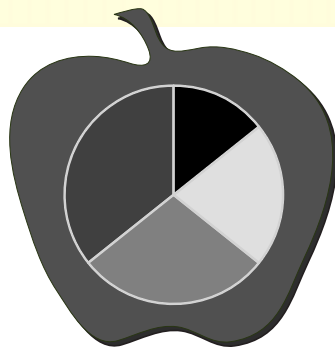


THE EDUCATION DIVIDEND

**Why Education Spending
is a Good Investment for BC**

by Robert Allen



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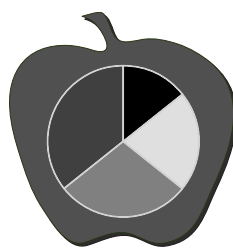
www.policyalternatives.ca

March 1999

CAW 567

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Acknowledgements

The author would like to thank the following people for their advice, feedback and editorial assistance: Randall Brown, Paul Burns, Ed Finn, Dean Goard, Colleen Hawkey, Seth Klein, Arlene McLaren, Mongi Mouelhi, Gideon Rosenbluth, Anny Schaefer, Karl Skof, Jim Soles, Walter Sudmant, and Skip Triplett.

The contents and opinions contained in this paper, however, are those of the author, and do not necessarily reflect the views of the CCPA.

Layout: Shannon Daub

We gratefully acknowledge the financial support for this paper of the Province of British Columbia through the Ministry of Advanced Education, Training and Technology, and the Ministry of Education.

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ISBN# 0-88627-949-6 Cost: \$4.00

Contents

| | |
|---|----|
| Executive Summary | i |
| Part I: Introduction | 1 |
| Part II: The Educational Challenge | 2 |
| Part III: The Economic Returns of Educational Investment | 3 |
| Part IV: The Provincial Response | 10 |
| <i>Elementary and Secondary Education</i> | 11 |
| <i>Post-Secondary Education</i> | 12 |
| Part V: Who Should Pay? | 17 |
| Part VI: Responsiveness of Colleges and Universities to the Economy | 19 |
| Part VII: Education and Inequality | 21 |
| Part VIII: Impact on the deficit | 22 |
| Part IX: Conclusion | 23 |
| Endnotes | 25 |
| References | 26 |

Executive Summary

The economy of the twenty-first century will require a highly educated work force, and, indeed, the Canadian economy has been shifting in this direction since the 1960s. The expansion of colleges and universities has increased the supply of educated workers, while demand for their skills has grown at least as rapidly.

Data from the 1990s indicate that further expansion of the educational system is warranted. The test is whether the social rate of return exceeds the cost of borrowed funds. Education involves the cost of building and operating schools, the student's cost of books and supplies, and the wages students forgo by studying instead of working. The principal economic gain from this investment is the higher wages that graduates and program completers earn as a result of their studies. Juxtaposing these figures gives the social rate of return, which shows the combined profitability of education to the student and the Treasury (and thus all citizens).

Social rates of return are extremely high for finishing high school or acquiring a trade certificate, for college career programs, and for university degrees. The profitability of completing high school with either a diploma or trade certification is in excess of 25% in most cases, while the profitability of a college career diploma or undergraduate degree is generally a further 10-15%. Undergraduate degrees in all fields of study are highly profitable for women, and most fields are also profitable for men. Since these rates of return exceed the cost of government borrowing (5%), it is profitable for the province to borrow money to make these investments.

Interprovincial comparisons throw more light on the matter. In the 1990s, BC has increased its spending on education by a greater percentage than has any other province. Much of this increase, however, has simply met

the needs of population growth, which has been higher here than anywhere else in Canada. Pupil-teacher ratios in elementary and secondary schools are higher here than in many provinces, so there is a case for more spending to reduce class sizes and drop-out rates.

Post-secondary participation rates (at both the vocational/career and university levels) are near the Canadian average when participation is measured with enrolment. When program completions are the measure, BC does badly at the university level, since this province awards fewer bachelor degrees relative to its population than does any other province. The number of degrees awarded is far below the growth in demand for university graduates, so there is a strong case for expanding the universities and university colleges at the third and fourth year levels.

Class sizes have grown substantially at the province's universities because enrolment has been increased without significant corollary increases in the number of full-time faculty. An increase in the number of full-time faculty would cut class sizes, providing better education for all undergraduates, and improving completion rates.

BC has frozen tuition fees for post-secondary programs at low levels. This is a desirable policy in many respects, since it promotes economic development and greater access, while reducing inequality. However, the provincial government must significantly increase educational spending in order for these objectives to be realized.

BC should increase spending on education even if greater spending leads to a deficit or postpones tax reductions. Education is too good an investment to pass up. It is only sound business to borrow money at 5% in order to realize a profit of 10%, 15%, or even 25%.

Part I: Introduction

Education is widely seen as the basis for sustainable economic development in the twenty-first century. The popular press emphasizes the shift from a resource or manufacturing economy towards a “knowledge-based” economy. Economists have increasingly emphasized the importance of “human capital accumulation” as the source of prosperity. Natural resources become depleted; capital runs into diminishing returns. Only knowledge can be indefinitely enlarged, and only economic development based on knowledge can proceed without limit.

Many kinds of knowledge will be required in the next millennium. Technical knowledge is required to invent new products and produce them cheaply, but the required knowledge extends far beyond that. In a world of rapidly changing technologies, specific skills, whose application is limited to a narrow range of tasks, will quickly become outmoded. Specific skills can be the source of short-term wealth, but a change in technology renders them obsolete and valueless.

A broad education that enhances the abilities to read, to write, and to do mathematics will successfully lay the base for acquiring the sequence of specific skills needed to stay ahead in the changing economy. As the world economy becomes more integrated, many jobs will involve dealing with people from different cultures and working with people in different economic and social systems. In addition to the abilities to communicate, compute, and analyze, the ability to negotiate cultures and economic systems will contribute to future prosperity. A broad education will also create better citizens and help people realize the full potential of their talents and abilities.

The advent of the knowledge-based economy comes at an opportune moment in

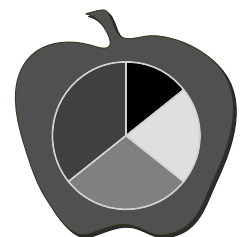
the history of British Columbia. Since the late nineteenth century, BC has grown rich on natural resources. Fish, timber, coal, and metals were harvested and mined in this province, processed and shipped around the world. But the settlement of British Columbia is now complete; there are few new resources to exploit. Technical progress in the resource industries is leading to fewer jobs and economic dislocation. A new basis must be found for economic advance in the new millennium.

In fact, the economy of British Columbia—like that of the rest of Canada and, indeed, the industrialized world—has been evolving away from resource extraction and, more generally, manufacturing for some time. By embracing that possibility, BC can assure a high standard of living for its people.

What must BC do to respond to the challenge of the new world economy? Further investment in the educational sector is necessary. This paper establishes that the social rate of return to educational investment is very high in this province. This result applies to high school, to most college and university programs, and to trade programs under some circumstances. Compared to other provinces, BC has invested more heavily in these areas than have other provinces in the 1990s, but much remains to be done, as interprovincial comparisons show.

Most provinces, most notably Ontario, have responded to the need for more education spending by increasing the tuition fees paid by students. But raising tuition is intrinsically an inefficient approach for meeting the educational needs of the next century. Rather, the federal and provincial governments must increase their spending on education. Moreover, spending must be increased even if it raises the provincial government deficit or postpones tax reductions.

This paper establishes that the social rate of return to educational investment is very high in this province. This result applies to high school, to most college and university programs, and to trade programs under some circumstances. Compared to other provinces, BC has invested more heavily in these areas than have other provinces in the 1990s, but much remains to be done, even if it raises the provincial government deficit or postpones tax reductions.



Part II: The Educational Challenge

From 1970 to 1995, the demand for labour was moving toward educated workers. The economy was ratifying the policy of Canadian governments in expanding post-secondary education.

A fundamental feature of the new world economy is a rapid growth in demand for educated workers and a concomitant fall in the demand for less educated workers. These trends have been apparent for the last few decades and give every indication of continuing indefinitely into the future. Table 1 shows the educational attainment of young Canadians aged 25-29 in 1970 and 1995. These people are new entrants into the labour force, so their experience is a barometer of shifts in the economy.

From 1970 to 1995, the educational attainment of this group increased substantially. The fraction of women with a high school education or less and

who were employed full-time fell from 61.7% to 23.9%; for men, the corresponding drop was 57.6% to 34.3%. The proportion of fully employed women with a post-secondary certificate or diploma rose from 18.0% to 40.2%, while the proportion with a university degree increased from

9.3% to 26.9%. For men, the proportion with a post-secondary certificate or diploma rose from 20% to 35.8%, and the proportion with a university degree increased from 12.3% to 21.9%. Clearly, Canadians have become much more educated in the last generation.

The immediate reason for the rise in educational attainment was the expansion of enrolment in schools, colleges, and universities in Canada; that is, the supply of labour was increasing. What of the demand? If the demand for educated labour was not growing, then the additional college and university graduates would have been forced “down the job ladder” and would have found work only at lower wages. However, between 1970 and 1995, the average earnings of full-time workers with university degrees showed virtually no change with respect to the earnings of high school graduates.¹

For women, the premium earned by a university graduate declined from 42% to 40%, while for men it rose from 18% to 21%; that is, essentially no change on average. Further, full-time workers with post-secondary certificates or diplomas (i.e., completers of vocation, technical and career programs) experienced significant increases in earnings in comparison to high school graduates. In 1970, men or women with post-secondary certificates or diplomas earned about the same incomes as high school graduates, while in 1995 the premium for a post-secondary credential had increased to 11-13%.

