in economic benefits across alternative programs and point to the importance of not viewing training as homogeneous.

Firms' Return on Training Investment, Worker Turnover and Wages

The classic rationale for firms underinvesting in general worker training, training that is not firm specific, is that once worker productivity increases as a result of the training those skills are marketable and the worker will either seek a higher wage with the current employer, or a new employer. (When one employer actively seeks workers trained in a different firm this is sometimes terms "poaching".) Hence the firm making the investment cannot reap the return on that investment. This can result in private actions that are not socially efficient and an underinvestment in training. However, it begs the question: why do workers not finance such general human capital investment themselves? Interestingly, Lin and Tremblay (2003) observe that much of the training provided by firms is in fact general, and not firm specific. Does the provision of general skills imply that all beneficial investments in firm-specific human capital are completed (else why offer general training)? More broadly, how relevant is the distinction between firm specific and general training? Are there complementarities between general and firm-specific human capital? Or are firms able to capture sufficient returns to general training? How does training affect worker turnover? Alternatively, do workers who desire training select employers that offer it? Is it an employment benefit that reduces turnover? From a slightly different perspective, has there been an increase in occupation switching over the life-course such that increased (re-) training is required? Further, is there evidence that firms, especially small firms, are liquidity constrained in funding training?

Although firm "success", variously defined, is often posited as a main goal of training, Lin and Tremblay report that there is mixed empirical evidence on the relationship between training and firm growth. A better understanding of the relevance of training over the life-cycle of the firm, and with respect to firm "success", would aid help in ensuring that training is not mis-targeted.

Apprenticeship

It is not entirely evident why apprenticeship programs are not more common in Canada. It is possible that for many firms, particularly small ones, the long-term commitment required for apprenticeship training is not feasible given shifts and product demand (and the options offered by the EI system). Alternatively, geographic and firm mobility in the Canadian labour market may be too high to allow firms to earn a return on their investment.

Tax Policy, Government Subsidies and Training

There is some interest in the government developing policies to encourage, or require, firms to provide training. Québec's training levy is an example of such a policy, and such policies also exist in some European countries. How do such policies perform? Do they allow firms sufficient flexibility across years, and across the business cycle, in the timing of training? Do they increase training, productivity and other outcomes? How is training monitored for policy purposes? Do these types of policies alter the types of training offered? What alternatives exist, or might exist?

Multinational Firms and International Comparisons

International comparisons of training in particular industries/sectors are useful for understanding alternative approaches to training delivery over the life-course and within firms. They also provide opportunities to evaluate the relationship between training inputs and various outputs of interest (increased productivity, worker turnover and the like) in a variety of contexts. Similarly, the ownership and governance structures of firms, which vary within Canada and internationally, are posited to affect their propensity to train and the nature of the training provided. Do domestically owned firms differ in their provision of training than foreign owned ones? Understanding these relationships may be quite important in developing policy with respect to training.

Social and Equity Issues

Evidence was presented by Lin and Tremblay (2003) that more educated and highly skilled workers receive more training over their lifetimes (much as they must have received more education in the first place). Is this an equity problem? Can it be addressed by policy? Can training be used to address the needs of disadvantaged groups within society?

Priority Research Issues of Direct Relevance for Policy
(Some overlap with the above discussion)

I. A fuller understanding of the existing distribution of training within the economy is required.
   A. This includes understanding the implication of using different measures of the quantity of training (e.g., participation, hours and expenditures), and different definitions of what constitutes training and employer sponsored training (e.g., definitions could be based on who pays - where costs include time, funds, and in-kind transfers; who initiates; or the strength of connection to the firm).
   B. While some information is available regarding differences by correlates with training such as gender, education and firm size, many questions remain unanswered. Examples include: How does training vary with foreign ownership? Are there differences in the public versus private sector? In publically-traded compared to privately held or not-for-profit firms? Across occupations and post-secondary fields of study? Moreover, though this is difficult to do given the available data, changes in the same over the business cycle, and across the life-cycle of a firm, would be even more valuable in developing policy.

   International comparisons of the same would be useful since rankings appear to alter substantially depending upon the measure employed and the subgroup being studied. Relatedly, if training investments are seen to vary over the business cycle, then this has implications for interpreting international comparisons. Understanding these issues will provide a better sense of the nature of training in Canada and the nation's investment relative to other countries.

II. There is a need to look at training as a heterogeneous input and to explore the relative value of different approaches to training. The link between different types training and

the outcomes of interest – firm "success", innovation, growth, productivity, profitability and the like – needs to be better established and its empirical magnitude estimated. To this end, are certain types of training best delivered by the public/private sector (perhaps because of economies of scale, or credentials)? How does, for example, the value and delivery of initial orientation differ from that delivered later in an employee's tenure? How much training is associated with the introduction of new capital? (e.g., training related to software appears to be very important.) This last leads to the very important area of the relationship between physical and human capital accumulation, which needs to be better understood. Are there some types of skills that are difficult to develop in training sponsored by firms? (For example, Green and Riddell (2003) find that literacy and numeracy skills are only influenced by formal education.)

III. Several questions exist about the distinction between employer-sponsored, and employee-sponsored or state-sponsored, training. Does it matter for productivity, economic growth and related issues who sponsors training? Are firms better able to select training that improves productivity than workers? Or, are different sponsors better adept at selecting different types of training? Answering these questions is pertinent for considering the relevant "policy intervention platform" – that is, is the appropriate endpoint the worker, the firm or the sector?

IV. Questions surrounding the limits of firms' return on training investment are important and numerous. Worker turnover and training are central issues in understanding firms' training decisions and their ability to capture the returns to training. Are firms able to capture sufficient benefits from training so that they sponsor the optimal quantity and type? Or, is training effectively subsidized by worker compensation (wages and/or benefits), so that firms do not bear an appreciable cost? How much does the apparent portability of many skills within industries and occupations hinder firm investment in training? Do workers who receive more training quit more frequently? How does training affect turnover at the firm/industry/occupation/sector level?

V. Understanding the relationship between government programs such as EI and social assistance, and firm-sponsored training would be especially useful. Are EI-sponsored (or increasingly provincial LMDA related) training and firm-sponsored training complements or substitutes? Does the operation of the EI system, and especially temporary layoffs, help or hinder firm-sponsored training? How do EI special programs interact with training inside firms?

