

Total and Private Returns to University Education in Canada: 1960-2030 and in
Comparison to other Post-Secondary Training

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This Draft: February 5, 2004

Prepared for: Higher Education in Canada, John Deutsch Institute for the Study of
Economic Policy, February 13-14, 2004

Total full-time university undergraduate enrolment has grown from 69,000 students in 1956 to 600,000 students today. Over the same period, the ratio of full-time university enrolment to the Canadian population aged 20 to 24 increased from 0.04 to 0.29. Along with the expansion of Canada's university enrolment, up until 1980 there were large increases in public expenditures and public investment that resulted in growing resources per full time student (Davenport 2002). Since 1980, enrolment growth has outstripped the growth of university revenues, particularly from public sources, such that the real level of resources per student in universities has declined. In addition, where public funding of universities resulted in falling tuition costs for students until 1984, since that time with the squeeze on public funds for universities, tuition costs for students have climbed to the point that tuition costs per student today are in real terms higher than at any time since 1950. As we look to the future, there are two important resource issues for university and post-secondary education. First, should resources for university education be restored to the levels of the late 1970s, or should they be allowed to decline? Second, should the large amount of resources used for "general education" within universities be reallocated to programs training students for specific skills and knowledge in demand, within universities and to colleges and vocational schools?

A common concern with the "squeeze" on Canada's universities has been that in order to accommodate enrolment growth after 1980, the quality of education has been compromised and will likely be diminished further unless resources for universities are increased, or enrolment growth is slowed. With this view, the cause of the decline in public funding for universities is attributed to causes external to universities themselves

such as the perception that the opportunity cost of public funds increased after 1980.¹ An alternative view of the squeeze on university funding is that its causes were rooted in universities and what they provide. It was argued that the value of university education has declined in general since 1970 and society would be better served by allocating resources towards trades/vocational training.² Canadian workers are viewed as over-educated relative to society's human capital needs, hence the level of public spending on post-secondary education is too high. Thus, diverting resources away from universities to other uses represented a desirable re-allocation of public funds. Finally, as most Canadians believe that the private benefits to post-secondary education are high, it seemed reasonable to shift the burden of financing education away from the general tax payer and onto the individual who benefits from the investment.

Riddell and Sweetman (2000) distinguish between two views of the importance of educational attainment for society through two explanations for the rise of participation in post-secondary education in Canada. First, the "relative demand shift" view sees technical change, or structural change in Canadian labour markets, increasing the demand for higher skilled workers relative to lower skilled workers. Thus, growing employment opportunities for highly educated workers signal the need for increased educational attainment to meet the growing demand for this type of labour and to prevent and increase in unemployment that would be associated with declining demand for less

¹ For example, Laidler (2002) argues that government spending on universities in Canada competes directly with spending on health care at least in the mind of the electorate. Thus, as government spending tightened after the 1980s, it was inevitable that university funding from governments would tighten in order to maintain spending levels on health care that benefit a wider segment of society than post-secondary education.

² See Allen 1998, Laidler 2002, or Davenport 2002 for a discussion of this perspective on university education. This point of view gained credence through theoretical alternatives to the human capital model, in particular, signaling and sorting theories. Alternatively, there was a perception that government "subsidies" encouraging greater participation in post-secondary education resulted in over-investment in education (Texeira 2000)

skilled labour. The contrasting view is the “overeducation/underemployment” view that increased educational attainments are the result of poor labour market opportunities for youth and young adults. Thus, young Canadians invest in post-secondary education to improve their chances at getting a good job, and employers facing a glut of applications for their vacancies upgrade their workforce. In this view, there is a substantial unemployment and underemployment among the well educated. Rising educational attainment is a waste of society’s resources (time and money), as the education received is unnecessary since high human capital workers occupy jobs requiring a lower level of education. In addition, what universities do in terms of programs offered has been brought into question to the extent that many believe that universities are training workers ill-suited for the current labour market at a high social cost.

Labour market outcomes (employment, earnings premia, and quality of jobs) indicate that the relative demand shift is a better description of the Canadian of the reasons for the rise in participation in university education.³ Thus, rising participation and allocation of resources to university education was driven by labour market demands. This alone, however, cannot tell us if the university system has had too many resources allocated to it, or too few. As Allen (1998) argues, we need to know the costs and benefits of resources allocated to universities which are summarized by the Internal Rates of Return (IRR) to investments in university education. If Canadian society has allocated too many resources to university education, then we should see that the rate of return to the investment of those resources is low. If “squeezing” universities by reducing per student resources has diminished the quality of education, then we should see that the rate of return to a university education has fallen. If trades and other forms of vocational

³ Allen (1998), Beaudry and Green (2000), Riddell and Sweetman (2000), Davenport (2002).

training are better uses for society's resources, then we should see rates of return to those post-secondary credentials exceeding the rates of return to university degrees.

This paper addresses these resource issues by examining the evolution of university participation in Canada and by surveying the literature on the rate of return (cost/benefit) to resources allocated to university education in Canada. My investigation of the private and total rates of return to Bachelor's degrees over the last 40 years suggests that the university system had an unnecessarily high level of resources by the mid-1980s. While the earnings premium of bachelor's degree holders high school graduates has been stable since 1981, the total rate of return to a Bachelor's degree has increased while the resources per university student has declined. In addition, while private costs have increased and reduced the private rate of return to university education, university education remains a good investment for the individual acquiring the education and there is still considerable scope for raising tuition fees. Finally, even if resources per student are squeezed further, the rate of return to university education for the individual and society will rise due to the expected contraction of the supply of highly education workforce that will arise with the aging of Canada's population.

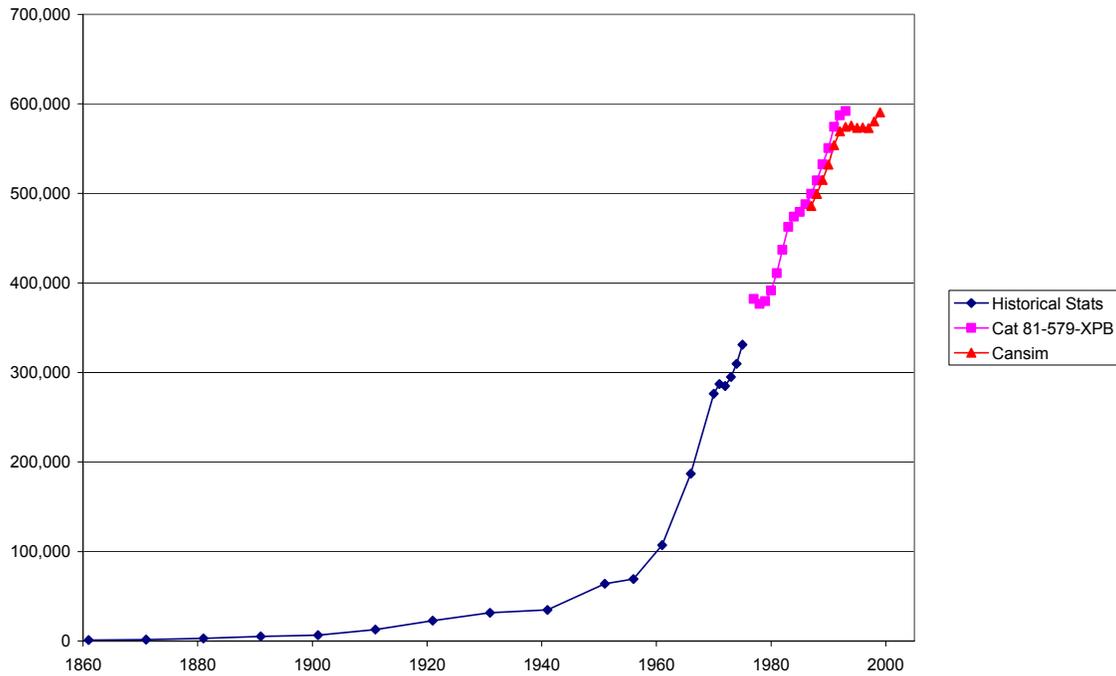
The evolution of participation in university education⁴

Figure 1 shows the size of full-time undergraduate enrolment in Canadian universities since 1860. Over a 140 year period, 1960 to 1970 and 1980 to 1990 stand out as two notable decades as full-time university undergraduate enrolment increased by 200,000

⁴University Enrolment accounts for 60% of total post-secondary enrolment. (CAUT Almanac of Post-Secondary Education in Canada, 2003).

students in both of those decades. Owram (1996) notes that between 1963 and 1968, Canadian university enrolment increased as much as it had between 1913 and 1963.