Despite the huge increase in their

Table 1
Composition of the Canadian Work-Force
(full-time employees, aged 25-29)

| Women | 1970 | 1995 |
|------------------------------------|-------|-------|
| high school or less | 61.7% | 23.9% |
| post-secondary non-completers | 11.0% | 9.0% |
| post-secondary certificate/diploma | 18.0% | 40.2% |
| university graduates | 9.3% | 26.9% |
| Men | 1970 | 1995 |
| high school or less | 57.6% | 34.3% |
| post-secondary non-completers | 10.1% | 8.1% |
| post-secondary certificate/diploma | 20.0% | 35.8% |
| university graduates | 12.3% | 21.9% |

Sources: 1970: Statistics Canada, *Census of Canada*, microdata file.

1995: Statistics Canada, *Survey of Consumer Finance*, microdata file

number, university and college graduates were not being forced down the job ladder. The demand for labour, in other words, was moving toward educated workers. The economy was ratifying the policy of Canadian governments in expanding post-secondary education from 1970 to 1995.

Is there scope for further expansion? Predicting the future is always difficult, but the evidence of the mid-1990s suggests that the economy is demanding more highly trained workers than the educational system

is producing; in particular, university graduates and the completers of two-year college programs are in high demand. Indeed, demand is high for graduates in most fields of study at these institutions. Conversely, there is very little demand for people who have not completed high school, so there are considerable economic returns to raising the high school completion rate. Finally, there are significant opportunities for improving the quality of education by reducing class sizes at both the K-12 and university levels.

The economy is demanding more highly trained workers than the educational system is producing; in particular, university graduates and the completers of two-year college programs. Indeed, demand is high for graduates in most fields of study at these institutions.

Part III: The Economic Returns of Educational Investment

The conventional approach to test whether expansion of an educational system is warranted is to evaluate it as an investment decision. When education is undertaken, costs are incurred. These include:

1. the student's cost of books and supplies,
2. the earnings forgone by the student when he or she attends school instead of working, and
3. the costs of constructing and operating schools.

The student's cost of room and board is not considered in this framework since the student would have to eat and sleep whether or not he or she was in school. Tuition fees are also excluded since they do not represent additional costs to society as a whole: while they are costs to the student, they are revenue for the Treasury.

The benefit from this investment is the increase in (pre-tax) lifetime earnings realized by the student because of the education. (Universities also contribute to the economy through research, but those contributions are not included here nor are the corresponding costs of university research.) Setting the students' income gain against the listed costs produces a rate of return called the "social rate of return," representing the profit of the educational investment to society as a whole, i.e., to the student and to the Treasury (and thus all citizens) combined.

As a first step in assessing the wisdom of spending more money on education in British Columbia, social rates of return have been computed for four educational levels: the last year of high school, a trade certificate, a college diploma, and a bachelor degree. Separate

calculations are presented for men and women, since they realize different returns (education is a particularly profitable investment for women) and in several versions reflecting alternative interpretations of the data and the investment decision.

The calculations have many limitations, among them these: Calculating the profit of finishing high school is only a limited investigation of the economic value of elementary and secondary education. A more extensive investigation—such as computing the profitability of high school as a whole, or even elementary education—is no longer feasible since attendance is compulsory, so there are few data on the earnings of the uneducated and their experience is probably not indicative of that of the majority. Research from earlier in the twentieth century, when high school education was not the norm, shows it to have a high rate of return, however. In BC today, the main question relating to extending elementary/secondary education is whether high school completion is a good investment for those who drop out, and that is a question addressed here.

Likewise, it ought to be noted that the social rate of return computed for universities is an incomplete assessment of their economic contribution, in two respects. First, no calculations are presented of the profitability of graduate degrees, although calculations presented elsewhere (Allen 1998c) indicate that they also are profitable. Second, the research of universities is not evaluated here. University research contributes new technologies, better methods of social and economic organization, and improved cultural understanding that raise the income and the quality of life of Canadians. These benefits are not included in the social rates of return to be presented.

Before presenting the social rates of return, I will review the data that go into the calculation. I start with the benefits, i.e., the

increase in pre-tax earnings from acquiring more schooling.

Earnings increases were computed from two Statistics Canada microdata files—the BC individual file from the 1991 Census of Canada (this income information applies to 1990) and the Canada-wide sample from the 1996 Survey of Consumer Finances. The advantage of the census sample is that it is confined to BC and includes information on some variables (like field of study) that are not available in the Survey of Consumer Finance. The disadvantage of the census sample is that it is nine years old. The results of the 1996 census are still not available, so data from the 1996 Survey of Consumer Finances were used to get more recent information on the labour market. This is a much smaller survey than the census, and the BC portion of the sample is not large enough to reliably measure the returns to education in BC, so the full Canada sample was used.

In fact, high rates of labour mobility within Canada imply that wages and salaries are similar across the country, so the Canada-wide results are indicative of the BC situation. Use of the Canada-wide results can also be justified on the grounds that they represent the full range of opportunities available to children growing up in BC. In any event, the two data sources point to similar conclusions about the returns to education.

Earnings depend on age as well as education. Generally, earnings increase with age, but at a diminishing rate. Earnings peak between the ages of 40 and 50 when allowance is made for people retiring or not working. The age effect can be captured by estimating “age-earnings profiles” (equations in which earnings are a function of age and age squared). These equations show the average earnings experience of people with different educational levels. There is considerable variation from person to person in earnings around these trends.

Figures 1 and 2 show age-earnings profiles for women and men estimated from the census data. Income increases with education at almost every age. The main exception to that generalization is among people in their early and mid-20s, where university graduates earn less than most others. This finding parallels the popular notion that university education does not prepare young people for high-paying jobs, but also sets that view in a broader perspective: The earnings of university graduates increase rapidly with age, so that they are the highest income earners by their late 20s / early 30s.

Why do earnings increase with education? One possibility is that more highly educated workers are more able and would have earned more than less-educated workers, irrespective of educational attainment. In that case, educational attainment is only a proxy for ability, and it is ability rather than education that determines earnings. The meritocratic organization of education lends some credence to this view. Many studies, however, have called this proposition into question.² A variety of statistical schemes have been devised to hold ability constant and measure the effects of education on earnings. They arrive at results that are the same as those discussed here where ability is ignored.

It appears that the link between ability and education is broken by three factors: 1) location and social class play major roles in determining who gets educated; 2) the ability to get good grades is not the same as the ability to make money; and 3) the most scholastically able people continue their education beyond the bachelor's degree and so are not included in the sample of university graduates analyzed here. The higher earnings of more highly educated people are thus the result of education.

There are three kinds of costs associated with education:

1. books and supplies

I assumed that elementary and secondary students incur no costs for books and supplies, while students in post-secondary programs spend \$1,000 per year on these items.

2. forgone earnings

When people devote their time to schooling, they lose the income that they might have earned instead, and those forgone earnings are a measure of the value of the time devoted to education. In computing rates of return, a specific time path of work and study must be postulated. I concentrate here on full-time students since the time path is well defined; in particular, I assumed that post-secondary students did not work for the eight months of the year they were studying.³ The cost of their time is therefore two-thirds of the average annual earnings of a high school graduate. In analyzing the decision to complete high school, I assume that the average earnings of a non-completer would be \$5,000, which is generous in view of the average earnings of high school graduates in their late teens.

3. *cost of building and operating schools, colleges, and universities*

The third cost of education is the cost incurred by the government for the schools, colleges, and universities. These costs include operating costs and capital costs. I begin with the former.

The operating cost of a year of high school was computed from the operating costs and number of students in BC public schools in 1996/7. Following Vaillancourt,⁴ it was assumed that a year of primary education cost 75% of a year of secondary education.

The costs of technical/vocational certificates and college career diplomas were computed from Statistics Canada's figures on the total expenditures of BC colleges and institutes

in 1994-5,⁵ and the details of provincial funding for these programs.⁶ College expenditures exceeded provincial funding mainly by an amount equal to tuition fees and income from ancillary operations. Provincial funding per full-time equivalent student (FTE) in each program was increased by the ratio of total college spending (exclusive of debt charges and capital spending) to total provincial funding in order to determine the total operating cost per student in each program.