VI. How empirically important are the various potential sources of market failures that may prevent firms from sponsoring training in addition to firms' potential inability to capture the returns to training mentioned above? These failures may arise from information problems, liquidity constraints or other sources.

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Theme C: Adjustments in markets for skilled labour in Canada
Report from the roundtable on March 22, 2004 Ottawa Ontario.

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This report summarizes the main points that emerged from the discussion at the "Roundtable on Adjustments in Markets for Skilled Labour in Canada." It is intended to supplement the "issues papers" by Boothby and Rainville and Montmarquette and Boisclair, which provide overviews of many of the key issues to be addressed in this research program.

The research priorities identified at the Roundtable can be discussed under the following headings:

1. Linkages between the production of skilled workers and outcomes such as research and development and innovative activity.
2. Assessing the Canadian mix of tertiary education.
3. Assessing the adaptability of Canada's post-secondary education system.
4. Factors affecting the long-term supply of skilled workers.
5. Achieving excellence: assessing the quality of education and training of skilled workers and the ways educational quality can be influenced.
6. Student financial support and the supply of skilled workers.
7. Influences on student decisions regarding educational choices and skill acquisition.

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1. Linkages between the production of skilled workers and outcomes such as research and development and innovative activity.

An important set of research questions relates to the linkages between the education and training of skilled workers and outcomes such as research and development and innovative activity. Linkages of this nature -- for example, between the number of scientists and engineers and innovative activity -- are a central feature of many models of endogenous growth. "New growth theory" emphasizes the contribution of knowledge creation in fostering advances in living standards over time. The influence of these new perspectives has been enhanced by empirical evidence that supports the view that education plays an important role in economic growth. However, much remains to be learned about the nature of any linkages between the supply of skilled workers on the one hand and outcomes such as innovative activity on the other hand.

Such relationships are of considerable policy interest because of the key role of innovative activity in economic progress. Even apparently small differences in growth rates will, if they persist over extended periods of time, make huge differences to the living standards of the average citizen. Furthermore, these models of economic growth suggest that there may be social benefits to human capital formation in addition to the private benefits that accrue to those making the investment in education and training.

A substantial body of evidence shows that there are significant private benefits from schooling in the form of higher earnings over the individual's lifetime, lower unemployment and more varied and satisfying careers. However, it has long been believed that there are also important social

benefits associated with additional education, such as greater civic participation, reduced criminal activity, improved own health and children's health, and positive externalities leading to greater economic growth and higher living standards. Indeed, public support for education is to some extent based on the view that these social benefits are substantial, and that, in the absence of subsidization by government, many individuals would acquire too little education.

The research questions in this area include the following. Does an increased supply of skilled workers lead to an increase in innovative activity? If so, what is the magnitude of this effect and what are the mechanisms through which this effect operates? To what extent is the impact on innovative activity received by those making the investment in increased education or training, and to what extent does the impact on innovative activity take the form of social benefits that accrue to society at large? Do these social benefits differ according to the field of study pursued by skilled workers? In particular, are the social benefits associated with the education and training of skilled workers greater for those pursuing studies in science and engineering than for other fields? Similarly, are the social benefits associated with studies at the university bachelor's level or post-graduate level greater than those for more vocational programs at the college level? How do the teaching and research functions of educational institutions contribute to advances in knowledge and to the dissemination and adoption of new knowledge in the economy?

2. Assessing the Canadian mix of tertiary education.

According to widely used measures of educational attainment, Canada is unique among the OECD countries in the proportion of the labour force with a non-university post-secondary education (i.e., a college diploma or trade certificate). In contrast, Canada falls behind several other OECD countries (especially the US) in the fraction of the labour force with a university education. The international data thus suggest that at the tertiary level Canada devotes an unusually large fraction of its resources to the non-university post-secondary sector, by comparison to other developed countries. Several important research questions flow from this observation.

First, it is important to ascertain whether the cross-country data on educational attainment provide a reasonably accurate picture. For example, the OECD data indicate that Canada is a substantial "outlier" in terms of educational attainment, with the proportion of the Canadian labour force with a non-university post-secondary degree, diploma or certificate being about triple the OECD average and far higher than any other OECD country. There are, however, a number of reasons to believe that the OECD data may overstate the extent of the differences between Canada and other OECD countries in this respect. For example, some of the individuals who are classified as non-university post-secondary graduates in the Canadian data supplied to the OECD may be classified as high school graduates (and some as high school dropouts) in other countries. Research addressing these measurement questions would be worthwhile. Such studies would attempt to make the Canadian data comparable to that of a number of other relevant countries (or vice-versa). This analysis would require a detailed examination of the various survey instruments used to measure educational attainment in the relevant countries, as well as the nature of the education systems in these countries.

Even if the international data overstate the extent of Canada's investment in non-university post-secondary education to some extent, it is clear that the Canadian mix of post-secondary education is unusual by international standards. A central question is whether the current mix is optimal. There are a number of research questions here. To what extent is

Canadian non-university post-secondary education appropriately characterized as being vocational and technical in nature? Does university education provide graduates with a broader set of skills? Although both types of education are needed to some degree, is the current balance appropriate at this time? For example, one view is that vocational and technical programs are relatively more important for countries that are far away from the technological frontier, whereas university programs are more important for countries close to the frontier. A related view is that a shift toward more emphasis on university education is appropriate in periods of rapid technological advance whereas more emphasis on technical and vocational education may be appropriate when the technology of production and consumption is relatively stable.

Research that could contribute to these questions would examine the evolution of the private returns to non-university post-secondary education, including the components of this category such as trade schools and community college programs. As is the case in the US, most of the Canadian literature on the returns to post-secondary education has focused on the private returns to university programs. Given the importance of the non-university component in Canada, more needs to be known about this issue.

Another important question relates to the extent to which the university and community college systems should be integrated. Some provinces have adopted policies to promote the integration of universities and colleges through such mechanisms as university transfer programs. In other provinces there has been limited collaboration and cooperation between universities and colleges. Little is known about the costs and benefits of promoting greater integration of these components of the post-secondary system. Studies of the consequences of these different policies for outcomes such as access to post-secondary education and the quality of education would be valuable.

3. Assessing the adaptability of Canada's post-secondary education system.

Many participants at the roundtable raised questions related to how adequately the supply of skilled workers adjusts to changes in demand. Such questions require an assessment of the responsiveness of educational institutions -- as well as student decisions -- to changing labour market conditions. Cross-country comparisons of adjustment to changing circumstances could be useful here.