Figure 1: Full-Time Undergraduate University Enrolment, 1861-1999/2000



Some of the increase in full-time undergraduate university enrolment was due to the demographics of the baby boom, but the majority of the increase was due to increases in participation in university education amongst Canadians aged 18-26.⁵ Owram (1996) notes that in 1951, one in twenty 18 year olds went on to university. By the mid-1960s, it was one in ten, and by the early 1970s it was one in six. Participation rates have been highest for Canadians aged 20-24 and Figure 2 shows that the ratio of university enrolment in Canada to population aged 20-24 increased from less than 0.02 from 1860

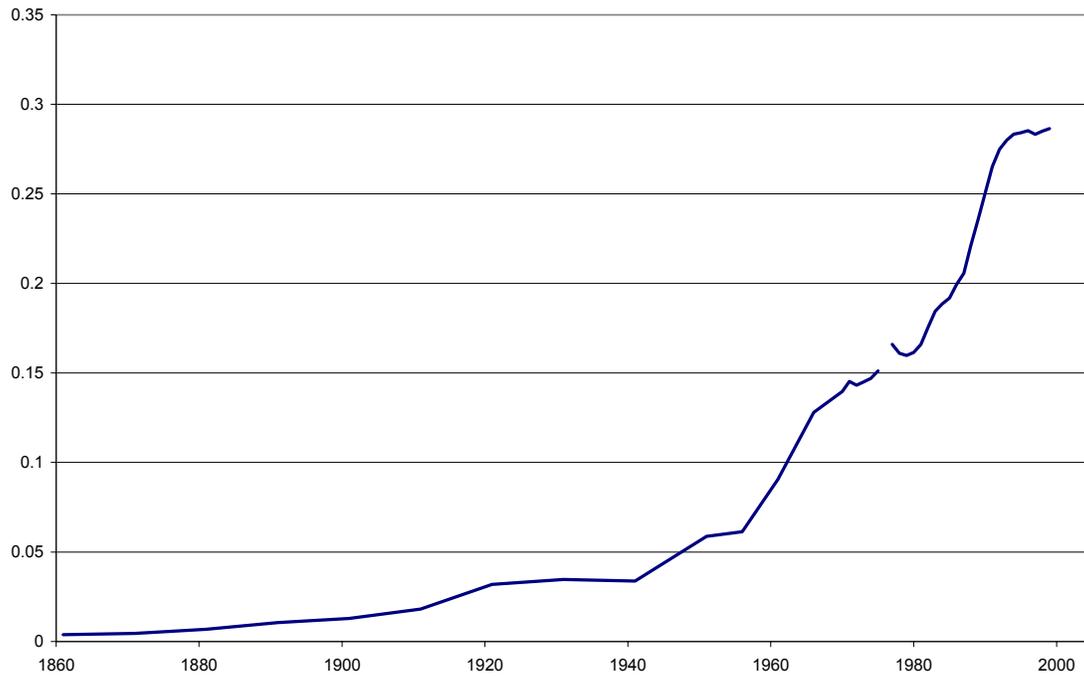
⁵ Figure 5.2, CAUT Almanac of Post-Secondary Education in Canada, 2003.

to less than 0.04 in 1940. From 1940 to 1956 the ratio increased to 0.06. By 1970, the ratio had increased to 0.14. From 1970 to 1980, the ratio only increased by 0.02 to 0.16, thus enrolment increases in this decade were largely a function of the baby boom cohort entering the traditional ages for attending university. From 1980 to 1990 the ratio of enrolment to 20-24 year old population increased by 0.09 to 0.25 but from 1990 to 2000 only increased by 0.04 to 0.29. Another notable feature of the growth of full-time university undergraduate enrolments is lack of change in the age group that has gone to university. The highest participation rates in university education are amongst Canadians aged 20-24. Thus the growth of enrolment reflects the choices, behaviors and opportunities for this age group as opposed to changing behaviors, choices and opportunities of Canadians over the life-cycle.⁶

Within the 20-24 year old age group, a notable development over the last half century has been the increasing proportion of females choosing to pursue university education to the point that since 1988, females represent a larger share of undergraduate enrolment than males (Easton 2002). Although the rising proportion of women in full-time undergraduate enrolment has been increasing for the last century, it is the post 1960 expansion in participation that is the remarkable development. In 1911, female enrolment to male enrolment was 0.25 and by 1950 the ratio had reached 0.28, and by 1960 it reached 0.33. By 1970, the ratio was 0.58 and by 1977 it was 0.8. In 1988 there were as many females as males enrolled in full-time university undergraduate study in Canada and in 1999/2000, the ratio of female students to male students is 1.25.

⁶ Figure 5.2, CAUT Almanac of Post-Secondary Education in Canada, 2003.

Figure 2: Full-Time University Enrolment to Population Aged 20-24, 1861-2001



The baby boom generation with its sheer size also resulted in increases in enrolment, but as the peak of the baby boom entered university around 1979, university enrolments were expected to plateau, if not fall, through the 1980s. Foot and Stoffman (1996) argue that increased participation of Canadians over age 25 in university education fuelled the growth of enrolments in the late 1980s and early 1990s. Thus, through the 1980s as the traditional supply of 19-24 year olds declined in Canada, entrance standards fell and competition to attract students increased. Foot and Stoffman contend that baby boomers facing a bottleneck in traditional career ladders returned to university to retrain for new labour market opportunities, though this was largely increasing part-time post-secondary enrolment and graduate program enrolments.

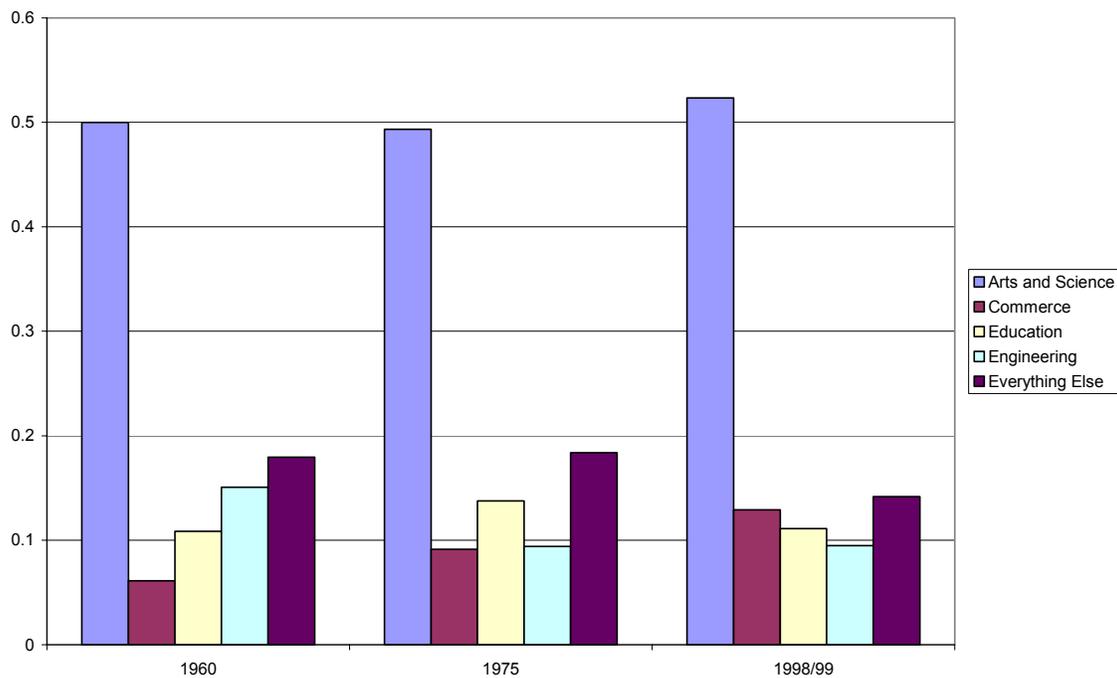
Figure 3 shows that while the size of University undergraduate enrolments has increased enormously, the general education remains the largest function of universities.⁷ In 1960, half of enrolment was in Arts and Science and by the end of the century, half of total university enrolment was still in Arts and Science. The only discernible shifts in enrolment patterns over the last 40 years have been the relative rise of enrolment in commerce and business administration, and the decline in enrolment shares of Education, Engineering and everything else that universities teach.⁸ To see such stability in the distribution of enrolment over 40 years of dramatic changes in Canadian labour markets may be one reason that what universities do has come into question. In particular, in the 1990s many observers argued that universities needed to re-orient towards training graduates to have tangible, specialized educations to match up with labour market needs. Allen (1998) describes the view that emerged in Canada in the 1990s that university programs in the humanities and social sciences were irrelevant for success in the global economy because graduates of these programs lacked necessary “specific skills” to find jobs. Thus, the general education that dominated the function of Canadian universities specialized in was seen to be obsolete and impractical for the contemporary labour market. Foot and Stoffman (1996, 155) suggest that by the mid-1980s, many younger Canadians chose not to attend university due to a combination of higher fees and possibly

⁷ Data for enrolments by field are from Historical Statistics of Canada for 1960 and 1975. The data for 1998/99 are from the 2003 CAUT Almanac of Post-Secondary Education in Canada. Arts and Science includes enrolment in Bio-sciences (excluding Agricultural Science, Veterinary Science, and Household Science), Arts and Science, Humanities (excluding Religious Studies and Theology), Math and Physical Sciences and Social Sciences (excluding Commerce and Business Administration and Law). “Everything Else” includes Fine Arts, Health Sciences (including medicine), Household Science, Law, Religion and Theology and Veterinary Medicine.

⁸ While the distribution of undergraduate enrolments has not changed a great deal, one important change over the last 40 years has been the growth of graduate student enrolment relative to undergraduate enrolment. In 1998-1999, graduate program enrolment represented less than 14% of total university full-time equivalent enrolment (CAUT Almanac 2003, Table 5.3).