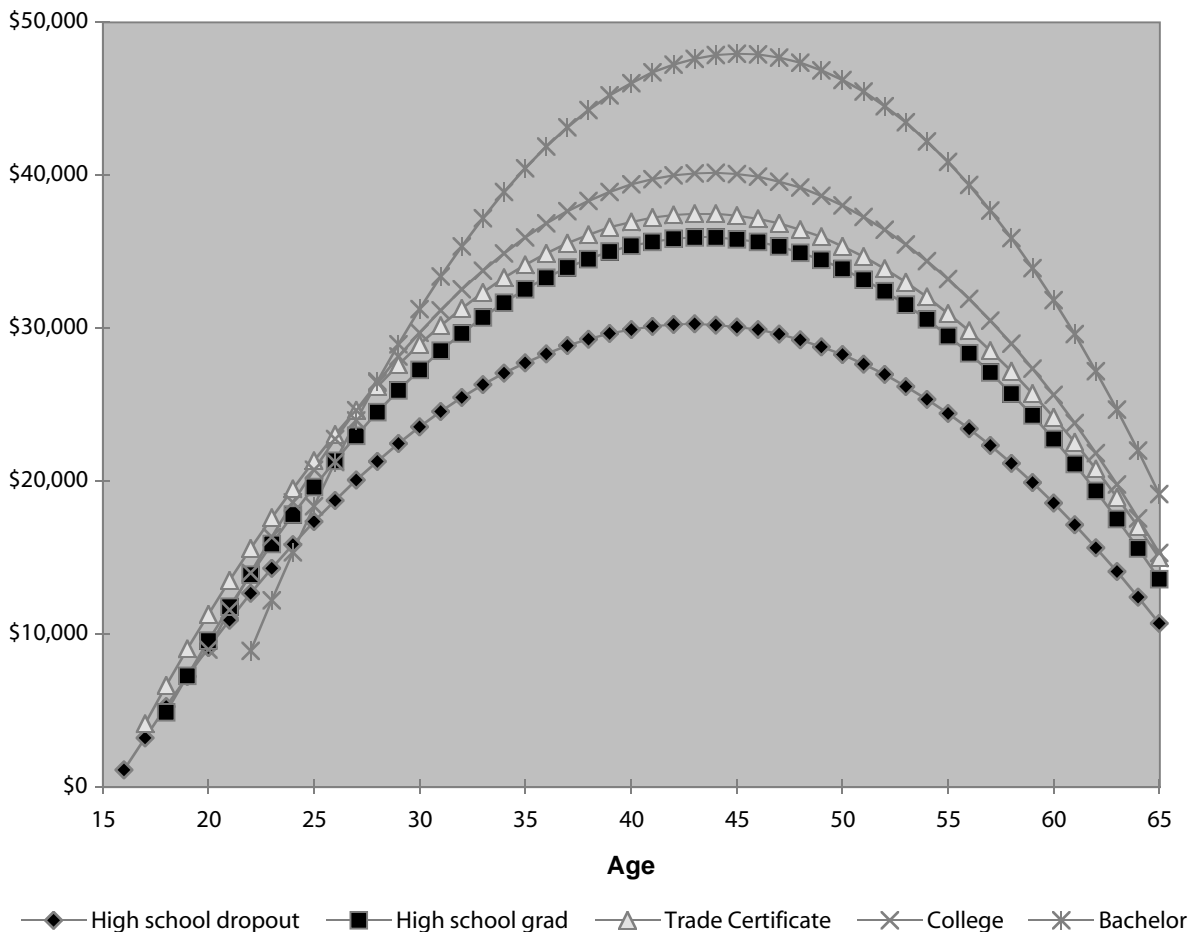
The operating cost of university programs

was calculated from Statistics Canada's summary of the costs of BC universities. The cost of research was estimated using the Hettich (1971) formula and deducted from total operating cost to determine the operating cost assignable to teaching.⁷ This was then divided by the number of weighted full-time equivalent students (WFTEs) to determine the cost per WFTE, and program costs were calculated from the number of WFTEs per program.

The weights used in computing WFTEs are intended to represent the relative costs of

Figure 1: Earnings, Age, and Education for Men in BC

(Source: census data—1990)



different university programs. The base case is first or second year arts, which receives a weight of 1.0. Upper level arts, commerce, and education students receive a weight of 1.5 on the grounds that instruction costs 50% more per FTE than first or second year Arts. A year's instruction in most undergraduate science and health programs receives a weight of 2.0. Weights range up to 5.0 for a year of medicine and 6.0 for a year of study towards a Ph.D.

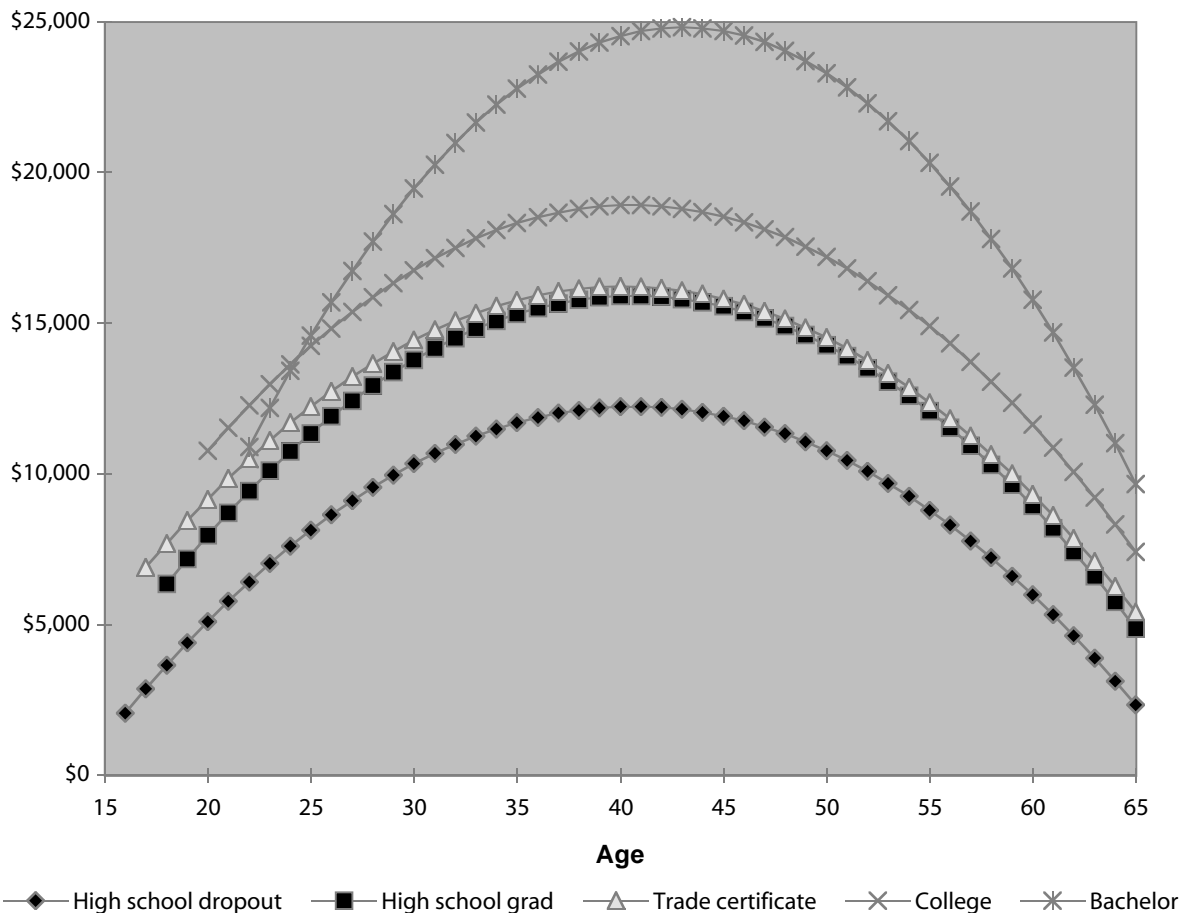
In this study, an undergraduate arts, education, or commerce degree was taken to equal

five WFTEs (two years at 1.0 and two years at 1.5), while an undergraduate science or health degree equals eight WFTEs (four years at 2.0 each). The average undergraduate was assumed to be half in arts and half in science. Program costs were thus calculated as 5.0 or 8.0 multiplied by the cost per WFTE.

While operating costs were calculated from data for BC in the 1990s, capital costs were calculated from Canada-wide data, since provincial data are lacking. Capital costs are defined to be interest (taken here to be 5%)

Figure 2: Earnings, Age, and Education for Women in BC

Source: census data—1990



and depreciation (2%) on the capital stock. Statistics Canada has prepared capital stock estimates for Canadian elementary and secondary schools, non-university post-secondary institutions, and universities. Capital estimates calculated in a variety of ways are available. Here I have relied on the constant price, net capital stock series using delayed depreciation. This is one of the highest series—hence implying low rates of return to education—and gives a better representation of the depreciation of educational buildings and equipment than the others.

The interest and depreciation on the capital stock for the three levels of education were divided by the Canada-wide number of elementary and secondary students, technical, vocational, and apprenticeship full-time equivalent students, and university WFTEs. These costs were then applied to the

corresponding provincial figures.

Table 2 shows the costs per full-time student that were used in the rate of return calculations. In view of the disparate sources of information, it is impressive that costs were so similar across educational levels. One could nuance the calculations further (for instance, using college costs of a bachelor degree instead of university costs), but the figures are all sufficiently close that no new insights would come from such substitutions.

The costs were combined with the age-earnings profiles to compute rates of return to education. It was assumed that incomes would grow in the future at a rate of 2% per year due to inflation, plus 1% per year due to economic development. The latter assumption is standard in OECD investigations.⁸ The results, using both 1990 and 1996 data, are shown in Table 3. Rates of return decline with educational levels but are generally high—considerably higher than the yield on long-term government bonds, which is about 5%. This shows that education is a good investment for the BC government.

Completing high school in some fashion gives the highest rate of return. Finishing grade 12 and graduating is associated with rates of return of 18.8% - 31.8%. Even higher returns are realized by people who obtain a trade certificate instead of completing grade 12. That course produces returns of 28.4% - 39.8%. Thus, completion of secondary education with either a diploma or a trade certificate is the best educational investment that one can make.