Several research projects could emerge from the issues that were raised. Some of these involve assessing the adjustment experience. For example, is there evidence of insufficient or excessively slow adjustment in the past? Such evidence might include persistence of relatively high earnings in some fields of study, lack of expansion of programs with substantial queues of applicants, and persistent rationing in the form of high (or increasingly stringent) entrance requirements.

Another set of potential research projects would attempt to identify institutional barriers to adjustment in the PSE system. Such studies should examine the incentives facing those within the system (administrators, faculty, and students) to adjust to changes in demand. Studies could also assess whether adjustment in the PSE system primarily takes the form of differential grading standards across disciplines rather than changes in the supply of graduates in programs for which there is growing demand.

Supply lags play an important role in the adjustment process. Can the length of time between when changes in demand occur and when new graduates enter the labour force be reduced? More generally, what do we know about time to completion of various educational programs -- both variation in completion times across different fields of study and changes over

time in average time to completion? How has reduced government funding for post-secondary education influenced time to completion of undergraduate and graduate programs?

4. Factors affecting the long-term supply of skilled workers.

Although the post-secondary education system plays a dominant role in the supply of skilled workers, long-term supply also depends on such factors as elementary and secondary schooling, parenting skills and activities, and early childhood development. Studies of the contribution of these factors to the supply of skilled workers would be useful. For example, do variations across jurisdictions in student achievement influence field-of-study choices in post-secondary education? Do educational policies such as province-wide curriculum-based examinations and use of specialist teachers in mathematics and science affect field-of-study choices in post-secondary? Does the supply of skilled workers adjust more rapidly to changes in demand in jurisdictions with higher student achievement at the elementary and secondary level?

5. Achieving excellence: assessing the quality of education and training of highly skilled workers and the ways educational quality can be influenced.

Much research focuses on the quantity of skilled workers, in part for reasons of data availability. However, the quality of education and training are also important, albeit more difficult to measure. Several issues related to the educational quality were raised. A central concern is whether there are appropriate incentives within the post-secondary education system for ensuring that high levels of quality are achieved and, if so, maintained. Some jurisdictions have experimented with basing funding of post-secondary institutions and programs on assessments of the quality of educational programs and graduates. Research on the consequences of this approach would be useful.

Another important issue is whether the Canada's university system exhibits sufficient differentiation by quality and research intensity. For example, would Canada be better served if there were a few truly outstanding universities and research institutes? If so, what are the best mechanisms to bring about this situation?

6. Student financial support and the supply of highly skilled workers.

The implications of alternative systems of student financial support for the supply of skilled workers received considerable attention at the roundtable. One issue that received attention relates to the consequences of alternative forms of financial support for the adaptability of the post-secondary education system and its responsiveness to change. Participants also recommended research assessing the experience of countries such as Australia, the U.K. and New Zealand that have adopted income-contingent loan programs as the principal basis for student financial support.

7. Influences on student decisions regarding educational choices and skill acquisition.

Information is of central importance in markets for skilled labour, and there is a perception that decisions relating to educational programs and career choices are frequently based on highly imperfect information.. How do those making decisions about what skills to acquire and how to acquire them learn about labour market opportunities and requirements? How can the timeliness and quality of such information be improved? To what extent are decisions regarding educational programs based on factors such as the expected return on the investment? What role does the variability in expected returns (degree of risk associated with the investment)

play? Are there differences by family background in how appropriate information is acquired and processed? If so, what types of policies might reduce such differences?

Theme D: International Mobility of Skilled Labour: Analytical Issues and Research Priorities
Report from the roundtable on February 27, 2004 Ottawa Ontario.

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INTRODUCTION

High-skilled labour (HSL) refers to skilled individuals in knowledge-intensive professions, including, for example, doctors and nurses; scientists, engineers and technicians; PhD students and university professors; and administrators and managers. Typically, these individuals have at least an undergraduate university education. Given the time involved in getting their education and training, the HSL component of a country's labour force does not change quickly except through inward and outward migration.

The traditional view of international migration of HSL was the *brain drain model*, whereby skilled labor flowed from poor to rich countries, motivated by expected wage gains in the receiving country.[i] These individuals were seen as permanently lost resources to the sending countries and gains to the receiving, implying a zero-sum game with winners and losers. In both cases, the number of migrants, relative to the total population, was typically small.

More recently, we have seen several trends that affect this traditional picture. First, the skill intensity of production, both in manufacturing and services, has risen so the demand for high-skilled labor has increased in all countries. As Michael Porter and John Dunning have argued, we now live in a *knowledge-based economy* where *knowledge workers* (high-skilled labor) have replaced natural resources and capital as the key resource for national competitiveness. Some evidence of this is provided in Table 1, which shows growth rates in employment by skill level. In 1992, 25.6 percent of employed workers in the United States had a university bachelor's or advanced degree; by 2000, this share had risen to 28.9 percent, up by one-third compared with 1992.

Table 1: Percent Change in Employment of Full-Time Employees in the United States, Age 16 and Older, by Educational Attainment, 1992-2000

	1992		2000		
Degree obtained	**Level**	**% Share**	**Level**	**% Share**	**Percent Change, 1992-2000**
< high school	9,989,221	11.77	10,674,424	10.68	6.90%
High school diploma	30,667,477	36.15	32,213,426	32.24	5.00%
Some college, no degree	16,179,385	19.07	19,403,266	19.42	19.90%
Associate degree, vocational	3,492,089	4.12	4,587,904	4.59	31.40%
Associate degree, educational	2,759,600	3.25	4,189,340	4.19	51.80%
Bachelor degree	14,625,896	17.24	19,534,018	19.55	33.60%
Advanced degree	7,121,710	8.39	9,315,033	9.32	30.80%

Bachelor and Advanced degrees combined	**21,747,606**	**25.64**	**28,849,051**	**28.87**	**32.65%**
Total	84,835,378	100.00	99,917,411	100.00	17.78%

Source: Adapted from Horrigan (2002, p. 16).

Second, the rapid growth in foreign direct investment (FDI) by multinational enterprises (MNEs) over the 1990s, outstripping the growth in international trade, has increased the demand for technical and managerial labor to staff their foreign subsidiaries. Thus, HSL and FDI appear to be complementary international flows, with FDI attracted to locations where HSL is plentiful.