“because they doubt that a degree will help much on the job market.” Allen (1998) notes that the policy implications of these perspectives was that money would be better spent on technical and vocational training programs, or other university programs that taught specific, relevant skills to students.

Figure 3: Proportion of Total University Enrolment by Field, 1960, 1975 and 1998/99



The Labour Market for University Graduates over the Long Run

Why did participation in post-secondary education increase so dramatically after World War II, particularly after 1960? World War II and the launch of Sputnik in 1957 are often given as explanations for some of the expansion of the university system (Owram 1996, Laidler 2002). In particular, the government support for returned veterans from the War to attend University reduced the cost of doing so, and Sputnik raised the perceived

benefit to Canadian society of having a highly educated workforce, particularly in science and engineering. But, as shown in the previous diagram, whatever impact World War II or Sputnik had paled in comparison to what happened after 1960.

Up until World War I, agricultural employment was the dominant activity for Canadian workers, but the share of employment in agriculture had been declining since the nineteenth century. In the 1950s, strong employment growth in the area of resource extraction and resource processing, in particular, pulp and paper, oil and gas, and other minerals was driven by export demands in the United States. By the late 1950s, however, technological change in forestry and mining reduced labour needs in the primary sector. By the 1960s, the share of total employment in primary industries was declining, while the service sectors had a rapidly growing share of total employment (Norrie, Owram and Emery 2002).

Owram (1996, 179) identifies the expansion of white-collar positions in administration, finance and in the public sector between 1950 and 1980 as the trend behind the increased participation of Canadians in university education. Canada needed more teachers, civil servants, nurses, doctors and bankers, and university education was increasingly a pre-requisite for obtaining employment in these occupations.⁹ Owram also argues that most of the emerging white collar jobs required a general education in arts and science as opposed to being for specialists. The existence of a post-1960 relative demand shift is not in itself a complete explanation as it is not obvious why a University degree became a necessary credential for obtaining these jobs. Barber (1962) noted that a relative demand shift towards white collar employment in favour of skilled, or more

⁹ Owram (1996) cites that the number of government workers rose from 318,000 in 1951 to 710,000 in 1971. Similarly, the number of teachers in 1951 was 153,000 but over 250,000 by 1971.

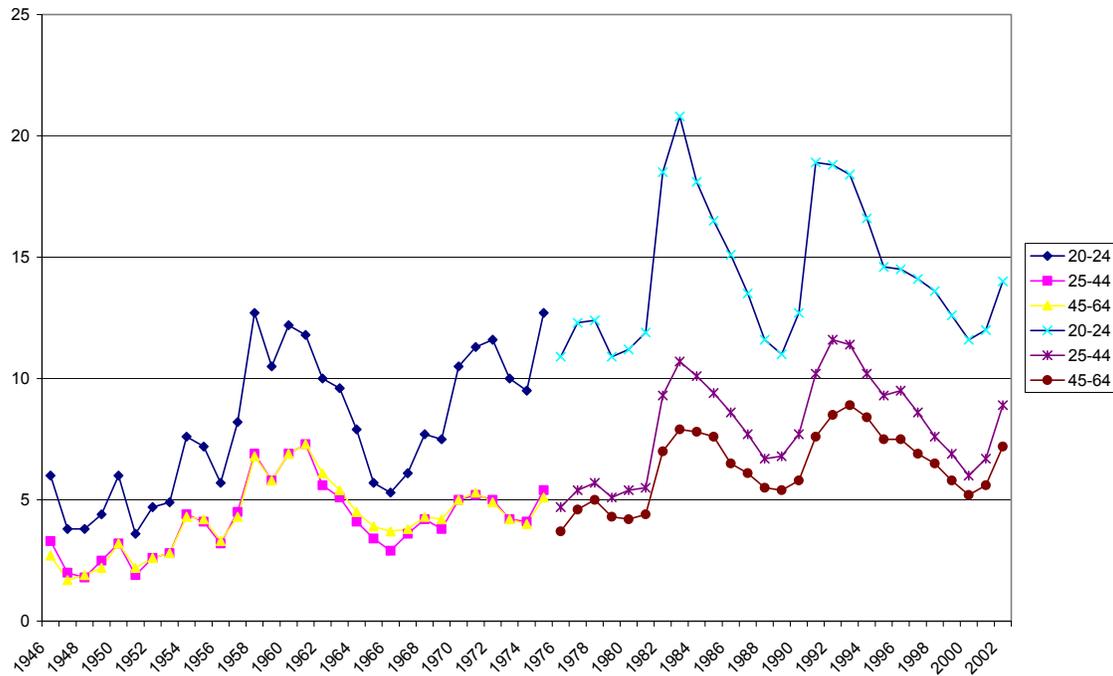
highly educated, workers was put forward as a cause for the rising unemployment rate in Canada in the late 1950s, as it was observed that many of the unemployed workers did not have the necessary skills or education. Barber argues that the largest increases in employment since 1949 were in the skilled, professional white collar occupations, but the skill requirement to “wear a white collar” was far from clear. If the relative demand shift was a full explanation, then university enrolments should have taken off after 1949, not 1958. It must be the case that higher education levels were required over time to obtain white collar employment. Thus, some of the rise of university education must have been due to employers upgrading the educational requirements of their workforce.

Figure 4 shows the effects of the changes in the Canadian labour market as reflected in unemployment rates of 20-24 year olds and workers over 24. While 20-24 year olds have always had higher unemployment rates than older age group workers, from 1946 to 1958, the gap was not large and overall measured unemployment was low. Strong employment opportunities were driven by exports of minerals, particularly oil and gas, and pulp and paper, and the coincident investment boom.¹⁰ The 1958 recession coincided with the end of this investment boom and unemployment increased, particularly for 20-24 year olds. Unemployment rates for workers over age 24 returned to a “normal” level of 5% by the early 1960s, but for 20-24 year olds, unemployment rates were generally double that and stubbornly high. The next notable change in the unemployment rates was during the 1982 recession when all age groups experienced large increases in measured unemployment, but for 20-24 year olds the unemployment rate reached 20% in 1983. Similarly in the early 1990s, Canadians of traditional

¹⁰ During the 1950s, gas and oil pipelines, the St. Lawrence seaway that the TransCanada Highway were notable projects during this boom (Norrie, Owrarn and Emery (2002).

university attendance age faced high unemployment rates. Thus, by the early 1960s, the opportunity cost of attending university for young Canadian workers fell.

Figure 4: Unemployment Rates by age group, 1946-2002



While there was clearly improvements in employment prospects for university educated males in the 1960s, by the 1970s a perception emerged that employment prospects of university educated workers were declining, possibly due to an over-supply of university educated workers. The Canadian workforce after 1970 was thought to be increasingly “over-educated” relative to labour market needs. For example, Statistics Canada in 1980 noted that while the less educated had always had more severe employment problems than the highly educated, “rapid expansion of the supply of highly educated job-seekers could affect this relationship.” (Cat. 81-570E Occasional, page 168) It was also argued

that over-expansion of university education, or over-education of workers, resulted in the situation that many university graduates could not find work, or they were forced down the job-ladder to work in jobs that did not require a university education.¹¹

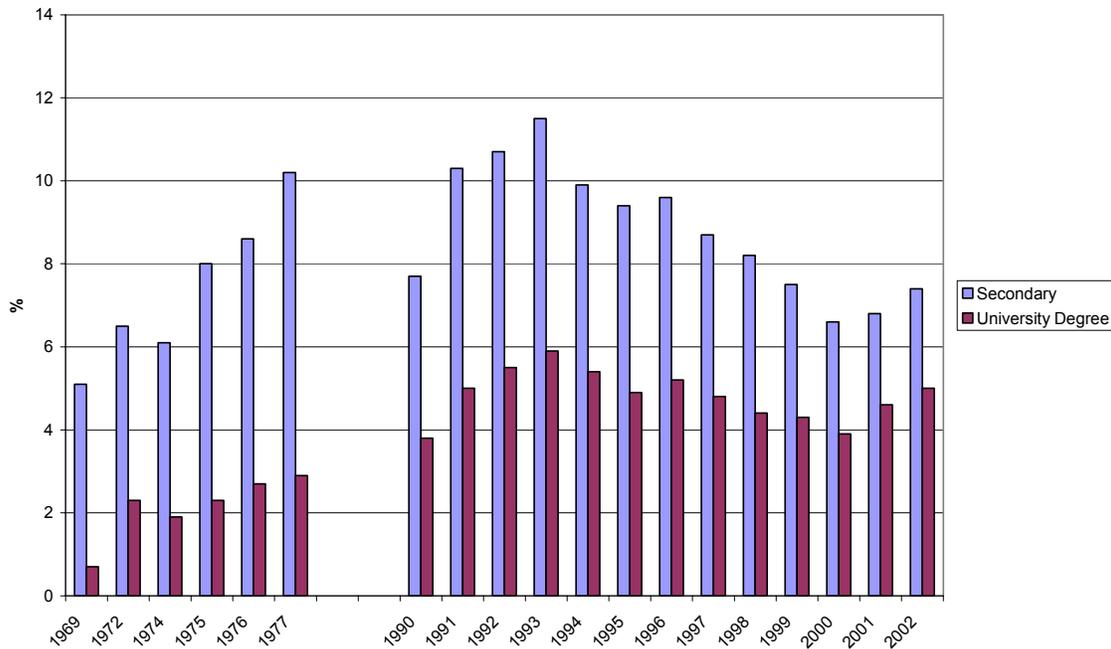
This has not turned out to be the case. Riddell and Sweetman (2000) argue that the increasing level of human capital investment of Canadian workers has been in response to relative shift in the demand for labour towards demand for highly educated workers. The body of evidence apparent in employment, unemployment and earnings outcomes overwhelmingly supports their view. While labour market conditions after 1970 worsened for all workers, they worsened by relatively less for university graduates. Allen (1998) finds that while the supply of university educated workers expanded, by the 1990s university educated workers have maintained their place on the occupational hierarchy, have had lower unemployment rates and higher earnings than less educated workers. Figure 5 shows that it is also the case that since at least 1969, university graduates have had lower unemployment rates than workers without university education (although the relative advantage for University Degree holders has been in decline since 1993).¹² As Allen notes, this is true for graduates of the Humanities and Social Sciences which suggests that general educations remain relevant. Allen concludes that the university system in Canada did not over-expand, and instead kept pace with the growth in demand for highly educated workers. Beaudry and Green (2000) show that since 1970 there has been a deterioration in employment outcomes for men in Canada with less than