The returns to acquiring a trade certificate after one has received a high school diploma are considerably less and also variable. The 1990 data showed a very respectable return for men of 14.0%, but that fell to only 1.4% in 1996. Fluctuations like this may reflect changes in the construction labour market. The returns to women for trade

Table 2: Institutional Costs of Education per Full-Time Student per Year (Dollars per Student)

| | operating | capital | total |
|--------------------|-----------|---------|--------|
| grade 12 | 5,588 | 324 | 6,042 |
| trade/vocational | 7,720 | 566 | 8,286 |
| college career | 9,074 | 566 | 9,640 |
| university-arts | 6,130 | 790 | 6,920 |
| university-science | 9,808 | 1,264 | 11,072 |
| university-average | 7,969 | 1,027 | 8,996 |

Notes: Costs include capital costs (interest and depreciation on the capital stock) and operating costs. The latter include provincial government funding, tuition income, income from ancillary enterprises, and any other sources of operating income for colleges and universities.

University costs are built up from the cost per weighted full-time equivalent student (WFTE). Operating cost per WFTE was \$4904 and capital cost was \$632 for a total cost per WFTE of \$5536. First and second year arts and commerce were rated at 1.0 WFTEs and third and fourth year at 1.5 WFTEs. All years in science, engineering, and health were rated at 2 WFTEs each. The university average is assumed to be half arts and half science, i.e., 1.625 WFTEs.

Source: See text.

certificates (mainly one year secretarial programs and hair dressing certificates) give a modest return of 5.8% or 4.7%, depending on the data source. These are marginal investments.

College and university give much higher returns than do trade certificates earned after high school graduation. For men the profit rate was 7.6 - 10.1% for a college diploma, and for women it rose to 13.6% - 16.0%. University bachelor programs also give very high returns. For men, they ranged from 9.3% to 11.0%, while they were 11.0% to 15.3% for women. Women generally realize higher returns than men for post-secondary education—a typical finding in such investigations.

One issue that has attracted much attention in recent years is the relative importance of general education and specific skills training. A popular notion is that specific skills training is important in getting a good job, while general education (for instance, university programs in humanities, the social sciences, and education) is poor preparation. As noted, Figures 1 and 2 show why people might believe this—the average earnings of university graduates in their twenties are less than those of nonuniversity graduates—but also calls the relevance of that fact into question by showing that university graduates earn high incomes later in life. Indeed, their incomes are high enough to justify investing in their educations. The less impressive returns on trade certificates for those who already had high school diplomas casts further doubt on the popular view. Ultimately, a balance of general education and skills training is needed.

The value of different degrees can also be investigated using the information in the census on field of study. Instead of computing rates of return to university degrees as a whole, returns for each field can be computed

Table 3: Social Rates of Return to Education

| | men | | women | |
|------------------------|-------|-------|-------|-------|
| | 1991 | 1996 | 1991 | 1996 |
| grade 12 | 18.8% | 31.8% | 29.8% | 25.6% |
| trade/no high school | 28.4% | 32.4% | 39.8% | 37.9% |
| trade/high school grad | 14.0% | 1.4% | 5.8% | 4.7% |
| college-career | 10.1% | 7.6% | 13.6% | 16.0% |
| university | 9.3% | 11.0% | 11.0% | 15.3% |

Notes: The rates of return were based on the following comparisons:

Grade 12—Earnings of a high school graduate (grade 12) with no further education compared to a grade eleven completer with no further education.

trade/no HS grad—Earnings of someone with a trade certificate but with no further education compared to a grade eleven completer with no further education.

trade/ HS grad—Earnings of someone with a trade certificate but with no further education compared to a high school graduate (grade 12) with no further education.

college career—Earnings of someone with a college career diploma but with no further education compared to a high school graduate (grade 12) with no further education.

university—Earnings of someone with a bachelor degree but with no further university education compared to a high school graduate (grade 12) with no further education.

Table 4: Social Rates of Return to University Fields of Study

| | men | | women | |
|----------------------|-------|-------|-------|-------|
| | 1991 | 1996 | 1991 | 1996 |
| fine arts | n/a | n/a | 6.5% | 11.9% |
| humanities | none | none | 6.9% | 12.2% |
| social science | 13.2% | 11.6% | 13.4% | 17.6% |
| commerce | 11.4% | 10.4% | 12.9% | 17.2% |
| agriculture/biology | 4.9% | 5.0% | 7.1% | 11.7% |
| engineering | 14.3% | 12.3% | 10.7% | 14.6% |
| other health | 5.6% | 5.6% | 15.0% | 18.1% |
| nursing | n/a | n/a | 11.5% | 15.3% |
| physical science | 7.7% | 7.4% | 11.4% | 15.3% |
| education | 5.5% | 5.6% | 11.8% | 17.6% |
| humanities/education | 8.1% | 7.7% | 7.6% | 9.6% |

Notes: For all fields except humanities/educ, the rates of return are based on the earnings of someone with a bachelor degree in the indicated field but with no further university education compared to a high school graduate (grade 12) with no further education.

For humanities/educ, the rates of return are based on the earnings of someone with a bachelor degree education but with no further university education compared to a high school graduate (grade 12) with no further education. It is presumed that the university program takes five years instead of four.

(Table 4). All degrees—even the least practical, such as fine arts—are profitable for women, and in fact the variation from field to field is comparatively small.

For men, the variation across fields is greater. Most fields are profitable, including those in which men concentrate—social sciences, commerce, engineering, and physical sciences. There are so few men in fine arts and nursing that reliable rates of return cannot be computed. A humanities degree does

not generate more income for men than a high school diploma unless the humanities degree is followed by other training. An important example is humanities followed by education, a popular combination. A man who gets a B.A. degree in literature and then a one-year B.Ed. degree—a program which would prepare him for teaching high school—earns a high rate of return. Combinations involving law degrees imply even higher rates of return.

Part IV: The Provincial Response

We have shown that the rate of return from investing in education is high for high school completion or trade certification, college career programs, and university programs. Indeed, the prospective rates of return for most programs substantially exceed the cost of borrowing (5%) for Canadian governments. Moreover, the rates of return have generally risen in the 1990s, indicating that the economic demand for educated workers has been increasing in this decade.

The appropriate response to these high rates of return is to increase spending on education to meet the demands of the evolving economy. All Canadian governments face this challenge, since the mobility of labour around the country means that the wage and salary structures are similar everywhere—hence the rates of return to educational investment are also similar. And yet most governments have failed to meet the challenge.

The federal government has cut transfers to the provinces, effectively reducing its spending on post-secondary education. (High profile programs like the Millennium Scholarship Fund and registered educational savings plans may help some students, but do not translate into more spending on

education.) Some provinces, such as Ontario and Alberta, have cut spending on education and encouraged colleges and universities to make up the loss by raising tuition fees. Such actions are essentially a tax on students and do not automatically translate into more professors and more classrooms.

The appropriate response to a high demand for education is not to ration a limited capacity to teach by raising its price, but rather to increase the capacity and maintain a low price so that many students will attend. Such a course of action obviously requires that governments spend more money on education.

British Columbia stands out for having increased educational spending during the 1990s far more than did any other province. Table 5 shows the relative increase in educational spending by provinces in the 1990s. From 1990/1 to 1996/7, BC's spending on elementary and secondary education increased by 37.5%. This was much more than the second-place province (Saskatchewan at 18.9%) and very much more than most provinces where spending on average increased by less than 10%. In the case of colleges and universities, BC's spending rose by 59.7% from 1990 to 1998—way ahead of Quebec, which was

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in second place with a 30.8% increase. BC has accounted for a disproportionate share of the increase in educational spending needed to prepare the country for the next millennium.

While BC has increased educational spending significantly, the extra spending has not made BC the nation's educational leader. A variety of indicators show that the quality and quantity of education provided in BC leave much to be desired. There are two reasons why increased spending has not made BC number one in education. First, BC started off the 1990s significantly behind other provinces. The lag shows up in such indicators as student-teacher ratios in the public elementary and secondary schools, and in post-secondary participation rates. Second, throughout the 1990s, BC's economy has attracted migrants here from other provinces and countries. As a result, the BC population (including the school age population) has grown much faster than elsewhere. Much of the extra spending on education has been required to service the rapidly expanding population, rather than pushing BC performance above that of other provinces.

It is ironic that economic success has meant that increased educational spending has not made up for the shortfalls in the province's educational system. Further spending will be required to do that.

Elementary and Secondary Education

These themes are illustrated by the history of pupil-teacher ratios in the public elementary and secondary schools. Class size has been a major issue for many parents, who know that their children will receive more personalized instruction if classes are small. In 1990/91, BC had an unimpressive student-teacher ratio (Table 6). There were 15.26 pupils per educator in Canada as a whole, while in BC the ratio was 16.12. The ratio was slightly

higher in Saskatchewan (16.15) and New Brunswick (16.27) and notably higher in Alberta (16.77) and Prince Edward Island (16.88). The largest provinces, Ontario (14.84) and Quebec (14.56), had appreciably fewer students per teacher.