Third, statistics on international migration patterns show that the number of, and growth in, short-term HSL migrants dwarfs permanent HSL flows (Lowell and Findlay, 2001). These temporary flows include, for example, graduate students, information technology (IT) specialists and expatriate managers sent overseas to MNE affiliates.

Fourth, not only is crossborder migration of high-skilled individuals on the rise, so also is the migration of high-skilled jobs. Outsourcing historically has been associated with the shift of low-skilled blue collar manufacturing jobs to lower labour-cost locations such as export processing zones in developing countries. Now, white collar, skilled jobs are following such as, for example, basic data entry, telemarketing and claims processing (Mann, 2003; McKinsey Global Institute, 2003).

Lastly, the situation in Canada has changed because of the 1989 Canada-US Free Trade Agreement (CUSFTA) and the North American Free Trade Agreement (NAFTA), both of which liberalized the regional labour market linking the two countries (Papademetriou, 2003). In particular, the chapter on temporary entry of skilled workers has encouraged cross-border migration, as documented in Tables 2 and 3. Migration by NAFTA professionals from Canada to the United States, under the TN visa, as a percent of all high-skilled temporary migrants has risen from 40 percent in fiscal year 1994 to 47 percent in fiscal year 2001. TN migration from the United States to Canada, for the same years, has risen from 17.2 percent to 22.1 percent of all temporary high-skilled migrants.

Table 2: Migration of Temporary Workers and NAFTA Professionals from Canada to the United States

	FY1994	% Dist	FY2001	% Dist
Non-NAFTA Migrants	23,992	38.7%	61,437	31.1%
…... Treaty workers and investors (E1/E2)	3,123	5.0%	3,704	1.9%
….Workers with specialty occupations (H1B)	3,527	5.7%	16,454	8.3%
….Intracompany transferees (L1)	6,482	10.5%	22,838	11.6%
NAFTA Professionals (TN)	24,828	40.1%	92,915	47.1%
Total High-Skilled Migrants	61,952	100.0%	197,348	100.0%
TN-Migrants as % of Total High-Skilled Migrants	40.08%		47.08%	

Source: adapted from Papademetriou (2003, p. 41).

Table 3: Migration of Temporary Workers and NAFTA Professionals from the United States to Canada

	FY1994	% Dist	FY2001	% Dist
Non-NAFTA Migrants	16,791	45.16%	15,613	41.95%
…... Management	1,053	2.83%	592	1.59%
….Professional	8,058	21.67%	7,895	21.21%
….Skilled and Technical	4,896	13.17%	4,879	13.11%
NAFTA Professionals (TN)	6,385	17.17%	8,236	22.13%
Total High-Skilled Migrants	37,183	100%	37,215	100%
TN-Migrants as % of Total High-Skilled Migrants	17.17%		22.13%	

Source: adapted from Papademetriou (2003, p. 41).

Thus, we appear to be moving from uni-directional permanent flows of skilled individuals from poor sending to rich receiving countries (brain drain) to two-way flows of temporary and permanent HSL (the so-called *brain circulation model*). How has the increased international mobility of high-skilled labour affecting Canada and Canadians?

The one-day workshop organized by Industry Canada, Human Resources Development Canada and the Social Sciences and Humanities Research Council (SSHRC) was designed to sort out the key analytical issues involved in the international migration of high-skilled labour and to set out some research priorities. Four topics were identified for the roundtable:

- Global trends of recent international skilled migratory flows;
- Fundamental (non-policy) drivers of international mobility of high-skilled workers

with a focus on Canada-US migratory flows;

- Costs and benefits associated with cross-country movement of skilled labour and the main factors conditioning these costs and benefits; and
- The role of policy, focusing on how policy has adjusted or should adjust to increased skilled labour mobility in the global economy.

Two papers were prepared for the roundtable, the first by Surendra Gera and Thitima Songsakul (Industry Canada) and Samuel Laryea (Human Resources and Skills Development Canada) on "International Mobility of Skilled Labour: Analytical and Empirical Issues, and Research Priorities", and the second by Richard Harris (Simon Fraser University) on "Labour Mobility and the Global Competition for Skills: Dilemmas and Options". These papers were followed by shorter comments from Richard Harris (Simon Fraser University), Surendra Gera (Industry Canada), John Noble and Michael Hart (Carleton University), Peter Larson and Sandra Lopes (Public Policy Forum), and rapporteur Lorraine Eden (Texas A&M University). General discussion followed, focusing on summarizing where we were and what the possible next steps might be.

I turn now to reviewing the papers, the shorter comments and the general discussion.

THE GERA, LARYEA AND SONGSAKUL (GLS) PAPER

The first paper, by Surendra Gera, Samuel Laryea and Thitima Songsakul (the GLS paper), "International Mobility of Skilled Labour: Analytical and Empirical Issues, and Research Priorities", addressed four research questions:

- How mobile is the skilled work force internationally?
- What are the non-policy drivers of international mobility of high-skilled labour?
- What are the costs and benefits associated with international mobility of high-skilled labour?
- What are the implications for business and public policy of increased international mobility of high-skilled labour?

On the first question, the degree of international mobility of HSL, GLS argue there are four types of HSL mobility:

- Traditional permanent migration, where HSL moves permanently from a sending to a receiving country;
- Temporary migration, for example, H1-B visas to the United States;
- Intra-company transfers, normally associated with multinational enterprises moving expats; and
- Temporary visiting foreign scholars and researchers.

In terms of addressing the first research question on how mobile is HSL internationally, what is clear from the paper is that data on HSL migration are scarce. Long run detailed information, even for OECD countries, are not available on who moves and why and for how long. The data presented in the GLS paper are drawn solely from OECD, Canada and US sources, and the picture presented is primarily of intra-OECD flows (see also OECD, 2002). While other sources of data are available (most notably, the International Labour Organization's recent research program on international HSL migration from developing to developed countries), they do not appear to have been used here, perhaps because the research focus was intra-OECD.[ii]

The statistics in the GLS paper show that HSL inflows are primarily temporary as opposed to permanent entry for the United States, but the reverse for Canada. The United States

in 2001 received 165.8 thousand permanent and 1,148 thousand temporary entrants; whereas Canada in 2001 received 137.1 thousand permanent and 49.9 thousand temporary entrants. Similar statistics are shown for 1998, but long run bilateral HSL flow data are not available, making it difficult to determine whether this is a persistent trend or not. Nor is it clear why the US and Canadian patterns are the reverse of one another. Since the OECD pattern is for more (and faster growth in) temporary than permanent entry, the apparently different pattern in Canada warrants more analysis. This is, of course, difficult to do without long run, detailed data on US-Canada migration flows.