¹¹ See Allen (1998, 13), Riddell and Sweetman (2000) and Davenport (2002) for discussions of this point of view.

¹² Unemployment rates are from Table V-8 “Spring Unemployment rate by educational level, Canada, 1969-77”, Statistics Canada, *Out of School – Into the Labour Force: Trend and Prospects for enrolment, school leavers and the labour force in Canada – The 1960s through the 1980s* (Catalogue Number 81-570E Occasional, 1978), and Cansim V2582457 and V2582460.

a university education, while for university educated men, once cyclical effects are controlled for, there has been no deterioration in employment prospects.¹³

Figure 5: Unemployment Rates for Workers with Secondary Education and University Degrees, 1969-1977 and 1990-2002



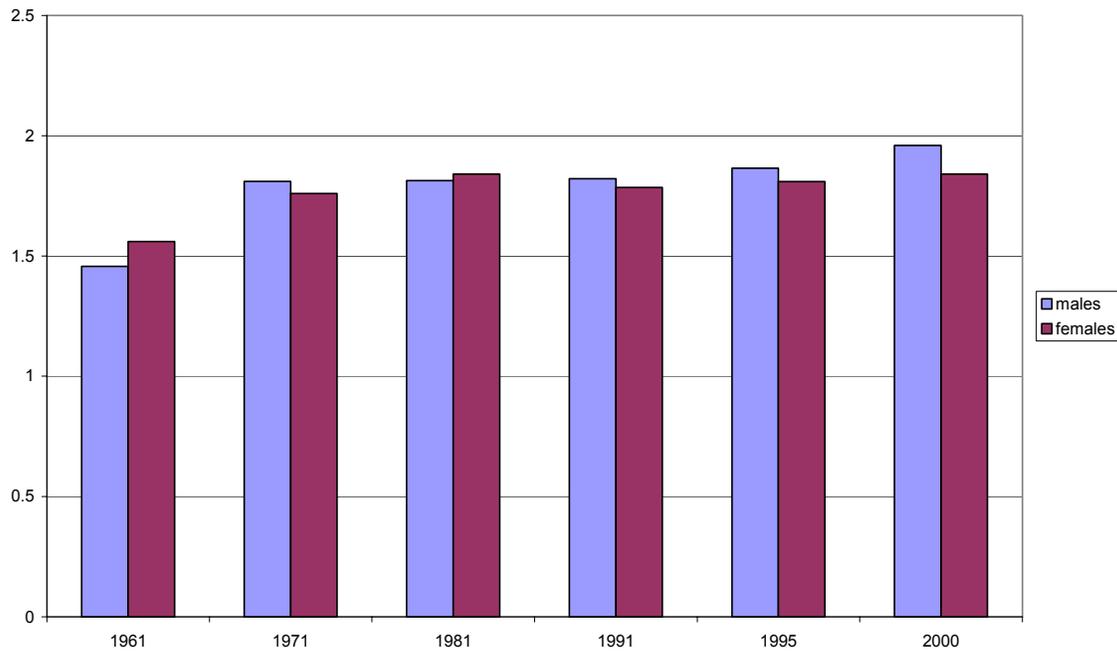
Despite the large expansion in the Canadian workforce with university education, with the exception of the first half of the 1970s, there has been no decline in the earnings premium of males with university degrees over males with high school diplomas (Dooley 1986, Riddell and Sweetman 2000, Bar-Or, Burbidge, Magee and Robb 1995, and Burbidge Magee and Robb 2002). Census earnings data for 1961, 1971, 1981, 1991, 1995 and 2000 suggest that the “education premium” associated with a university degree increased from 1961 to 1971 but has been stable since (See figure 6). There are several other studies that look at ratios of weekly earnings from the Survey of Consumer

¹³ Beaudry and Green find no evidence of increased work instability for females generally, thus, the changes in the Canadian labour market since the 1950s have largely impacted Canadian males with high school education or less.

Finance, the Labour Force Survey and the SLID that reveal the same overall behaviour of the education premium. Bar-Or, Burbidge, Magee and Robb (1995) find that the ratio of median weekly earnings of males aged 25-64 with a university degree to the median weekly earnings of males in the same age group with a high school education fell from over 1.35 in 1971 to 1.3 in 1977. The ratio increased to over 1.35 in 1981 and it remained between 1.35 and 1.4 to 1991. For females, the ratio of median earnings for university and high school educated females was 1.7 in 1971, fell to 1.55 in 1975 and then trended towards 1.65 in 1990. Burbidge, Magee and Robb (2002) look at the ratio of weekly earnings of the university and high school educated in Canada for the period 1981 to 2001 and find that for males the ratio has remained between 1.35 and 1.4 for the entire period. For females, the earnings ratio has declined from 1.65 in 1981 to 1.5 in 2001.

The studies of the education premium are informative for understanding the relatively large increase in female participation in university education. As Easton (2002) shows, the returns to university education have been persistently higher for females than for males but it would appear that the growth of the supply of female workers with university education is starting to reduce the education premium towards that observed for males. With the exception of the first half of the 1970s, there does not appear to be any problem of with the growth of supply of highly educated workers exceeding the growth in demand for them. It would appear that the expansion of enrolment in universities, even with its orientation towards “general education” has matched the growth of labour market demands. It is also worth noting that the education premium since 1970 has been much higher than it was in 1960 prior to the expansion.

Figure 6: Ratio of Average Annual Earnings of Workers with University Degree to Workers with Completed High School, 1961-2001, Census Data



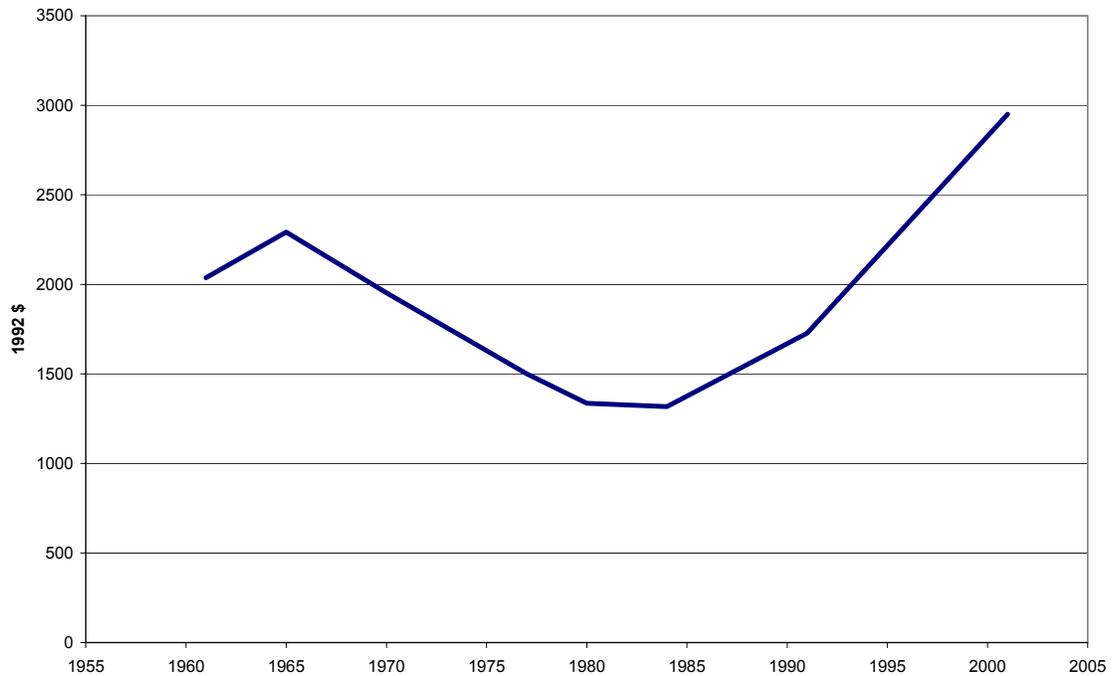
While it is clear that the Canadian labour market has increasingly demanded workers with higher levels of education since 1960, there is still the issue of the resource cost of investment in university education, and whether the benefits of the educational investment justify the allocation of resources towards university education. It may be that education premium is stable but it is at too low a level given the cost to society of educating the workers; earnings of university graduates may be higher than those of high school graduates but is the gain in productivity enough to justify the investment of resources in those workers?