In the 1990s, BC increased its educational spending significantly, as already noted, and the number of public school teachers (on a full-time equivalent basis) increased from 31,147 to 34,711 between 1990/91 and 1996/97. In contrast, the number of teachers declined in seven provinces and rose minutely in the two showing increases.⁹ Despite the greater number of teachers, the student-educator ratio in BC rose to 16.85. BC improved its standing relative to the rest of the country, however, since the national ratio rose from 15.26 to 16.13.

Relative to the other provinces, BC did not do badly in the 1990s, but classes nonetheless got larger. The recent agreement between the BC Teachers' Federation and the BC government, however, promises smaller classes for kindergarten through grade three.

The reason that the pupil-teacher ratio increased in BC despite the increase in the number of teachers was a vast increase in the number of

British Columbia stands out for having increased educational spending during the 1990s far more than did any other province. While the province has increased educational spending significantly, the extra spending has not made BC the nation's educational leader. A variety of indicators show that the quality and quantity of education provided in BC leave much to be desired.

Table 5: Relative Increases in Educational Spending by Province, 1990s

| | elementary/ secondary | college/ university |
|----------------------|--------------------------|------------------------|
| Newfoundland | 0.3% | 23.6% |
| Prince Edward Island | 4.8% | 16.0% |
| Nova Scotia | 2.1% | 13.4% |
| New Brunswick | 10.9% | 28.2% |
| Quebec | 8.1% | 30.8% |
| Ontario | 16.4% | 21.7% |
| Manitoba | 6.6% | 28.3% |
| Saskatchewan | 18.9% | 15.7% |
| Alberta | 9.0% | 8.7% |
| British Columbia | 37.5% | 59.7% |

Sources and notes:

elementary and secondary: Inter-Provincial Education Statistics Project (1998). "Summary of school statistics from the provinces and territories: final edition," Table 6. New Brunswick figure for 1996/7 converted to a 12 month basis. Elementary and secondary expenditure increase computed from 1990/91 to 1996/97.

colleges & universities: Statistics Canada. Expenditure increase computed from 1990 to 1998.

students. In BC, enrolment rose 16.5%, followed by Alberta at 9.6%, and Ontario at 7.0%. In the other provinces, enrolment either declined or rose only slightly. Over this period, the increase in enrolment in BC accounted for about one-third of the national total.¹⁰

The enrolment changes reflected population changes, which in turn mirrored economic growth since people moved to the new jobs. The job growth of the BC economy, which attracted migrants, prevented the increase in provincial spending on elementary and secondary schools from lowering the pupil-teacher ratio. Thus, BC's economic success worked against educational improvement.

Pupil-teacher ratios reflect policy decisions as well as demographic and economic trends. While BC increased the number of teachers, Alberta and Ontario reduced the employment of teachers despite the significant increases in student enrolment in those provinces.

These reductions are consequences of the tax-cutting and spending-cutting policies followed by their governments. The result has been sharp rises in pupil-teacher ratios. Whoever has an advantage in Alberta, it is not children in the classroom.

In addition to pupil-teacher ratios, high school completion rates need to be addressed. As noted earlier, high school completion commands a very high rate of return—the counterpart to the limited employment opportunities of high school non-completers. By some measures, BC is doing very badly in terms of

high school completion. According to Statistics Canada's computed secondary school graduation rates, BC vies with Alberta for the worst record in Canada.¹¹ The census and the labour force survey, however, show BC in a better light, with a slightly better than average completion rate.

These surveys, however, still show about one-fifth of British Columbians of age 20 without a high school diploma. Some of these non-completers may eventually finish or acquire an equivalent credential or trade certificate, but non-completion represents a serious limitation of anyone's life prospects and a loss to the provincial economy. The rate of return to completing high school is so high that many thousands of dollars could be profitably spent on each drop-out to help him or her complete school or acquire a trade certificate. Indeed, the provincial government has recently eliminated tuition fees for adults completing their high school educations — a wise investment according to the above calculations.

Post-Secondary Education

The situation in post-secondary education has many parallels with the K-12 system. As with elementary and secondary schools, spending on colleges and universities increased much more rapidly in BC than elsewhere in Canada (Table 5), and enrolment expanded. BC has also witnessed impressive growth in the variety of both trades and college programs—from apprenticeship programs, to First Nations' institutes, to training programs for full-time workers—thereby offering British Columbians increased choice and flexibility in the post-secondary system.

Increased post-secondary enrolment overall, however, has not been much greater than population growth—the number of 18-24 year olds increased by 17.6% between 1990 and 1998—with the result that participation rates did not rise sharply.

**Table 6:
Student Educator Ratios,
elementary/secondary schools**

| | 1990/91 | 1996/97 |
|----------------------|---------|---------|
| Newfoundland | 15.32 | 14.48 |
| Prince Edward Island | 16.88 | 16.91 |
| Nova Scotia | 15.91 | 17.47 |
| New Brunswick | 16.27 | 17.01 |
| Quebec | 14.56 | 14.73 |
| Ontario | 14.84 | 16.23 |
| Manitoba | 14.74 | 15.49 |
| Saskatchewan | 16.15 | 16.80 |
| Alberta | 16.77 | 18.29 |
| British Columbia | 16.12 | 16.85 |
| Canada | 15.26 | 16.13 |

Source: Inter-Provincial Education Statistics Project (1998). "Summary of School Statistics from the Provinces and Territories: Final Edition," Table 11.

This result is important because, by some measures, BC has very low post-secondary participation rates. Statistics Canada publishes figures on total enrolment and degrees awarded for each province. For inter-provincial comparisons, these data must be standardized for differences in the provincial populations. This standardization is accomplished by dividing total enrolment of people of all ages in colleges and universities by the population aged 18-24, since members of that age group are most likely to attend these programs.

The ratio of college-career students to the 18-24-year-old population in BC is the third lowest in Canada (Table 7). This comparison, however, is unfair to British Columbia because of inconsistencies across provinces in classifying students in “trade/vocational” programs, on the one hand, and “college career”

programs, on the other. In BC the former generally refers to programs lasting one year or less, while the latter are two-year programs. Consistent inter-provincial comparisons can only be made by combining the two categories, as in Table 7.¹² (In these comparisons, trade/vocational enrolment is confined to what Statistics Canada calls “pre-employment vocational programs” and does not include instruction in English or adult basic education, i.e., high school equivalency programs.) By this measure, BC is in the middle of the pack with a participation rate not far below Ontario’s.

How BC stacks up against other provinces in terms of university participation also depends on the measure chosen, but the results are less reassuring than those for vocational and career instruction (Table 8). Bachelor degrees are the output of undergraduate

Table 7: Vocational and College-Career Participation Rates, 1995/6 per thousand people aged 18-24

| | career | vocational & career |
|----------------------|--------|---------------------|
| Newfoundland | 103 | 217 |
| Prince Edward Island | 106 | 192 |
| Nova Scotia | 88 | 121 |
| New Brunswick | 71 | 302 |
| Quebec | 140 | 252 |
| Ontario | 155 | 220 |
| Manitoba | 36 | 90 |
| Saskatchewan | 32 | 122 |
| Alberta | 94 | 189 |
| British Columbia | 53 | 198 |

Notes: Career enrolment is FTEs in which a part-time student is counted as one third of a full-time student. Vocational enrolment is full-time only in pre-employment vocational programs.
Rates computed by dividing enrolment by the population (in thousands) aged 18-24.

Table 8: University Participation Rates, 1996/7 per thousand people aged 18-24

| | Degrees | University | University + College-Univ. Transfers |
|----------------------|---------|------------|--------------------------------------|
| Canada | 46 | 219 | 261* |
| Newfoundland | 35 | 214 | 214 |
| Prince Edward Island | 34 | 196 | 196 |
| Nova Scotia | 66 | 325 | 325 |
| New Brunswick | 46 | 239 | 239 |
| Quebec | 44 | 236 | 374* |
| Ontario | 54 | 235 | 235 |
| Manitoba | 46 | 208 | 208 |
| Saskatchewan | 42 | 241 | 241 |
| Alberta | 37 | 197 | 224 |
| British Columbia | 30 | 164 | 211 |

Notes: Enrolment is FTEs in which a part-time student is counted as one-third of a full-time student. University enrolment includes university college programs.
The Canada and Quebec figures marked with * are probably not comparable with the others due to classification of CEGEP students (Quebec’s post-gr.11 junior college system).
Rates computed by dividing degrees and enrolment by the population aged 18-24.

education. When the provinces are compared in terms of all bachelor degrees awarded divided by the population 18-to-24 years old, BC comes in last by a wide margin. BC awards only 56% as many degrees per 18-24-year-old as does Ontario, which is a suitable province for comparison, as will be shown shortly.

The provinces can also be compared in terms of total enrolment relative to the 18-24-year-old population. When enrolment is restricted to students at universities, BC again comes in last. However, in BC many students receive their first two years of instruction at a college in a university transfer program. Alberta has a similar but smaller system, and small numbers of students are educated in a similar way in some other provinces. Adding the university transfer students¹³ to those in university raises BC's university participation rate above those of Prince Edward Island and Manitoba, and to within 11% of Ontario's.

Why does BC do badly when degrees are compared and not as badly when enrolment is the measure? The answer is that a far lower proportion of students complete university education in this province than elsewhere. There are many possible reasons for this. First, the system is unbalanced: There are too few third and fourth year undergraduate places in relation to first and second year. Expansion is needed at the third and fourth year level. Second, many students, especially in the colleges, are part-time students, and it is possible that part-time students are less likely to complete than are full-time students. One reason the colleges have been successful in expanding enrolment is their flexibility, including their willingness to accommodate part-time study. This flexibility is laudable and necessary, but

may result in fewer completions.