In terms of inflows of HSL to the United States, the GLS paper's statistics on the US H1-B (temporary admissions[iii]) program are interesting. H1-B visa represent the bulk of HSL temporary migration to the United States; other programs include exchange visitors (J1), intra-company transferees (L1) and NAFTA visas (TN). In 1997, 4,192 Canadians entered the United States on H1-B visas; this was 2.9 percent of 144,458 total US admissions. Five years later, in 2002, admissions from Canada had doubled in relative size to 5.4 percent (19,866 of 370,490 admissions). The number of admissions from Mexico were above Canada in 1997 (5,273) but below in 2002 (15,867). Canadian and Mexican H1-B visas, however, are a drop in the proverbial bucket compared to India, which grew from 29,239 to 81,091 admissions.

Since Canadians and Mexicans can enter the United States under the NAFTA TN visa program, as an alternative to the H1-B visa, perhaps a more appropriate comparison would add the TN visa numbers to the H1-B visa numbers to better measure Canadian and Mexican temporary HSL inflows to the United States relative to H1-B visas from other countries. A table with these data is not included in the paper. The closest is a figure showing temporary and permanent outflows of skilled workers from Canada to the United States, for 1997-2002, suggests the total number of H1-B, TN, J1 and L1 visas, in terms of persons, were approximately 1,300 in 1997, rising rapidly to peak about 4,300 in 2001, with a drop back to 3,700 in 2002.

Looking now at HLS inflows into Canada, there were 41,448 HSL temporary entries to Canada from all countries in 2002, down from 52,446 persons in 2000 (the first year data are available). Data on the US share of HSL entries to Canada are not available, but the authors estimate the numbers are approximately 1,400 per year, or about 2 percent of all temporary HSL entries. Some evidence on permanent US flows to Canada is presented in the paper: of the 137,100 permanent entries in 2001, only 656 or about one-half of one percent were from the United States.[iv] Thus, the US share of both temporary and permanent HSL migration to Canada appears to be very small.

When one compares the relative shares of exports and imports in goods and services between the two countries or shares of inward and outward FDI, it is clear that the migration shares are far smaller than other economic linkages. Thus, the border matters more for labor flows than it does for trade and FDI. A better understanding of the barriers to labour mobility between Canada and the United States, relative to the barriers to trade and investment, appears to be needed. Table 4 illustrates the type of data that would be required for appropriate comparisons across goods, services, capital and labour flows between the two countries. The differential impacts of the Canada-US Free Trade Agreement and NAFTA on the different types of economic flows between the two countries would also be important to investigate.

Table 4: Bilateral Shares in Total Economic Flows, 2002

Annual Data	From Canada to the United States		From the United States to Canada	
	As % of All Canadian Exports /Outflows	As % of All US Imports /Inflows	As % of All Canadian Imports /Inflows	As % of All US Exports /Outflows
Goods	87.2 %	18.2%	62.6%	23.6%
Services	60.2%	8.0%	61.2%	8.3%
FDI Flow (Balance of Payments)	35.2%		74.65%	
FDI Stock /Position	46.7%	6.8% *	64.2%	10.1% *
High-Skilled Labour Migration				
…Temporary				
….Permanent				

Sources: Trade and FDI data are from Canada (2003) and Borga (2003).

The 'bottom line' answer to the first research question – how mobile is HLS internationally? – is we do not really know but believe it to be high and rising as a percentage of all crossborder labour migration. The related question of Canada-US migration, in both directions, as a share of these flows is also difficult to answer with current data. We simply do not know whether Canada is attracting (or losing) its 'fair share' of HSL migrants.

The second research question posed in the GLS paper is to identify the fundamental non-policy drivers of HSL migration patterns. The authors look at a variety of factors: technological change, globalization of trade and FDI, research and innovation, increased income and employment opportunities, and changing individual preferences. Technological change is seen as having mixed effects; on the one hand, it raises the demand for HSL but on the other hand, telemobility permits work to be done and shared from multiple locations. Information technologies now allow jobs to migrate to the workers rather than workers to the jobs, for example, outsourcing of jobs such as software engineering, data entry and call centers.

Two key statistics regularly reported as evidence of globalization are the enormous growth in cross-border trade and FDI flows in the 1990s. The obvious question is their impact, singly and together, on HSL migration. If HLS were a complementary asset to trade and FDI (as the evidence suggests trade and FDI are to each other) then, one would expect globalization to also promote international migration of HSL. In particular, since the growth in trade and FDI are primarily intra-OECD, rather than North-South, this suggests the growth in HLS migration should also be intra-OECD. Moreover, since trade in services is closely tied to on-site delivery of those services, this suggests that HSL migration patterns, particularly temporary flows, should track the growth of trade in services. However, again, we know little about actual intra-OECD

HSL migration (see however Table 1.3 in the GLS paper).

The third research question in the GLS paper is the costs and benefits of international migration of high-skilled labour. In this section, the authors review the major potential gains of the receiving country (efficiency gains from increased specialization, accumulation of human capital, knowledge spillovers and redistribution of risks) and costs imposed on the sending country (forgone human capital spillovers and reduced capacity to absorb new knowledge absorptive). In addition, out-migration of skilled workers could lead to a "vicious circle", where economic activities become less skill intensive over time, generating innovation and income gaps relative to receiving countries. International factor mobility could reinforce a core-periphery outcome, or, alternatively, lead to income and productivity convergence. We simple do not know enough to tell under what circumstances international migration encourages convergence (virtual circles) or divergence (vicious circles) between sending and receiving countries.

A list of the possible benefits and costs of labour migration to sending and receiving countries is provided by Solimano and Pollack (2004), which is summarized in Table 5. In a brain circulation model, the sending country can receive benefits in terms of development and human capital effects that can offset the brain drain losses. Receiving countries experience gains in terms of development and technology, higher education and fiscal effects, in addition to the direct labour market effects; negative effects are expected to be minimal. In addition, on a global basis, greater crossborder flows of high-skilled labour improves efficiency and raises world welfare, encourages the formation of high-tech clusters, but may exacerbate global inequalities.