Figure 7 shows that the real cost of tuition fell to its historic lows in the mid-1980s and they have since climbed to historic highs by 2001.¹⁴ The ratio of fee revenues

¹⁴ Data for Figure 7 from Dominion of Bureau Statistics *University Student Expenditure and Income in Canada 1961-62*, Cat: 81-520 Occasional; *Tuition and Living Costs at Canadian Degree-Granting Universities and Colleges* Cat: 81-219 for 1965-66 to 1970-71; Statistics Canada, *Tuition and Living Accommodation Costs at Canadian Universities* Cat: 81-219, 1993-94; Canadian Education Statistics

to total university operating expenditures is less today than it was in 1960 (Figure 8), but this is largely explained by relatively low operating expenditures of Universities before 1960 (Figure 9).¹⁵ Resources per university student increased until the early 1980s but have declined since that time.

Figure 7: Average Tuition fees in 1992 \$ 1961 to 2001



Council, *A Statistical Portrait of Education at the University Level in Canada* Cat: 81-579-XPB; and *CAUT Almanac of Post-Secondary Education in Canada 2003*. For a detailed tuition fee picture, see Figure 5.4 in the CAUT Almanac that shows Average Annual Cost of University Tuition in Canada (2001\$), 1972-2002 for 5 different degree categories.

¹⁵ Data for Figures 8 and 9 from Statistics Canada, *Historical Compendium of Education Statistics From Confederation to 1972* Cat. 81-568 Occasional; Canadian Education Statistics Council, *A Statistical Portrait of Education at the University Level in Canada* Cat: 81-579-XPB

Figure 8: Tuition Fee Revenue as a Share of Total Operating Expenditures, 1951-2001

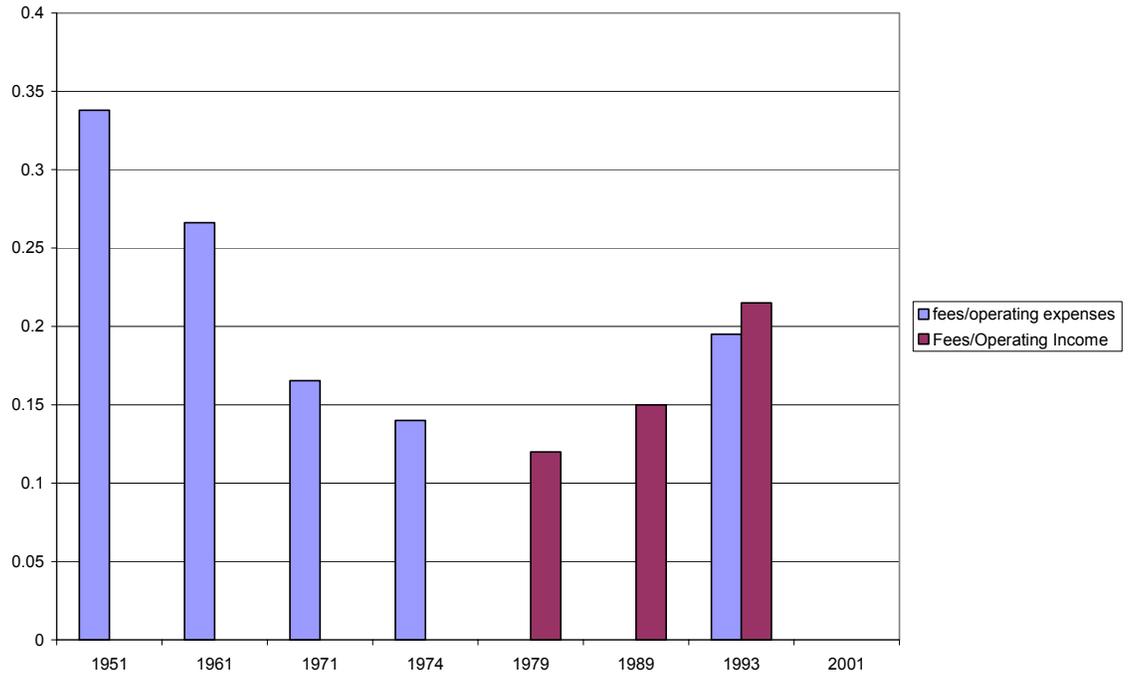
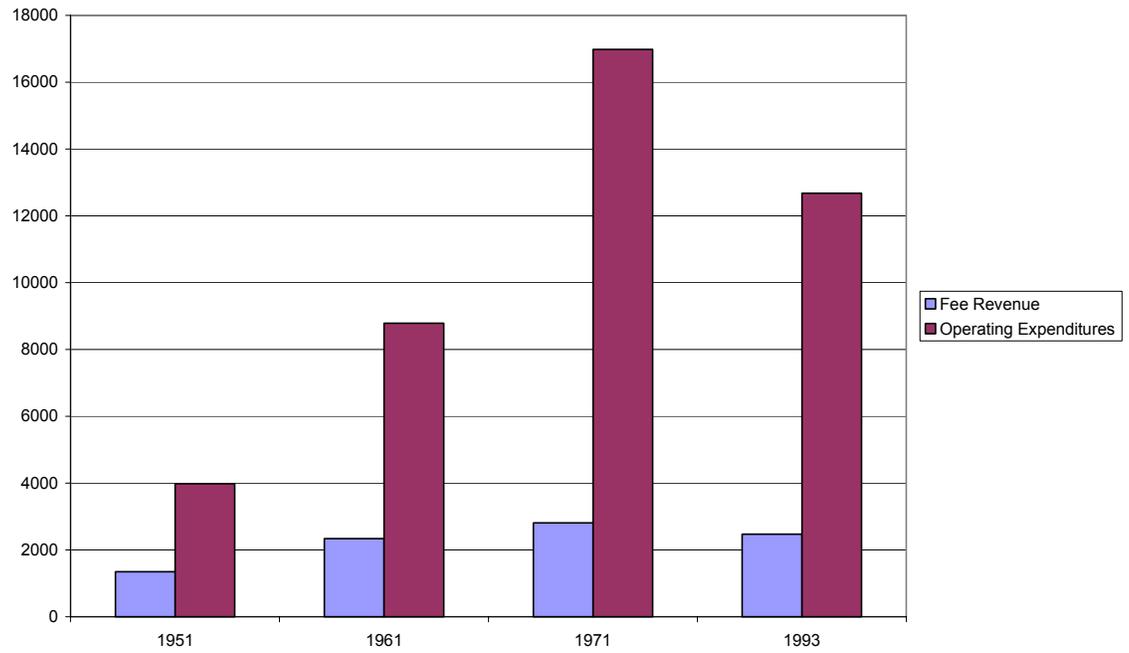


Figure 9: Total Operating Expenditures per Full-Time Post-Secondary Student, 1951, 1961, 1971 and 1993 (Constant 1992 \$)



Operating expenditures per student increased from 1960 a peak in 1978, after which time growth in enrolment outpaced the expansion in university revenues. Between 1977 and 1993 General operating expenditures per Full-Time Equivalent Enrollee in universities fell from \$13,500 to \$11,000 (Constant 1993 Dollars).¹⁶ While tuition fees have risen since the mid-1980s, the increased fee revenue has not offset the lack of growth, and in many cases, reductions in the values of grants to universities from the provincial governments.¹⁷ Davenport (2002) shows that in 1998, public funding per student (in constant dollars) was 70% of its 1980 level. From 1980 to 1985 the decline in per student public funding to 90% of its 1980 value reflected enrolment growth outpacing the growth of government funding. After 1990, the precipitous drop in per student resources from public sources reflected dramatic reductions in provincial operating grants to universities.

What is not clear is whether the real level of resources to universities and post-secondary education should be restored to 1970s levels, be maintained at current levels or reduced back to 1960 levels. While faculty of universities and students may complain about lower resources that result in larger classes, higher tuition and stagnant salaries, Canada allocates a higher share of resources to formal education than other OECD countries and has one of the most highly educated workforces in the world. Thus it may be that Canada is investing too many resources in post-secondary education. Riddell and Sweetman (2000, 87) show that in 1994, Canada's expenditures on education represented 7.2% of GDP compared to the OECD average of 6.3% of GDP. Public sector spending

¹⁶ Chart C6 "Index of General Operating Expenditures and Full-Time Equivalent (FTE) Enrolments and General Operating Expenditures per FTE, Constant 1993 Dollars, Canada, 1977-1993", Canadian Education Statistics Council, *A Statistical Portrait of Education at the University Level in Canada* (Ottawa: Statistics Canada, 1996), Cat. 81-579-XPB.

