THE EMPLOYABILITY OF UNIVERSITY GRADUATES IN THE HUMANITIES, SOCIAL SCIENCES, AND EDUCATION: RECENT STATISTICAL EVIDENCE

by

Robert C. Allen

August, 1998

Discussion Paper No.: 98-15

DEPARTMENT OF ECONOMICS

THE UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER, CANADA V6T 1Z1

http://web.arts.ubc.ca./econ/

The Employability of University Graduates in the Humanities, Social Sciences, and Education: Recent Statistical Evidence

by

Robert C. Allen

Professor of Economics
University of British Columbia
Vancouver, B.C.
Canada V6T 1Z1

UBC Department of Economics Discussion Paper 98-15

Abstract

The paper analyzes the employment experience of people with different levels and types of education between 1970 and 1995. Particular attention is given humanities, social science, and education graduates. The do well when success is measured in terms of unemployment, earnings, and the social rate of return to their programs.

August, 1998

I. Introduction

Globalization and technological change are radically restructuring the Canadian economy. How Canadians should respond to this situation is a source of great concern. While many believe that advanced education is still a key to personal and national prosperity, there is deep uncertainty as to what form that education should take and, indeed, whether education remains as potent a source of wealth as it was in the past.

A particular concern is the proper balance between specialized skills training and general education, particularly in the humanities and social sciences. On the one hand, the new economy seems to require highly technical skills since it is based on the spread of computers and information technology throughout the work place. Perhaps the only way to a secure job in the future is through the study of university mathematics and engineering or the applied engineering skills taught in technical, vocational, and college programs. That way one can design, implement, and maintain the new computer systems. This view draws strength from newspaper allusions to unemployed Ph.D.'s and literature majors serving cappuccinos.

On the other hand, the new world economy is supposed to be one of flux and endless change. For how long will today's specific technical skills be relevant? What may be needed is a general education so that one can continue to master whatever new

skills come into vogue. Twenty years ago, the computer revolution put a premium on programming, and many people learned computer languages like Fortran, Cobol, and Basic. But today, those skills are wholely obsolete, made irrelevant by new software systems. Where have all the programmers gone?

Moreover, the economy consists of more than new technologies. The rapidly changing economy will require people to manage it and to think of creative solutions to new problems. Perhaps those solutions will require imagination beyond the technological. And if the new economy requires lifelong learning, it requires teachers. The faculties of humanities, sciences, social sciences, and education have been the route to that occupation, so perhaps the shift to the knowledge based economy will increase demand in those areas. The "information age" means that we are passing from an economy in which physical capital accumulation was the source of growth to one in which human capital is the key. The humanities, social sciences and education faculties open the door to the future since they train the teachers who impart that human capital needed for future prosperity.

This paper analyzes recent Statistics Canada survey data to gauge how the economy is changing and what kind of education is in demand. Section II discusses two theories about the new economic order. Section III analyzes trends in the supply and demand for university, college and high school education. It is

shown that demand has shifted strongly in favour of post-secondary credentials and university degrees in particular. Canada has been fortunate that its colleges and universities have been greatly enlarged in recent decades, for without that expansion, the country would have faced a serious shortage of people with post-secondary credentials. At the very least, the result would have been a surge in income inequality like that which has occurred in the United States, as employers bid against each other to hire scarce university graduates, while the wages of the less educated sank under the competition for the few available jobs.

Section IV concentrates on the experiences of humanities, social science, and education graduates vis-a-vis graduates in other fields and people with lower levels of education. It is shown that the labour market experiences of humanities, social science, and education graduates are generally quite favourable. They readily find jobs. A majority are also employed in managerial and professional occupations. Very few graduates work as waiters, bar maids, or the like. Humanities, social science, and education graduates generally earn high incomes.

Section V pursues the situation of graduates in various fields with more recent data. The 1995 Survey of 1990 Graduates provides information about the experience of recent university and college graduates in the mid1990s. The results look as

favourable as those for earlier years.