Table 5: Economic Effects of International High-skilled Labour Migration

Sending Countries	Receiving Countries
* Increased knowledge flows and collaboration, higher international mobility leads to increased ties with foreign research institutions	*Increased R&D due to enhanced availability of individuals with a higher stock of knowledge.
* Export opportunities for technology	*Inflow of entrepreneurship.
* Remittances and venture capital from diasporas networks	* Knowledge flows and collaboration with sending countries.
* Successful overseas entrepreneurs bring valuable management experience, capital and increased access to global networks	* Immigrants can foster diversity and creativity.
* Increased incentive for natives to seek higher skills	* Creation of export opportunities for technology.
* Possibility of exporting skills reduces risk/raises expected return from investment in education at individual level.	* Increased enrolment in graduate programs.
* Brain drain" (loss of productive potential due to (at least temporary) absence of higher skilled workers and human capital	* Renewal of faculty and researchers.
* Lower returns from public investment in tertiary education (waste of national public resources) "	* Increased tax revenues levied on human capital.
* Loss of fiscal revenues from taxation of human capital	*Easing of labour shortages of high skill workers. Wage moderation in high growth sectors with labour shortages.
	*Immigrant entrepreneurs foster job creation.
	*Immigrants can act as magnets for accessing other immigrant labour (network hiring effects).

	* Decreased incentives of natives to seek higher skills in certain fields. Crowding out of native students for foreign students from best schools.
	* Technology transfers to foreign competitors and possible "hostile" countries in situations of potential conflict.
Possible Global Effects	
* Increased flows of knowledge across countries, formation of international research/technology clusters (Silicon Valley, CERN).	
* Increased efficiency in global labor markets for high skills workers, researchers, information technology experts.	
* Increased concentration of global expenditure in science and technology in OECD countries.	
* International global competition for scarce human capital raises incentives for individual human capital formation.	
* Increase in global real income due to human capital reallocation from lower return countries to higher return countries.	
* Increases in global inequality.	

Source: Based on Solimano and Pollack (2004, page 13).

The GLS paper concludes with a discussion of public policy issues related to international migration of high-skilled labour. They argue that domestic barriers to inward migration should be reduced, for example, speeding up the temporary entry process, lessening restrictions on recognition of foreign accreditation for professions and trades and by reducing the number and variety of provincial regulations related to labour migration. More generally, the key is to reduce "border risk", so that US-Canada crossborder flows of trade, investments and labour are not impeded by trade policies. The authors also argue that Canada's science and technology (S&T) policies have, to date, not reduced its innovation gap as Canada's innovation capacity remains near the bottom of the G-7 countries.[v] The paper argues that S&T and migration policies should be coordinated if Canada is remain an attractive location for high-skilled labour.

THE HARRIS PAPER

The second paper, by Richard Harris, "Labour Mobility and the Global Competition for Skills: Dilemmas and Options", addressed four questions:

- What are the analytical implications of the two competing theoretical perspectives on the international migration of high-skilled labour: the brain drain and brain circulation perspectives?
- What are the welfare and growth consequences of increased international mobility of high-skilled labour?
- What are the distributive and political economy consequences of the emergence of a class of mobile high-skilled workers relative to the low-mobility majority of voters?
- What are some of the policy implications, both national and regional (Canada-US), of the growing international mobility of HSL?

Harris first reviews the Brain Drain literature, arguing that this literature treats labour migration as "permanent and irreversible shifts in labour supply". Efficiency gains are created if labour moves from areas where its productivity is temporarily or permanently low to areas where its productivity is higher. This suggests a brain drain from low-income developing countries to high-income OECD countries, which is exacerbated when it is the "best and brightest" that leave.

Countries are seen as strategically competing to attract skilled labour in a zero-sum game.

The new view, however, is a Brain Circulation model whereby an outflow of skilled labour from the sending country is followed by a reverse flow or re-circulation of knowledge from the receiving country back to the sending country. In other words, high-skilled labour migration creates a two-way flow of knowledge that can benefit both the sending and receiving countries.

A fundamental question underlying Harris' paper is whether an integrated labour market between Canada and the United States, which he called a NALM (North American Labour Market) is a possibility in the near future. He sees this as unlikely, but argues it is important for Canada to understand what the economic and distributional implications of a NALM might be. He argues the effects are best understood in the context of labour migration within an existing economic union, such as between the provinces in Canada.

To help understand the effects of a NALM, Harris turns first to the literature on the welfare economics of labour mobility. The traditional approach sees small welfare effects from migration; however, empirical estimates of the static effects are "fraught with difficulties" and few papers have taken an applied general equilibrium approach to estimating the effects.

In particular, Harris argues that little attention has been paid to the determinants of productivity growth. Economic integration through trade and FDI is seen as encouraging productivity convergence across countries over time, so it is possible that labour migration might also have this effect. However, in Canada, after 1994 its historical productivity gap relative to the United States has actually widened, suggesting that integration does not always lead to productivity convergence. Harris argues that the slowing down of the income convergence process between Canada and the United States, despite the free movement of labour and capital, may partly be due to crossborder barriers in labour mobility.

Knowledge spillovers are one of the key routes by which international labour migration can affect productivity. Harris refers to a study (Keller, 2002) which found that one dollar of US spending on R&D had 78 percent of the impact on Canadian productivity as one dollar of Canadian spending on R&D. Since US R&D expenditures are more than 40 times Canadian spending, this suggests US R&D spending has an impact on Canadian growth of 30-to-1 compared to Canadian R&D.

One sector where crossborder labour mobility is particularly important is business services because they typically involve physical proximity of buyers and sellers. Liberalizing trade in services therefore requires liberalization of labour markets, as in the NAFTA chapter on temporary entry for businesspersons. An exception is the growth of e-services such as call centers, data entry, software engineering, and so on where physical proximity is not necessary for efficient and effective delivery. The recent movement to outsourcing such activities, initially to Canada (e.g., call centers to New Brunswick in the late 1990s) and more recently to India, is a new version of the old-style offshoring of low-skilled manufacturing jobs to export processing zones. In these cases, we are seeing the migration of work instead of the migration of workers; that is, the migration of jobs offshore is a substitute for the migration of labour to the jobs.

Migration of high-skilled labour has distributional consequences. For the receiving country, capital and unskilled labour benefit while skilled labour loses from the inflow of skilled labour migrants; whereas the reverse occurs in the sending country. Harris argues distributional impacts are much larger than the static efficiency effects. It is possible that dynamic effects might partly reverse these results, for example, if the exodus of high-skilled labour from the sending country encourages individuals to further their education and training. The distributional

effects could also trigger a political backlash from immobile unskilled labour, and a reduction in the bargaining power of capital relative to high-skilled labour.