¹⁷ Davenport (2002), CAUT (2003).

on education was 6.7% of GDP compared to the OECD average of 5.2%. As the US is often Canada's most common comparator, Riddell and Sweetman show that the US spends 6.8% of GDP on education, but public sector spending on education only amounts to 4.9% of GDP. On the other hand, while the share of GDP that Canada expends on education and the reliance on public sector resources are high, the level of resources per student is considerably lower than in post-secondary education in the US (Riddell and Sweetman 2000, Davenport 2002). In 1994, the US had post-secondary expenditures per student of \$16,262 (USD) compared to Canada's \$11,471 (USD). The US also has a higher proportion of its population with a university degree (25%) than Canada (17%). Thus, it is not clear if Canada should be allocating fewer resources to formal education to be more in line with the rest of the OECD, or increasing the resources to post-secondary education to keep up with the world's leading economy, the US. What we really need to know is whether the rate of return to resources allocated to post-secondary education is high enough to warrant the allocation of more resources to education, or low relative to the alternative uses of the funds, that resources should be re-allocated away from universities to other purposes.

The returns to University undergraduate education, 1960-2000

In this section, I examine the trends in published rates of return to Bachelor's degrees over the period 1960-2000. Bachelor's degree enrolment, and full-time enrolment in particular, constitutes the largest part of post-secondary education in Canada and from a policy perspective, it is the component of post-secondary education that is being questioned a socially worthwhile investment.

Rates of return to university education are measured by “internal rates of return” (IRR) associated with the investment in the education. The IRR compares the stream of benefits from investment in education to the stream of costs from the time that the investment begins to the time at which the degree holder is assumed to retire. The IRR is determined by using the following:

$$\text{IRR} = r^* \text{ such that } \sum_{t=1}^n \frac{(B_t - C_t)}{(1 + r^*)^t} = 0$$

In the literature on returns to university education, there are two general types of IRR calculated; *private rates of return* accruing to the individual receiving the degree, and the *total (or social) rate of return*, that values the increase in GDP (assuming that workers increase in income reflects an increase in the value of the marginal product of labour) relative to the resource cost of the education. Typically, for the *private rate of return*, after tax incomes of a representative university degree holder are the B_t stream, and the foregone earnings of a representative high school graduate, and the costs of tuition and books incurred while in university are included in the C_t stream.¹⁸ For *total/social rates of return*, the before tax incomes of a representative university degree holder provide the B_t stream, and measures of the resources allocated towards teaching an individual while in university plus the foregone before tax earnings of a representative high school graduate provide the C_t stream. The resources allocated to teaching an individual student are often proxied by an estimated share of university operating expenses that goes toward teaching and allocated on a per student basis. For the total rate of return, tax incidence

¹⁸ It is also possible to adjust incomes to account for the benefits of non-wage/fringe benefits. The incomes used typically correspond to workers who worked full-year and full-time.

and tuition fees are irrelevant to the calculation since they apportion the benefits and costs between the individual student and society.

These IRRs are “risk free” rates of return since they typically do not incorporate unemployment, mortality, child-bearing or health risks that may interrupt a worker’s time in the labour force.¹⁹ For married females, the assumption that the working careers will be uninterrupted from ages 23 to 65 is not a particularly good one to make and may lead to unrealistically high calculated IRRs. As cross-sectional earnings data are used to construct age-earnings profiles for the calculations, it is also a maintained assumption that there is no expected productivity growth (general increases in real wages in the economy), and as inflation does not influence the cross-sectional calculation, the IRRs are interpreted real annual rates of return to the investment.

Figure 10 presents the estimated total rates of return to university degrees from 21 studies published between 1968 and 2002 plotted against the year for which they were calculated.²⁰ Figure 11 presents the estimated private rates of return to university degrees from the same studies. The figures demonstrate many of the conclusions about investment in university education. First, both the private and total rates of return to university education are high for the entire 1960 to 2000 period, with private rates of return typically being over 10% and social rates of return over 6%. Second, there appears to have been some reduction in the rates of return to university education in the late

¹⁹ Calculations by the author show that if the gap in unemployment rates between high school graduates and university degree holders is 6 percentage points as was the case in 1981, then the IRR adjusted for this gap will be 1.4 percentage points higher than the risk free rate.

²⁰ Some data points on the figures correspond to estimates for males and females from the same study. Where studies reported rates of return by specific bachelor’s degree programs, shares of total enrolments in those programs in Canada were used to calculate an “average rate of return” to correspond to a general “Bachelor’s” degree. Some studies report rates of return for specific provinces as opposed to Canada.

1970s and early 1980s, but by 1985, the rates of return resumed their high levels of the 1960s and 1970s.

Figure 10: Total returns to Bachelor's degrees, 1960 to 1995

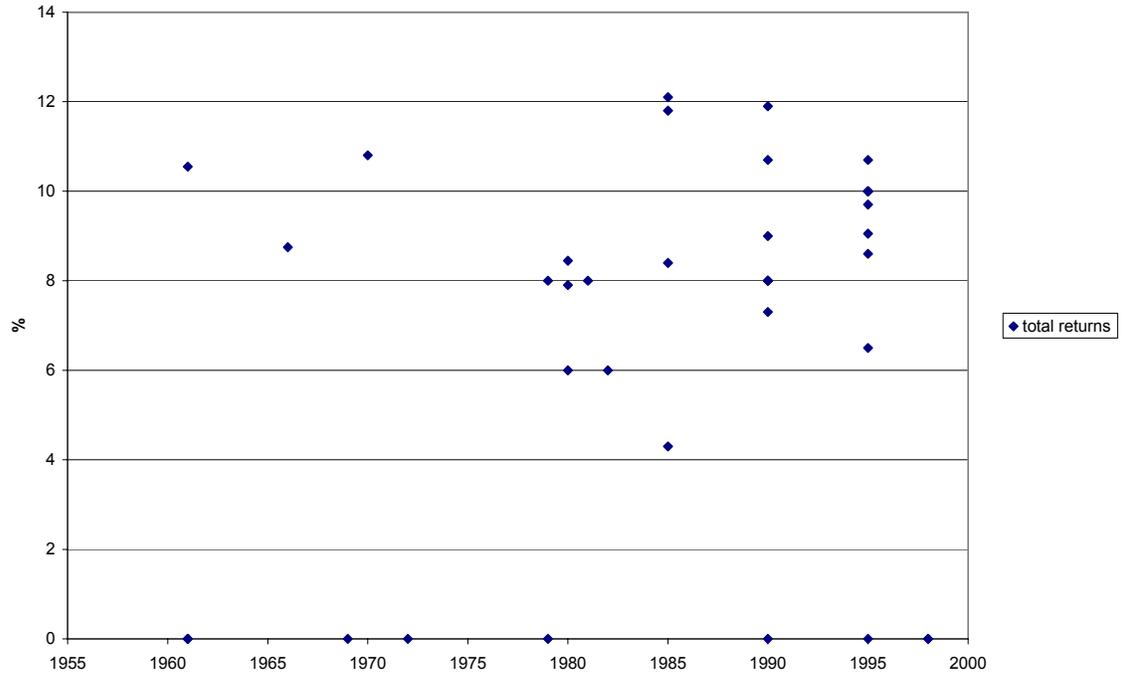
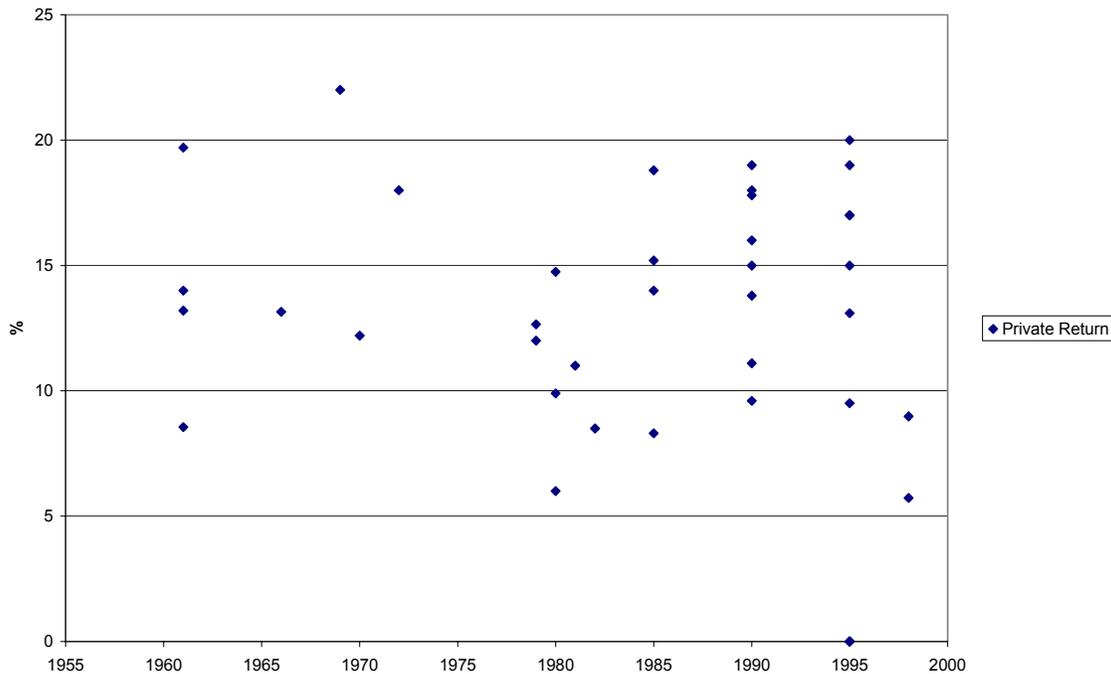