The low university completion rate may also be related to another failing of the universities—the large size of their classes. In 1980, BC universities employed 3,163 full-time teachers who taught 36,453 students (full-time equivalents) and awarded 5,997 undergraduate degrees. In 1997, the full-time teaching staff had increased by 7% to 3,379, while enrolment had jumped by 66% to 60,433 and the number of undergraduate degrees had ballooned by 88% to 11,301.

Much of the deterioration was due to the Social Credit restraint program of 1983-86, but the decline in full-time staff per student has continued in the 1990s, particularly when the provincial government forced universities to admit more students without providing more funding. Between 1990 and 1997, the growth in undergraduate degrees outpaced the growth in full-time teachers by 25%, while the growth in enrolment exceeded the growth in full-time teachers by 19%.

Some of the rise in enrolment was met by hiring sessional lecturers and part-time teachers. Unfortunately, the potential contribution of these people is limited, since they have no long-term relationship with the universities. Much of the rise in enrolment has been dealt with by increasing class sizes. (Large classes are not just a problem in elementary and secondary schools.) Larger classes are bad for students, since their experience becomes more passive as they listen in huge lecture halls rather than participate in small group discussions.

Larger classes also make for an impersonal and less supportive learning environment, which is again difficult for all students and is particularly trying for college transfer

students who face additional stresses from leaving home and the more personalized education offered in the colleges. Not only does BC need more third and fourth year university places, but it needs more spending per student to create a more successful learning environment. More funding is required to ensure part-time students receive the support they need, and to boost completion rates, so that the educational investments of students and the state are not lost.

There would certainly be jobs for more university graduates. While Ontario leads the country with 19.9% of its workers having university degrees, BC and Quebec tie for second place with 18.8% of their workers holding degrees (Table 9). The high level of employment of university graduates in BC reflects the demand for graduates in this province rather than provincial training, which trails the rest of the country. Thus, much of BC's demand for university-educated workers continues to be met by interprovincial migration.

The range across provinces in the proportions of employees with university degrees is quite broad and reflects differences in their economies. BC is one of the growth centres in Canada for the knowledge-based economy of the twenty-first century.

In the 1990s, provincial demand has exceeded provincial supply for trade/vocational and college career graduates, and especially for university graduates. Between 1990 and 1996, the employment of people who had completed trade/vocational and college/technical programs increased by 21.8 thousand per year, on average. Allowing for retirements and the fact that not everyone has paid work implies that 34,200 program completers were needed

each year to meet the growth in demand.¹⁴ In the mid-1990s, somewhat more than 30,000 people per year completed such programs.¹⁵ Thus, the growth in demand exceeded the growth in supply by a few thousand people per year.

At the university level, the gap was much greater. Employment for people with university degrees increased by 21,900 per year from 1990 through 1996. Allowing for retirements and non-workers implies that 29,000 bachelor degrees had to be awarded each year to meet the growth in demand. In 1995, BC universities awarded 11,142 bachelor or first professional degrees (up from about 8,000 in the late 1980s). Thus, BC is producing less than 40% of the growth in demand for university-educated workers in the province.

Table 9: Educational Attainment of the Work-Force, 1996

| | Percentage of employees with: | |
|----------------------|---------------------------------------|-------------------|
| | post-secondary certificate or diploma | university degree |
| Canada | 32.3% | 18.6% |
| Newfoundland | 41.8% | 13.2% |
| Prince Edward Island | 33.3% | 17.5% |
| Nova Scotia | 38.3% | 18.2% |
| New Brunswick | 36.2% | 15.5% |
| Quebec | 30.0% | 18.8% |
| Ontario | 30.0% | 19.9% |
| Manitoba | 22.2% | 11.1% |
| Saskatchewan | 29.2% | 14.3% |
| Alberta | 31.9% | 16.4% |
| British Columbia | 31.9% | 18.8% |

Source: Statistics Canada, *The Labour Force*, December, 1996.

It may be unreasonable for BC to educate all of the university graduates its economy requires, since the population as a whole is growing through migration (including in-migration of university-educated people) and since the economy is peculiarly tilted toward university graduates in its demand for labour. There is no reason, however, why BC could not do as well as Ontario. If British Columbia awarded as many degrees as Ontario does relative to its population, then this province would be graduating 18,800 people per year instead of the current rate of 11,100. Expanding the university system to meet that goal is not unreasonable, although BC would still be producing about 10,000 fewer graduates each year than its economy requires.

Such an expansion would have important benefits on a regional basis. The economies of the lower mainland and greater

Victoria are doing much better than the rest of the province, especially those communities dependent on the traditional staples (forestry, fishing, and mining). The weakness in those sectors is partly cyclical but partly fundamental. If resource-based communities do not reorient their economies to “value added” production, then technical changes in logging, mining and milling will result in falling employment, and that has already been the fate of many towns and cities.

Young people in these communities can no

longer count on high-paying work in forestry, fishing, or mining and will have to direct their talents elsewhere. Getting a university education and moving into the knowledge-based economy is one option, but it has been a hard option for people in these areas, since the province’s universities have been located in the big cities. Colleges have provided an important first entry into university courses, but they have not solved the problem, as the low completion rate in BC university programs suggests.

The establishment of the University of Northern BC and the creation of university colleges outside of the big cities are important initiatives with the potential to change the situation, and they warrant expansion. Additional funding for the established universities to increase capacity at the third and fourth year levels and reduce the size of classes to create a more supportive learning environment are also important steps in graduating more students. Initiatives in this direction have the potential to alleviate the unemployment problem in resource-based communities in the long run.

Inter-provincial and inter-temporal comparisons indicate areas in which BC should increase its educational spending. The comparisons also highlight a structural reason for increasing spending, namely, provincial population growth: BC needs to spend more money on education than other provinces just to service the influx of people moving here. If spending on education is related to the size of the economy (its gross domestic product, or GDP), BC needs to invest a larger fraction of its GDP in education than do provinces that grow less rapidly. However, BC’s educational investment rate is only equal to the Canadian average, and behind that of all provinces except Ontario and Alberta (Table 10). BC needs to increase the portion of GDP spent on education to be Canada’s leader.

**Table 10:
Educational Spending
Relative to GDP, 1996/97**

| | |
|----------------------|------|
| Canada | 6.3% |
| Newfoundland | 9.2% |
| Prince Edward Island | 7.3% |
| Nova Scotia | 7.1% |
| New Brunswick | 6.7% |
| Quebec | 6.9% |
| Ontario | 6.1% |
| Manitoba | 6.5% |
| Saskatchewan | 6.6% |
| Alberta | 5.1% |
| British Columbia | 6.3% |

Note: Educational spending includes elementary and secondary spending by public schools and expenditures on colleges and universities.

Source: Same as Table 5.

Part V: Who Should Pay?

There is a compelling case for spending substantially more money on education in British Columbia. Despite the slowdown of economic growth in the last year, the long-run prospects of the province remain bright, and educational spending must be increased simply to keep pace with the long-run growth in population. The number of university graduates (including those of university colleges) should be expanded by more than two-thirds, plus an increment for population growth. There is also a case for expanding vocational and career programs, since they yield high rates of return for certain groups. Spending per student could be increased in elementary and secondary schools and at universities to reduce class sizes. Such reductions might increase graduation rates at both levels.

The practical question is: who should pay for this increased spending? No one has seriously suggested that elementary and secondary education be privatized so that parents would have to pay, but the issue is hotly debated at the post-secondary level. At the present time, BC pays most of the cost of the province's colleges and universities, and students make a small contribution through tuition fees. According to the conventional analysis, students are a heavily subsidized group since their fees amount to a third or less of post-secondary expenditures.

This funding arrangement is being increasingly called into question on the grounds that 1) all consumers of government services (including students) should pay the full cost of those services, 2) a less-subsidized, more market-oriented system would be more responsive to the needs of the economy, 3) subsidies to students are an

undesirable redistribution of income from the general taxpayer to the well-to-do since it is the children of well-off parents who disproportionately attend post-secondary institutions, and 4) increased government expenditures cannot be justified if they will increase the province's deficit.

In fact, none of these objections is persuasive.

The argument that students are a heavily subsidized group ignores the fact that they pay for their college and university educations in two ways. The most obvious is through tuition fees at the time of enrolment. These amount to several thousand dollars per year, depending on the program. These fees (net of the subsidy in student financial aid) amount to less than one-third of the cost of the program—hence, the apparent subsidy. The second way students pay is through higher taxes after graduation. Most students attend college or university with the aim of earning a higher income, and they are usually successful, as shown earlier. Because they earn higher incomes than they would have otherwise, they pay more taxes in total (including income tax, property taxes, GST, PST, and excise taxes like those on alcohol, tobacco, etc.) than they would have otherwise. These higher taxes are in effect post-graduation payments to the government for their education.

College and university financing in Canada should be thought of as a joint investment project between the student and the government. The student's investment includes the earnings lost by studying rather than working, the cost of books and supplies, and the tuition paid. The government's

investment includes the cost of building and operating the colleges and universities, less the tuition received. The student's return from the investment is the higher after-tax income he or she receives after graduation, while the government's return is the higher taxes paid.