Harris then turns to discussing two types of labour market policies: (1) those leading to further integration of the Canada and US labour markets, and (2) those increasing the mobility of Canadian skilled labour or Canada's ability to attract skilled labour migrants. First, in terms of an integrated North American Labour Market, Harris argues that Chapter 7 of the 1994 Agreement on Internal Trade (AIT) could provide a model. The AIT was designed to lessen interprovincial barriers to labour mobility through mutual recognition of licensing and certifications of occupations and trades. Harris argues that subnational governments – the Canadian provinces and US states – are critical here since they have key powers under their national constitutions for regulating labour markets. The large number of subfederal governments suggests it would be very difficult to get agreement here. In addition, the likelihood of any trilateral approach (Canada, US and Mexico) to a regionally integrated labour market seems impossible, given the widespread illegal migration from Mexico to the United States. This suggests that a bilateral approach (Canada and the US) is the only politically feasible route.

In terms of unilateral Canadian policy initiatives, Harris suggests, first, deepening existing trade agreements (e.g., at the WTO Doha Round) should encourage labour mobility if trade and labour flows are complements. Second, Canada should expend more efforts on increasing labour market flexibility. Other suggestions include a competitive tax regime and encouraging study abroad programs and private sector R&D. He concludes that the policy priorities should be policies that (1) increase Canada's ability to attract and retain the very high skilled; (2) increase the share of the Canadian labour force that is very high skilled; and (3) protect Canadian access to the US market for goods and services by improving Canada-US relations.

OTHER KEY POINTS FROM THE ROUNDTABLE DISCUSSION

The discussion after the paper presentations was wide-ranging, but a few themes emerged around which there was general consensus. I outline these below.

First, there was discussion about the importance of **geographic clustering** of high-skilled jobs. Knowledge-intensive firms are attracted to locations where high-skilled labour is abundant, and not by the cost of capital or abundance of unskilled labour.

Since knowledge spillovers tend to be location bound, clustering of firms is also driven by **knowledge seeking**; for example, Asian high tech firms locating in Silicon Valley. A key issue here is what happens when clusters stretch across national borders, as in the Canada-US automotive industry, particularly in the **post-9/11 environment**.

Also important in the location decision is the **quality of social infrastructure** (hospitals, airports, schools). Quality of life was seen as more influential for these migrants than salary differences (although others discussed the negative impact of high taxes on location decisions). While economic factors were seen the key determinant of highly skilled international migratory flows, individual factors such as quality of life, availability of good schools and hospitals, and the weather were also important drivers of mobility. Skilled workers would be more likely to place an emphasis on the availability of social amenities as a factor in location decisions. Canada, in general, should fare well in this regard, particularly in its cities.

A second discussion topic was the degree to which **hollowing out of high-skilled managerial jobs in Canada occurred after the formation of the Canada-US Free Trade Agreement (CUSFTA) and NAFTA.** Head office functions were expected to move to the

United States for two reasons. First, US multinationals closed head offices of their Canadian subsidiaries and shifted functions back to their US parents, as part of a regional consolidation of support services. In addition, as Canadian multinationals expanded their export and FDI activities in the United States, they moved headquarters functions south to support their US activities.

A third discussion centered on the **differences across types of high-skilled labour**. Migration patterns of managers and entrepreneurs are not necessarily the same as university professors or as doctors and nurses or engineers, and yet all are included in the term "high-skilled labour". In addition, **migration patterns for young high-skilled labour (the bulk of the international migration) are likely to be very different from those of older workers**. This suggests more research needs to done understanding how and why labour markets are evolving for each of these groups. In particular, more **surveys of how and why PhD graduates (particularly in the science and technology area) are moving**, within the OECD, would be useful. Another suggestion was to study the migration patterns, temporary and permanent, of MBAs.

Canada-US crossborder migration patterns came up frequently in the discussions. The nature of migration patterns in Canada and the United States was discussed, particularly in two contexts: (1) whether they are **temporary flows or permanent flows**, and (2) the **magnitude** of these flows. The general consensus was that highly skilled inflows of labour to the United States are temporary, but more permanent for Canada, according to statistics presented by Don DeVoretz, Ross Finnie and Elizabeth Ruddick. This distinction affects the formulation of policies to manage these flows. Some evidence was also presented that US citizens are more likely to be temporary entrants, moving back and forth across the border, whereas Canadians are more likely to move permanently to the United States. Even though the annual numbers of Canadian migrants to the United States are small as a percent of the labour force, they are higher when measured as a percentage of high-skilled labour. In terms of temporary migration, statistics on Canada-US business visitor traffic are apparently not collected.

Another issue raised was the difference between focusing on **migration patterns of the existing stock of high-skilled labour versus the flow.** The creation of high-skilled labour through the school system focuses on the beginning of the pipeline (new entrants) rather than the end of the pipeline (graduates). Understanding how and why people invest in human capital, and how government policies can generate a high-skilled labour force, is seen as critical in a world where all countries are engaged in a race to create human capital.

The new concerns over **outsourcing of high-skilled jobs** came up repeatedly in the discussions. Comparisons were made between "**first phase outsourcing**" when low-skilled manufacturing jobs shifted offshore to developing countries, and "**second phase outsourcing**" of information technology (IT) jobs to countries like India. White collar jobs are now being outsourced, not just blue collar jobs. The political backlash in the United States was also discussed. Coupled with heightened US border security controls **post-9/11,** the US backlash against outsourcing increases the hassle factor for US firms located in Canada.

The **brain drain versus brain circulation** phenomenon, developed in the Harris paper, depends on the sector and the countries involved. For example, developing countries will consider the migration of health professionals from their countries to western countries as a brain drain. On the other hand, IT workers moving from India to the United States and vice-versa will be perceived more as brain circulation.

Another topic of discussion was **Canada's attractiveness as a location for graduate students**, to both pursue their studies and work after graduation. With the United States severely restricting the number of graduate student visas, a window currently exists in which Canada could attract a greater number of these individuals to study in Canada, who would have gone to the United States but cannot get US visas. A suggestion was made to increase the length of time during which foreign graduate students could stay and work in Canada after graduation (currently, one year), on the assumption that these students would be more likely to find permanent employment and stay in Canada.