Section VI analyzes the experience of graduates in education, the humanities, and social sciences as an economic investment problem. The question is: Are their labour market outcomes good enough to warrant the expenditure of society's resources in their education? Estimates of the rate of return to investment in university programs are prepared. They indicate that the humanities, social sciences, and education not only pay their way, but are as profitable investments for Canada as are high technology programs like engineering. There is, consequently, an extremely strong economic case for funding university programs in the humanities, social sciences, and education.

II. The Growing Economic Demand for Advanced Education

There are two contending theories about the role of advanced education in the evolving world economy. I will call these theories the common view and the OECD model.

According to the common view, the new world economy is characterized by high unemployment and falling incomes due to globalization and the pressure of imports from low wage countries. The only way to get a job today is to exactly meet the needs of employers and that means having the specific skills they require at the moment of hiring. In the past--before globalization and high unemployment--a general education might have been

acceptable because employers could not be choosy in their hiring, as they can be today with hundreds of applicants for each job. The policy conclusions are clear: general academic programs like humanities, social sciences, and even natural sciences should be cut back, university resources should be concentrated on professional programs, and--more sweeping--one and two year college programs aimed at imparting specific skills should be expanded at the expense of university education.

This view has been endorsed by some official bodies--notably the B.C. Labour Force Development Board in its report Training for What?--and is pervasive in popular discussion. A recent poll in Ontario showed that 72% of adults think that technical or vocational training (rather than a university education) is the best preparation of the workforce of the future (Globe & Mail, 15 July, 1998, p. A6). This view is supported by stories of university graduates who are either unemployed or working as taxi drivers or enrolling in technical institutes to learn specific skills. However, labour force surveys show that these outcomes are not typical: Most university graduates, including those in education, the humanities, and social sciences, are employed at high salaries in managerial and professional jobs.

The second theory about the labour market is the OECD (Organization of Economic Co-operation and Development) model. The OECD is an important international organization whose views

are highly influential. According to the OECD model, the demand for labour in all industrialized countries has increased strongly for people with college or university educations and has declined for people with high school educations or less. According to the OECD, these changes in the demand for "human capital" reflect the twin processes of globalization and technological change.

The OECD view has important implications for the growth and distribution of income in Canada. So far as economic growth is concerned, the OECD view implies that post-secondary education should grow more rapidly than the economy as a whole in order to provide the increased number of graduates needed in the future. In economic terms, educational programs should be expanded if the social rate of return to that investment exceeds the interest rate. It will be shown later that social science, humanities, and education programs--as well as those in engineering and science--meet this condition.

The second implication of the OECD view is more paradoxical and concerns the distribution of income. In recent years, inequality has increased much more rapidly in the United States than in Canada. An important aspect of the rise in inequality in the USA has been a sharp rise in the earnings of university graduates relative to high school graduates. Indeed, this change in earnings is important evidence for the demand shifts that the OECD emphasizes. Canadian inequality has not risen nearly as

dramatically, and, in particular, the earnings premium of people with advanced education has not risen in this country as it has south of the border. The explanation is simple. Colleges and universities have expanded rapidly in Canada--indeed, more rapidly than in the United States--so the supply of people with advanced education has increased in pace with demand, while the supply of people with high school education or less has been cut back. These supply shifts have matched the demand changes and stabilized the income distribution. Indeed, simulations of labour demand, in which American demand patterns are imposed on the Canadian labour market show in detail that demand and supply have evolved in this way.[1]

This analysis of Canadian labour markets suggests three conclusions. First, the increase in the size of colleges and universities is important in maintaining equality in Canada. The issue is not simply one of equal access to people from all social backgrounds. Beyond that, the question is how the wages and salaries of people with different educational levels will move with respect to each other. Given a shift in demand toward educated labour, it is important to increase the supply of educated workers in order to protect the incomes of the less

---

[1]Kevin M. Murphy, W. Craig Riddell, Paul M. Romer, "Wages, Skills and Technology in the United States and Canada," in General Purpose Technologies and Economic Growth, ed. by Elhanan Helpman, Cambridge, MIT Press, forthcoming.

educated. Indeed, they have been prime beneficiaries of the expansion of Canada's colleges and university since, in the absence of that expansion, their incomes would have fallen significantly below today's levels.