This framework has an immediate application to the question of students being subsidized. The present value of the extra taxes paid by college completers and univer-

sity graduates must be added to the tuition fees to see whether the total exceeds the cost of building and operating the colleges and universities.

Tables 11 and 12 show the details of this calculation. The cost of the programs, which is the government's contribution to education and which is the sum which students ought to pay if they are to pay the full cost of their educations, is taken from the earlier discussion of the social rate of return.

Tuition fees (net of student aid) are taken from an earlier study of universities and a comparison of BC and Alberta (Klein and Walshe 1999). The additional taxes paid by program completers after graduation are calculated by applying an econometric model of the BC tax system to the incomes reported in the 1991 census microdata file of BC residents. A small reduction has been made since students paid less tax when they were in school because they were working less than non-students.¹⁶

Just exposing the payments of students and the costs of the program shows that students at all post-secondary levels pay the full costs of their programs,

Table 11: Payments for Education—Women (dollars)

| | student payments | | | | | treasury cost of degree |
|------------------------------|------------------------------|---|---------|-----------------------|----------|-------------------------|
| | present value of extra taxes | + | tuition | - less foregone taxes | = total | |
| grade 12 | 23,355 | + | 0 | - 1,564 | = 21,791 | 6,042 |
| trade certificate/no HS grad | 26,075 | + | 1,390 | - 1,564 | = 25,901 | 8,286 |
| trade certificate/HS grad | 2,721 | + | 1,390 | - 1,564 | = 2,547 | 8,286 |
| college career | 23,894 | + | 2,780 | - 3,127 | = 23,547 | 19,280 |
| university | 65,829 | + | 11,480 | - 6,254 | = 71,055 | 35,984 |

Notes: Program definitions are shown in notes to Table 3.

present value of extra taxes—see text.

tuition—Tuition is net of financial aid subsidy. University figure from Allen (1998b, Table 5). Trade and college from Klein and Walshe (1999, p. 21).

foregone taxes—University figure from Allen (1998b, Table 5). Grade 12, trade, and college calculated as one fourth and one half of the university figure.

Treasury cost of degree—Table 2 assuming college career at two years and university at four years.

Table 12: Payments for Education—Men (dollars)

| | student payments | | | | | treasury cost of degree |
|------------------------------|------------------------------|---|---------|-----------------------|-----------|-------------------------|
| | present value of extra taxes | + | tuition | - less foregone taxes | = total | |
| grade 12 | 40,402 | + | 0 | - 1,808 | = 38,594 | 6,042 |
| trade certificate/no HS grad | 57,466 | + | 1,390 | - 1,808 | = 57,048 | 8,286 |
| trade certificate/HS grad | 17,064 | + | 1,390 | - 1,808 | = 16,646 | 8,286 |
| college career | 36,274 | + | 2,780 | - 3,616 | = 35,438 | 19,280 |
| university | 104,457 | + | 11,480 | - 7,232 | = 108,705 | 35,984 |

Note: See Table 11.

generally by a substantial margin. The notion that students are a heavily subsidized group is contradicted by the facts. It is not valid to say that fees should be raised to eliminate a subsidy.

This conclusion, however, has an important corollary. If fees are not to be raised, then colleges and universities are dependent on the Treasury for their income. Consequently, both the province and the federal government have an obligation to fund post-secondary education at an adequate level, since they receive

the taxes. The shortfall in places must be eliminated, the needs of population growth must be met, and funding levels per student must be increased to ensure reasonable class sizes. By prohibiting tuition increases, the provincial government assumes the responsibility of providing the income that higher tuition would generate. The federal government also has the obligation to increase transfers to the provinces to pass on to them the increased income tax and GST revenue generated from post-secondary education.

Part VI: Responsiveness of Colleges and Universities to the Economy

A second argument in favour of shifting the funding of colleges and universities to student fees and corporate grants is to make the institutions more responsive to the needs of the economy. Such a change in funding would effectively privatize the colleges and universities.

The conclusion that privatizing post-secondary institutions would make them more responsive to the economy is based on the following reasoning: If students had to pay the full cost of their programs, they would think more carefully about their choices and choose the program most likely to maximize their incomes. Programs that were economically relevant would carry high rates of return; students would enter those, and they would expand. In contrast, economically “irrelevant” programs would attract few students and would contract. A greater reliance on corporate donations for constructing facilities and operating programs would reinforce this effect. Such changes would make universities

more responsive to the economy than they are now. According to this view, today’s publicly-funded universities do not have to respond to student or business demand because they are run by the faculty, who perpetuate their power and privilege and ignore the need for change. This line of analysis has been advanced by the World Bank, and Third World countries are being forced to put it into practice.¹⁷

This argument is vulnerable on many counts. First, it ignores the fact that colleges and universities have changed their programs considerably in recent decades. They do not exhibit the rigidity that the argument presumes. Indeed, their program mix is approximately what the economy requires. Implicit in the World Bank argument is the proposition that the equality of rates of return across programs is the condition that indicates the correct mix. Earlier I showed that rates of return to colleges and universities were similar, as were rates of return across most university

programs. Hence, the program structure of BC colleges and universities is about what the market demands.

It is not clear that greater reliance on student demand and corporate donations would produce a post-secondary education system that is more attuned to the needs of the economy. Popular opinion about the economic returns to education is wildly inconsistent with the facts. An Angus Reid survey of Ontario residents in May, 1998, found that most people believe that specific skills training would generate the best employment prospects: 37% thought that an apprenticeship or a high school diploma with job training was the best preparation for the future economy, while 35% thought a college career program in a technical area was best. Only about 25% thought that a university degree was the best preparation.¹⁸

These views are wholly at variance with the labour market survey data discussed earlier in this paper. If student demand reflects popular opinion—and how could the situation be otherwise?—then student demand is a poor basis for allocating educational resources.

Corporate funding is likewise an unsound basis for university finance. The problem is precisely that the funding will reflect the needs of business. So far as research is concerned, the projects funded will be those that address practical business problems (rather than extend basic knowledge) or that advance business ideology rather than support any kind of critique of society at odds with corporate interests.

Corporate funding often implies that research findings are proprietary information that cannot be freely disseminated, particularly if they threaten the funder's interests, whereas the university's goal is to share and disseminate knowledge. So far as teaching is concerned, the programs funded will be those that meet the short-term needs of business for

people trained in particular skills. Since there is no guarantee that the graduates of these programs will remain with the employer who funds the program, the employer has an incentive to train the student in skills that are useful only to the funding firm rather than in general skills that would increase the value of the student to other employers. A concentration on narrow, highly specific skills at the expense of general skills is the likely result of business funding of teaching programs.

The World Bank critique of public colleges and universities presumes that program mix is the main problem with post-secondary education. In fact, the main problem has often been the overall size of the system. So far as size is concerned, public financing has a fundamental advantage over private financing—namely, that the government can borrow money less expensively than can private households. If the government expands the system until the marginal return equals the interest rate on government debt, the system will be larger than if private individuals finance expansion.

The differing experiences of Canada and the United States reflect these possibilities. In Canada, where the system is publicly funded, expansion has been more rapid than in the U.S., where private funding is more important. By the mid-1990s, Canadians were more likely to receive post-secondary education than were Americans.¹⁹ The more rapid expansion of colleges and universities in Canada has been important in closing the income gap between the two countries.

The arguments in favour of privatizing universities, relying on corporate funding, and raising fees to make universities more responsive to the economy are unlikely to produce positive results in British Columbia. Publicly-financed institutions with low tuition rates will produce faster economic growth so long as the government adequately funds them.

Part VII: Education and Inequality

Higher fees and less public funding of colleges and universities are also promoted as a way of reducing inequality. The argument is that the post-secondary students come from well-off families, while much of the taxes collected in the province come from lower-income households. Funding public universities out of general revenue, therefore, is a transfer from the poor to the rich. High fees would eliminate that transfer and make the rich pay for their children's education.

While this argument had some merit in the 1960s, it has much less merit today. As the figures in Table 1 show, for Canada as a whole 67.1% of the women aged 25-29 and 57.7% of the men had completed a post-secondary program and another 8-9% had some post-secondary education. The argument that only the rich go to colleges or universities might have been true a generation ago, but the great expansion in post-secondary education since then has changed the terms of the distributional debate.

In fact, low-cost public education is likely to enhance equality. Low fees improve access to post-secondary institutions by students from low-income backgrounds. The critics of low fees counter that most students can afford to pay higher fees, so access will not be reduced by raising them. No doubt many students can afford to pay more, but some will be denied access if fees are raised.

Colleges and universities financed by general revenue can also improve equality by changing the wage and salary structure of the labour force. As argued previously, governments can borrow money less expensively than individuals. If governments avail themselves of that option, they will create a larger post-secondary education system than would be built by institutions deriving their income

from student fees. A larger system means a greater supply of educated workers and, correspondingly, a smaller supply of less-educated workers. Consequently, the salaries of educated workers will be less, and the wages of uneducated workers more, than would be the case with a high-fee, more exclusive private system. A large public system will therefore promote equality by equalizing the distribution of wages and salaries.