Figure 11: Private Returns to Bachelor's Degrees from Literature, 1960-1998



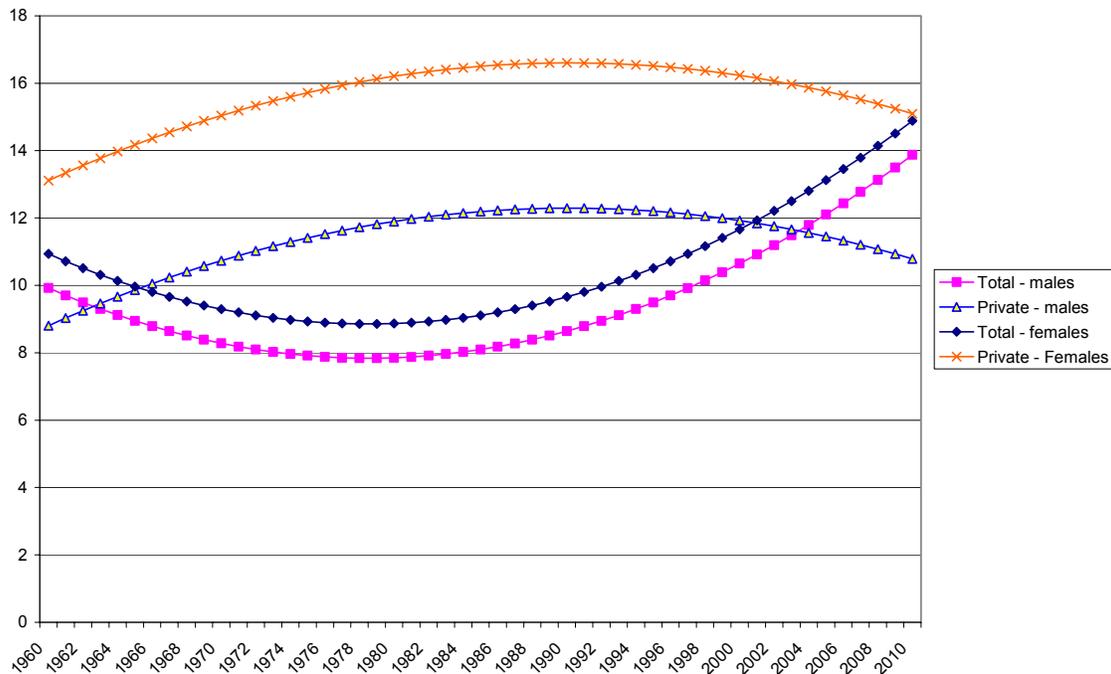
Typically the estimates presented in Figures 10 and 11 are presented as a defense of continued investment in university education in the sense that they are used to address the perception that the returns have been falling over time, and may have declined to levels at which it makes little sense to continue investing in university education. What has not been established is the long run trends for the total and private rates of return to university education, and what these trends may suggest about the likely rates of return in the future. To that end, I compiled a list of rates of return found in the literature and the characteristics of the studies (year published, for males/females/both, for Canada or a province, whether Census earnings data were used, and whether taxes were accounted for in the calculation of the private rates of return).²¹ Then the rates of return were regressed on the set of study characteristics to establish the expected rate of return by year for

²¹ The rates of return and study characteristics are largely from Vaillancourt (1995, Table 1) and Bourdeau-Primeau and Vaillancourt (2002, Table 1), supplemented with some other studies that they did not include in their surveys. The “data set” is presented in Appendix 1.

Canada and for males and for females. Time and time squared were included to account for any trends.

The fitted rates of return shown in Figure 12 highlight the declining total rates of return to university education after 1960 up until the mid-1980s. Even at the low point, however, in the late 1970s, for males the rate of return was above 7.8% and for females 8.8%. While total rates of return were at their lowest, the private rates of return were at their highest, when resources per student were high and the real cost of tuition was low. It is not difficult to see why policy makers perceived there was scope for students to pay more for their education and lower public expenditures on universities. By 2000, total rates of return are high and private rates of return have fallen by a two percentage points from their peak values of 12.3 and 16.6% in 1990.

Figure 12: Fitted Rates of Return to Bachelor's Degrees, Canada, 1960-2010



The higher rates of return for females is probably due in part to the upward bias associated with the assumption of full-time employment from the date of graduation to retirement, the higher education premium for females, and tax differences associated with income levels; note that foregone earnings are the same in the calculation of total and private returns so the only differences that can enter in are other costs. Social returns are expected to rise, while private rates are expected to fall, though remain in a range that Bachelor's degree represent a good investment.

The fitted private rates of return would seem to support the view that rising tuition fees, and consequently student debt loads, are eroding the incentive for Canadians to invest in university education at a time when the benefit to Canadian society from having them do so is rising. Stager (1996) finds that increasing the private share of the direct university teaching costs to 40%, via a doubling of tuition fees from \$1,950 to \$3,900, would reduce the private rate of return to bachelor's degrees by three percentage points. Rathje and Emery (2002) estimate that there is still considerable room for tuition fees to rise as it would take an increase of over \$10,000 in annual tuition fees for social science programs over the current levels to render a private rate of return of 4.25%.²²

Perhaps the most interesting implication of these changes in the total rates of return to Bachelor's degrees concerns what these finding suggest about whether more resources should be allocated to university education. As the earnings premium of university graduates has been stable since 1970, the changes in the total returns to bachelor's degrees are driven by changes in resource costs of education and potentially the distribution of who pays the cost. The total returns fell as the per student resources

²² Davenport (1996), Stager (1996) and Rathje and Emery (2002) also show that there is considerable scope for differentiating fees and fee increases by program.

increased and tuition fees fell. The private return increased in the 1970s despite a falling wage gap due to the falling costs for the individual. The reversal of the 1970s trends, with rising total returns and falling private returns arose from diminishing resources per student in universities and rising tuition fees, as earnings ratios of university degree holders to high school graduates have been stable through the 1980s and 1990s as shown above. Given the stability of the Bachelor's degree earnings premium, it would appear that Canadian labour market has not identified students educated in larger classes and with fewer resources as being less productive than earlier cohorts of university graduates. If anything, this suggests that earlier cohorts of university graduates were beneficiaries of unnecessarily high resources allocated to universities, and the squeeze on university funding since the 1980s has not had high social costs for Canadians.

What About “Other Post-Secondary” Programs?

Allen (1998) and Davenport (2002) describe how in the 1990s a belief emerged that a technical education at a community college or vocational school was more valuable than a university degree, particularly when the degree was in the humanities or social sciences. Full-time undergraduate university study accounts for 60 to 65 percent of total post-secondary enrolment in Canada today. In 1998, expenditures on University education accounted for 21% of total education spending in Canada and 49% of total post-secondary education expenditures. Expenditures on trade level education accounted for 32% of total post-secondary spending and community colleges accounted for 19%. Since 1993, total expenditures on community colleges in Canada increased 14% and trades level education had total expenditures increase by 41%. Over the same period,

total expenditures on university education increased by only 4%.²³ Thus, recent policy changes in Canada have directed resources to “other post-secondary” programs as opposed to University education, with the one caveat that many community colleges have expanded their university transfer programs and in some cases have evolved into Bachelor’s degree granting institutions. Perhaps what is most striking is the commitment of resources to training Canadians in Trades. This allocation of resources away from the general education of universities to training for specific skills reflects what Allen (1998) and Laidler (2002) identify as a declining belief in the relevance of university education in today’s labour market. Is this direction a desirable one for Canada’s post-secondary education system to take?