The role of **centers of excellence** was also a topic of discussion. Some participants argued that Canada needed to establish more centres of excellence in post secondary institutions in order to attract international highly skilled workers, especially science and technology workers. In general, Canada cannot compete with the United States in terms of resources and employment opportunities to attract highly skilled workers. To overcome this disadvantage, some individuals recommended that Canada should specialize in limited key sectors and aggressively target international highly skilled workers into these sectors, rather than spreading limited resources in all sectors.

There were diverging views among participants **whether research focus should be Canada** vis-à-vis a wider range of countries (such as China and India) or be mainly directed towards the United States where our interest is the most obvious. The role of **NAFTA** and deeper integration in the North American context were discussed. More research is needed to explore the effects of expanding on the NAFTA visas. A number of lessons (for the Canada-US scenario) could be learnt from the labour market integration experience of **Australia/New Zealand.**

MAJOR RESEARCH PRIORITIES

While I have provided some research ideas after summarizing the major arguments outlined in the themes above, some specific questions that should be highlighted are the following:

Definitions and Scope

- The term "high skilled worker" should be more carefully defined. It appears to include a variety of work categories (e.g., nurses and doctors, new PhDs, IT professionals) that may differ in their migration patterns, reasons for moving, and impacts on the sending and receiving countries.
- Distinguishing between the mobility of workers and mobility of work (enhanced by technology) is important. Even if people do not move, jobs do move and are moving. Canada must fashion policies to deal with this phenomenon.
- Given that the ultimate goal is to improve innovation and productivity, researchers should not concentrate solely on labour mobility. A research agenda should emphasize complementarities between labour and other inputs in production (e.g., linkages of skill mobility and trade, especially in services, role of technology, FDI and R&D). This complementarity will be more important for some groups of high-skilled workers than for others. Understanding these complementarities is an important research topic.
- It was suggested that research agenda should involve political scientists since the debate and some of the trade-offs are not only about efficiency, but also citizenship, democracy and political rights. It is also important to understand the distributional effects of the mobility of high-skilled workers.

- There are other policies to support innovation that are independent of immigration or international trade; for example, increasing access to post secondary education, R&D in universities. Should these policies be targeted instead of focusing on high skilled migration patterns if the goal is to improve Canada's innovation and competitiveness?

Dataset Issues

- Evidence-based policy requires analyzing a coherent data set. How can we improve the measurement of flows (data and statistics)?
- In order to establish a benchmark on skilled labour mobility, an assessment of Canada's performance relative to other advance economies is needed. This would require building an internationally comparable dataset.
- Special surveys to address some of these complex issues could be useful, for example, a survey on PhD graduates from Canadian universities.
- Migration flows from Canada to the United States seem small. However, this may not capture other forms of mobility. It is important to have more information on temporary mobility such as short-term business trips.
- Sector/occupation-specific studies are important (e.g., health). There are international occupations where barriers are less of a problem than for others.
- Business and economic studies at the micro-level could be useful, such as mobility within organizations, human resource management, and consumer behaviour.
- Who are the high-skilled people who are moving? We need to better understand the links between these movements and the relative innovation performance of industrialized countries.

Antecedents

- What is the role of international social capital in influencing the migration of highly skilled workers?
- What are the key mechanisms through which labour mobility occurs – foreign direct investment, research and development (private or public), technology spillovers, etc?
- What role do centers of excellence play in attracting high skilled workers, especially science and technology workers?
- How has the IT revolution affected the mobility of work and workers?

Consequences

- Cost/benefit effects of mobility are through different channels. There were some suggestions to study mechanisms through which mobility has economic consequences. Is it via FDI, R&D, and/or spillovers? A CGE model is an appropriate framework to address such questions although basic micro studies and data are missing.
- What are the impacts of mobility on social structure such as health care and inequality?
- What impact, if any, does the migration of highly skilled workers to the United States have on the immobile factors that remain in Canada?

Policies

- There is a large difference in the role of policy between using education and/or immigration to address skills shortages. What is the right policy direction? Should policy take a more proactive stand on attracting skilled workers rather than focusing on removing barriers to mobility?

- For the United States post 9/11, it will be important to integrate security concerns within trade and mobility framework in any subsequent policy analysis.
- What types of reforms are needed to improve the points system given that skilled immigrants who come through this stream have not done well lately? It was suggested for Canada to adopt for example, the UK model, where the level of earnings in the immigrants' home country is used as a predictor of how well he or she will perform in the United Kingdom.
- Should employers be given a bigger role in the selection process? This could solve some of the issues around foreign credential recognition and language skills because employers should know exactly what type of skills they want.
- Should foreign students be allowed to stay longer in Canada after their graduations? Since immigrants from institutionally different countries do not do well initially to recruit more graduate students and mentor them could be a better strategy.
- In terms of defining research priorities, there is a need to define target groups. Should the aim be a fully integrated North American labour market or only for segments such as S&T workers? Also, it is important to differentiate by type of movements such as temporary movement from permanent migration (return migration).

CONCLUSION

Economic growth in the 21st century depends on the quality of people. Knowledge-intensive production means that high-skilled labour is now more important than natural resources or capital for a country's competitiveness. The ability to develop, attract and retain high-skilled labour is therefore the critical building block for national economic growth. This fact is even more salient for small open economies that have smaller labour markets, are more dependent on international markets for exports and foreign direct investment, and are more easily buffeted by international shocks.

Thus, understanding the international migration patterns of high-skilled labour is important for Canada to develop effective public policies for developing, attracting and retaining high-skilled labour. This workshop was designed to raise awareness of the issues and suggest directions for future research in this critical area for Canadian long-run economic growth. As such, the workshop was a clear success. The papers presented and round table discussions point out the issues, clarify the debates, and suggest new directions for research.

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ENDNOTES

[i] See Commander, Kangasniemi and Winters (2003) for a recent analysis of the benefits and costs of the brain drain.

[ii] See, for example, the International Labour Organization's October 2001 summary report (Lowell and Findlay, 2001) and the background studies.

[iii] Note admissions are not the same as persons.

[iv] These data combine numbers from Tables 1.1and 1.4.

[v] The United States may also be losing its dominant position in science and technology worldwide (Broad, 2004). Scientific papers published by Americans peaked in 1992 and have fallen 10 percent since then. Taiwan and Singapore surpassed the United States in overall number of patent citations last year. Applications to US graduate schools from foreign students are down by 25 percent since 2001.