Recent North American history illustrates the force of this argument. Inequality has increased much more in the United States than it has in Canada, and one aspect of the American increase has been a steep rise in the salaries of university graduates and a fall in the earnings of people with a high school education or less. With the demand for labour shifting towards more educated workers, the more sluggish response of the educational system south of the border has resulted in a rise in the salaries of people with university degrees (since supply has not kept up with demand) and a fall in the wages of high school graduates (since their labour market has been overstocked with people who would have received further education had they lived in Canada).²⁰

Thus, an expanded system of public, low-fee colleges and universities can promote equality in British Columbia. As noted earlier, such a system can also promote economic growth more effectively than a high-fee, self-financing system. Both arguments require that the provincial government expand the system as long as the social rate of return exceeds the interest rate on government bonds. Given the current high returns to post-secondary education, BC can realize the full growth-promoting, inequality-reducing potential of colleges and universities only by significantly expanding the systems.

Part VIII: Impact on the deficit

The final argument against British Columbia's spending more money on education is that its budget is in deficit and needs to be balanced before additional funds are committed. That argument, however, ignores the fact that education is a good investment. The interest rate on long-term provincial debt is about 5%, while, as we have seen, the social rate of return to many educational expenditures is 10% or more. Borrowing money at 5% to make a 10% profit is simply good business.

Investing more in education now would also counteract the effect of low resource prices that are depressing provincial GDP and reducing employment. The increased spending would directly raise output and employment and the re-spending of their salaries by teachers, support staff, and those involved in building and supplying schools, colleges, and universities would lead to further economic expansion.

Tax cuts (rather than expenditure increases) are the alternative approach to stimulating the economy. Following the tax-cutting approach, of course, would forfeit the income gains and favourable effect on equality of additional educational spending. It would guarantee the kind of increases in class size that have occurred in Alberta and Ontario; it would guarantee the continuation of large classes in universities; and it would guarantee that thousands of students in British Columbia who might otherwise have earned a post-secondary degree will see

people from other provinces take the higher-paying jobs that they might have had.

Beyond those drawbacks, cutting taxes would likely have a smaller stimulating effect on demand in the province than would more educational spending. The problem with tax cuts in this regard is that some of the tax reductions are saved rather than spent, so dollar-for-dollar their stimulating effect is less.

The other virtue claimed for tax cuts is that they will accelerate economic growth by increasing the incentive to work and invest. The notion that high taxes in BC have depressed growth here is hard to credit, given that BC posted strong growth in employment and domestic demand during the 1990s with essentially the same tax structure that it has today. Why these tax rates have suddenly become an impediment to growth is unclear, especially when there are other developments like the Asian economic crisis and declining forest commodity prices that provide credible explanations for the recent economic slowdown. Indeed, employment growth has resumed, so the claim that BC's tax structure is depressing growth may be even farther off the mark.

The claim that BC's taxes are too high has drawn strength from the "brain drain" argument. The claim here is that high Canadian taxes have driven educated Canadians to work in the United States, to the great loss of this country. The brain drain, however, has been shown to be chimerical for Canada as a

whole,²¹ and it lacks any credibility for British Columbia. For decades, this province has benefited from brains coming in rather than brains draining out.

As shown earlier, the growth in employment of university graduates in this province

greatly exceeds provincial supply, and the gap is closed by migrants from other countries and provinces. These people have found ample incentive to settle here and work despite—perhaps, indeed, because of—the taxation and expenditure policies followed here.

Part IX: Conclusion

The demand for educated workers is rising in British Columbia, and the increase is expected to continue into the next millennium. Knowledge-based industries provide the opportunity to diversify the BC economy away from the extraction and export of primary resource commodities. The profitability of investing in education at all levels is very high, and so there is both economic need and popular demand for more spending in this area. It is only prudent business management for the province to borrow at 5% in order to realize a profit of 10% or more on educational programs.

Social rates of return and comparisons with other jurisdictions suggest the following areas require attention:

1. The BC pupil-teacher ratio in elementary and secondary schools exceeds the national average. An additional 1,550 teachers would be required to bring the ratio down to the Canadian average (based on 1996/7 figures).

2. A significant proportion of students in British Columbia fail to complete high school. Programs to increase graduate rates warrant further support.

3. BC's universities and university colleges should be expanded to increase the number of bachelor degrees by about 70%, or 8,000 per year. This would bring the rate of university completion up to the Ontario level, which is appropriate since BC (like Ontario) is a growth centre of the knowledge-based economy. Most of the expansion should be at the third and fourth year undergraduate level.

4. The colleges and universities need more full-time faculty to reverse the increases in university class sizes that have occurred in the last decade, as well as to teach the additional undergraduates that the provincial economy requires. To erase the damage of funding restraint and return the student-to-full-time-teacher ratio to its 1980 value

would require another 1,800 full-time teachers in the universities and university colleges.

In addition, the following conclusions regarding educational funding were implied by the analysis.

5. The long-run success of the BC economy means that the province's population has been growing—and will continue to grow—faster than that of the rest of Canada. BC not only must provide the resources for its existing population—which all jurisdictions must do—but in addition must build and operate schools to accommodate the new immigrants. The latter expenditure implies that BC must invest at a higher rate than most other provinces. BC now spends a smaller fraction of its GDP on education than all provinces except Ontario and Alberta. BC should increase its investment rate in education to be the highest in Canada if it expects to continue to be a growth centre in the knowledge-based economy of the twenty-first century.

6. Most funding for BC's colleges and universities has come from the provincial

government (including federal transfers to the province for post-secondary education). Government funding has one great advantage over tuition fees as a source of revenue: namely, that the provincial government can borrow at lower cost than private individuals. Hence, if the province finances education, it will be profitable to expand the system beyond the point where private individuals would find it profitable. A larger system would be good for growth and good for equality in the province. To secure these favourable outcomes, however, the provincial government must expand funding for post-secondary education. College and university graduates, in fact, pay for more than the cost of their educations through the higher taxes they pay over their lifetimes. These taxes, in effect, are compulsory contributions to their alma maters. The federal and provincial Treasuries should pass these contributions on to the colleges and universities and not use them to retire debt or reduce taxes.

7. BC should increase spending on education whether or not the extra spending increases the deficit. Education is an investment. It is only good business to borrow money at 5% in order to earn a 10% rate of return.

Endnotes

- 1 The averages discussed in this paragraph were computed from Statistics Canada, Census of Canada, 1970, microdata file, and Statistics Canada, Survey of Consumer Finance, 1995, microdata file. All figures have been expressed in 1995 dollars by using the Canadian consumer price index.
- 2 These studies are summarized in Allen (1998b), which also reports new results using BC data that support the conclusions that education increases earnings and that educational attainment is not a proxy for ability.
- 3 If part-time students continued to work full time, then the social cost of their education would be less than that of full-time students and that effect would tend to raise the rate of return to part-time education above that of full-time. However, part-time students will take longer to complete their programs than full-time students, so part-time students will have fewer years to earn the extra income caused by their program. That effect will tend to lower the rate of return to part-time study. In addition, there is the possibility that part-time students will be less likely to complete their programs than full-time students, a possibility that warrants further study. If true, that factor will also tend to lower the rate of return to part-time study with respect to the return to full-time study.
- 4 1995, p.545.
- 5 Statistics Canada, Educational Quarterly Review, Vol. 4, No. 2, 1997.
- 6 I thank Randall Brown, Coordinator of Funding, Finance and Information Management Branch, Post Secondary Education Division, Ministry of Advanced Education, Training, and Technology.
- 7 Dickson et al. 1996.
- 8 Education at a Glance; and Alsalam and Condy (1995).
- 9 Inter-Provincial Education Statistics Project (1998). "Summary of School Statistics from the Provinces and Territories: Final Edition," Table 4.
- 10 Inter-Provincial Education Statistics Project (1998). "Summary of School Statistics from the Provinces and Territories: Final Edition," Table 2.
- 11 Statistics Canada, Education in Canada, 1997, p.158-9.
- 12 Combining the categories, however, introduces one new complexity. In some provinces, a high school diploma is required for admission to trade/vocational programs, while in others (including BC) that is not always the case. Hence, for some students in BC, a trade/vocational program is not a post-secondary program, strictly speaking.
- 13 The much smaller number of students in third and fourth year undergraduate programs at university colleges are included by Statistics Canada in the university enrollment.
- 14 The details of this calculation are elaborated in Allen (1998a).
- 15 Statistics Canada data indicate that 2918 people

completed apprenticeships in 1994, 14,900 completed pre-employment vocational programs, 5707 completed skill upgrading programs, and 554 finished job related training. In 1995, 6,418 completed college career programs. These figures total 30,497. A higher figure could be obtained by including completers of language programs or adult basic education, but those programs are not post-secondary in a strict sense. Also, the size of the vocational and career programs is probably larger today (implying a smaller gap, if any, between demand and provincial supply) but figures are not available.

- 16 The details of the calculations and a full description of their rationale are in Allen (1998b).
- 17 "World Bank Promotes Its Agenda in Paris," CAUT Bulletin, Vol. 45, No. 9, November, 1998, pp. 1-8.
- 18 "Degrees allocated to back seat in Ontario poll on future jobs," Globe & Mail, 15 August, 1998, p. A6.
- 19 Education at a Glance: OECD Indicators, 1997, pp. 10, 170, 171.
- 20 Murphy, Riddell, and Romer (1998) develop this analysis in detail with a simulation model.
- 21 "Brain Drain or Brain Gain? What do the Data Show?" Statistics Canada, 1 October, 1998.

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