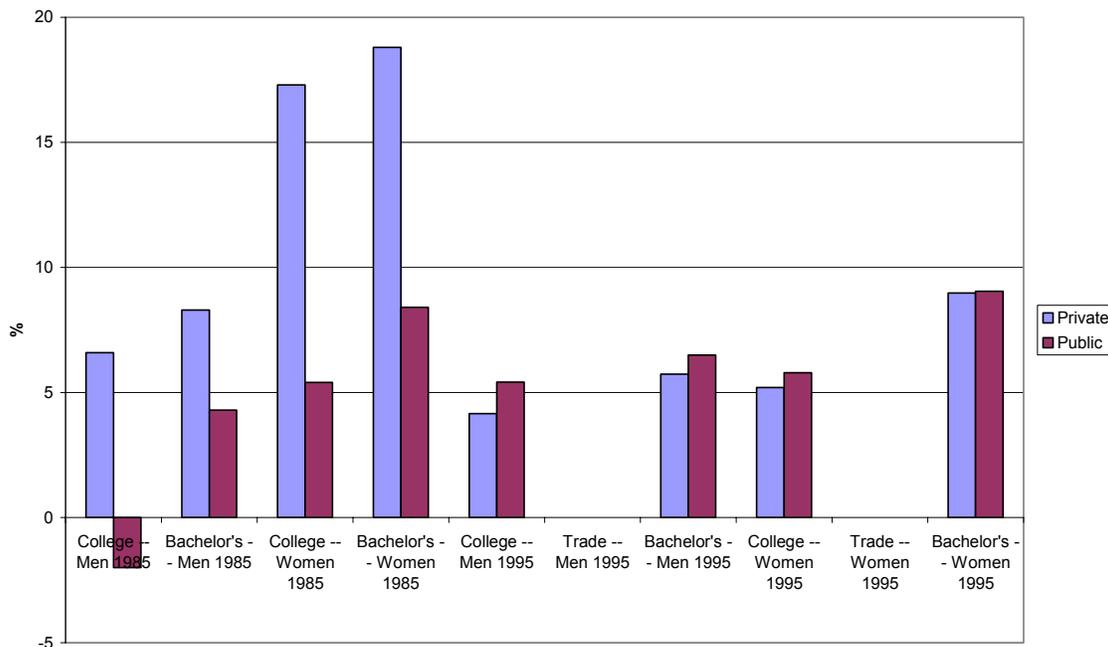
On the premise that incremental resources should be allocated to the use which yields the highest return, it would appear that the expansion of trades and community college education is not a socially efficient use of resources. Allen (1998) and Davenport (2002) show that earnings of university graduates, employment prospects and unemployment rates reflect superior labour market outcomes for university graduates over college diploma holders and trades people in Canada. Default rates on student loans are lower for universities than any other class of post-secondary institution. The picture emerges that there is an education based hierarchy in the Canadian labour market with high school leavers and graduates at the bottom and university degree holders at the top. College diploma holders and graduates of trade vocational schools sit in the middle of the hierarchy. While there has been a perception that the lofty position of university degree holders has declined, Allen (1998) shows that it has not. University graduates in the mid-1990s had far better labour market outcomes and status than any other education level.

²³ Statistics Canada, *Education in Canada, 2000* Cat. 81-229.

Whatever deterioration in the labour market for university degree holders occurred was less severe than the deterioration in labour market prospects for workers with other levels of education (other than graduate degree holders).

Two studies that estimate the rates of return to college diplomas, trades training and bachelor's degrees support the view that the highest returns for students and Canadian society arise from resources allocated to universities. Figure 12 summarizes the rates of return to college education, trades training and bachelor's degrees calculated by Vaillancourt (1995) for 1985 and Rathje (2000) for 1995. Both studies indicate that the private and "public" (total, social) rates of return to bachelor's degrees have exceeded other post-secondary education in 1985 and 1995 for males and females. Given the enormous expansion of resources towards trades training since 1993, Rathje's finding that the IRR for trades training were so large and negative as to be "undefined" should trouble policy makers. For the individual and society, the investment in these programs would appear not to be worthwhile. This could help to explain why the default rate of student loans was 30% in Ontario in 1996 and 1999 when the default rate for universities was 10% or less. These rates of return can also help explain why demand for university transfer programs have grown in community colleges over the last decade and why community colleges have been evolving towards traditional bachelor's degree institutions specializing in the humanities and social sciences programs. Both studies support Allen (1998) and Davenport (2002) who conclude that university education is considerably more valuable than that provided by colleges and vocational schools.

Figure 12: Public and Private Returns to College Diplomas and Bachelor's Degrees 1985 and 1995



What will happen to returns to university education in the future?

The previous forecast in rates of return maintained that the ratio of earnings of university degree holders to high school graduates would remain at their post 1980s levels. The post-1980 trends in rates of return were largely driven by changes in resources allocated to university education over time and changes in tuition fee levels. It could be that these forecasts are grossly optimistic and possibly grossly pessimistic depending on whether the earnings ratios change.

Canada is on the verge of a dramatic change in its labour supply as the workers of the baby boom generation reach the normal age of retirement. While there are reasons to believe that the labour force participation rates of baby boomers in their 60s will rise due to policy changes (e.g. increased age of eligibility for pension benefits), sluggish returns from capital markets, restructuring of work arrangements to accommodate preferences of

older workers, and possibly due to improved health status at higher ages, it is inevitable that the supply of labour in Canada will not grow to keep pace with the growth in labour demand. In all likelihood, this slower growth of labour supply will result in rising real wages paid for labour services (Emery and Rongve 1999, Scarth 2002, Merette 2002).

Merette (2002) is of the view that the demand for high human capital workers will accompany this development but it is not obvious that this will occur. The rate of return to investment in post-secondary education is driven by the opportunity cost of the training (the earnings of high school educated workers) and the direct (up-front) costs of the education. If Merette is correct, then the earnings premium of university graduates over high school graduates will rise and dominate any increases in education resource costs. On the other hand, if the relative rise in demand for labour increases wages for all skill/education levels, and if the resource costs of post-secondary education rise, then it is also possible that the rates of return to human capital will fall.

The two alternatives described above match up to the two alternative hypotheses for the rise of human capital formation in Canada after 1970 specified by Riddell and Sweetman (2000). In one case, university education is largely useful for helping employers choose between workers in ways that result in unnecessarily high education levels required for jobs. If this is the case, then as the baby boomers retire, the general labour scarcity will diminish the ability of employers to maintain their high requirements for education to fill the job due to the increased competition for workers. On the other hand, if the rise of participation in post-secondary education reflected the relative rise in demand for high education workers over lower education workers, then when the baby boomers retire, the premium of university graduate earnings over high school graduates'

earnings, then the returns to investment in post-secondary education should rise. Riddell and Sweetman come down on the side of the latter hypothesis and work by Beaudry and Green (2000) documents that employment opportunities for university graduates have been greater than for high school graduates and such conditions will likely persist.

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Appendix 1: Data for Regression for Figure 12

Author	year published	Year of returns	Private Return	total returns	Male	Female	both	not specified	Canada/province	Census data only	tax treatment
Podoluk	1968	1961	19.7	na	1	0	0	0	0	1	0
Stager	1968	1961	13.2	10.55	0	0	1	0	1	1	1
Dodge and Stager	1972	1966	13.15	8.75	1	0	0	0	0	0	0
Crean	1972	1961	8.55	na	0	0	1	0	0	1	1
Mehmet	1977	1961	14	na	0	0	1	0	0	1	0
Mehmet	1977	1969	22	na	0	0	1	0	0	0	0
Mehmet	1977	1972	18	na	0	0	1	0	0	1	0
Belanger and Lavallee	1980	1979	12	na	0	0	0	1	2	0	0
Cousineau	1984	1979	12.65	8	0	0	0	1	2	0	1
Vaillancourt and Henriques	1986	1981	11	8	1	0	0	0	0	0	1
Vaillancourt and Henriques	1986	1982	8.5	6	0	0	1	0	2	0	1
Cousineau and Vaillancourt	1987	1980	14.75	8.45	0	0	0	1	0	1	1
Vaillancourt, Carpentier and Henriques	1987	1980	6	6	1	0	0	0	0	1	1
Stager	1989	1985	14	12.1	1	0	0	0	1	1	1
Stager	1989	1985	15.2	11.8	0	1	0	0	1	1	1
?	1989	1970	12.2	10.8	1	0	0	0	1	1	1
?	1989	1980	9.9	7.9	1	0	0	0	1	1	1
Vaillancourt	1995	1985	8.3	4.3	1	0	0	0	0	1	1
Vaillancourt	1995	1985	18.8	8.4	0	1	0	0	0	1	1
Stager	1996	1990	13.8	10.7	1	0	0	0	1	1	1
Stager	1996	1990	17.8	11.9	0	1	0	0	1	1	1
Dickson, Milne and Murrell	1996	1990	9.6	7.3	0	0	1	0	3	1	1
Stager	1998	1995	13.1	9.7	1	0	0	0	1	1	1
Stager	1998	1995	19	10.7	0	1	0	0	1	1	1
Vaillancourt	1997	1990	15	9	1	0	0	0	0	1	1
Vaillancourt	1997	1990	18	8	0	1	0	0	0	1	1
Demers	2000	1990	11.1	na	0	0	0	1	2	1	1
Demers	2000	1995	9.5	na	0	0	0	1	2	1	1
Bourdeau-Primeau	1999	1995	17	10	1	0	0	0	0	1	1
Bourdeau-Primeau	1999	1995	15	10	0	1	0	0	0	1	1

Bourdeau-Primeau and Vaillancourt	2002	1990	16	8	1	0	0	0	0	1	1
Bourdeau-Primeau and Vaillancourt	2002	1990	19	8	0	1	0	0	0	1	1
Bourdeau-Primeau and Vaillancourt	2002	1995	17	10	1	0	0	0	0	1	1
Bourdeau-Primeau and Vaillancourt	2002	1995	20	10	0	1	0	0	0	1	1
Allen	1998	1995	na	8.6	0	0	1	0	0	0	0
Rathje and Emery	2002	1995	na	6.5	1	0	0	0	0	1	1
Rathje and Emery	2002	1995	na	9.05	0	1	0	0	0	1	1
Rathje and Emery	2002	1998	5.73	na	1	0	0	0	0	1	1
Rathje and Emery	2002	1998	8.98	na	0	1	0	0	0	1	1

Appendix 2: Regression Output