Second, the Canadian post-secondary education system has been remarkably responsive to the needs of the economy. While it is often claimed that the system is rigid and resistant to change, it has reacted appropriately to the changing labour demand in the country. Indeed, the American system has been the slower to expand. Perhaps this is because more of the costs are thrown onto students and their families in the United States, and they are less able to afford them with the result that supply does not respond to demand.

Third, the OECD model makes no distinction between different fields of university study and contains no bias in favour of specific--as opposed to general--skills. Indeed, in the OECD framework, general skills are of great value since they help individuals to keep adjusting to a changing work environment throughout their lives. Of course, it is an empirical question whether the demand for humanities and social science graduates has kept pace with that of engineers and whether a humanities or education degree is still a good investment for Canada. The OECD model, however, would incline one to think the answers are yes.

III. Long run trends--experience of 25/29 year olds

The purpose of this paper is to assess the employability of university graduates in general and those in the humanities, social sciences, and education in particular by using social survey data. In this section, I am concerned with broad trends over long periods, so no distinctions are drawn between graduate and undergraduate degrees nor is any attempt made to compare the success of graduates in different fields of study. These questions will be pursued later.

In this section, I concentrate on the experience of Canadians between the ages of 25 and 29. This group has great advantages for charting the changing evolution of the labour force.

First, they are the new entrants to the work force. It takes a few years after leaving school for most people to settle into long term work. University graduates in their late twenties are forming these permanent attachments, while high school graduates have recently completed them. Since people in their twenties are new entrants, the labour market is at its most flexible, so shifts in demand patterns are most apparent for this age group.

Second, the experience of "generation X" has been a topic of ongoing public concern. People in their late twenties are having trouble establishing themselves economically, and the view that

university graduates cannot find good work is based on tales--actually tall tales, as we will see--of the experience of people of this age. So it is important to investigate their experience.

Third, a related question is whether today's young Canadians can expect to replicate the economic prosperity of their parents or whether they face more difficult times. Does the new world economy portend a more prosperous future for today's school leavers or do they face bleaker prospects than their parents? The only way to find out is to compare the experience of today's twenty year olds with that of earlier generations.

These questions will be explored using information from the Census of Canada and the Survey of Consumer Finances. All of the records from the public access microdata files for people from 25 to 29 have been analyzed for the Canadian censuses from 1971 to 1991. Much of this information (such as the income figures to be discussed) relate to the years preceding the censuses--1970, 1980, 1985, and 1990. Since microdata from the 1996 census are not yet available, comparable figures for 1995 have been constructed from the Survey of Consumer Finance covering that year. These sources do not use entirely consistent concepts and definitions, but it has been possible to adjust the data to mitigate these problems and allow long term comparisons.

One of the more striking features of the data is the

increase in educational attainment. Figures 1 and 2 show the percentages of 25-29 year olds with various educational credentials from 1970 to 1995. Over this period, the share of women in their late twenties with a high school diploma or less has dropped from 61.7% to 23.9%. At the same time, the fraction with a post-secondary certificate or diploma rose from 18.0% to 40.2%, while the percentage with a university degree increased from 9.3% to 26.8%. Men have achieved similar, although more modest, gains. Most of these increases in educational attainment occurred in the 1970s, but the trends have continued to the present producing the most highly educated group of young workers in Canadian history.

There is no doubt that employment has moved strongly in the direction of more highly educated workers, but why has the change occurred? The immediate explanation is that new colleges and universities were built over this period and existing ones increased their enrollments so that more students were educated. The increase in advanced education occurred because governments and students believed that the future evolution of the economy required highly educated workers (the OECD view of the world). The critics of this view contend, however, that expansion went too far, that so many educated people were produced that they either could not find jobs or that they were forced down the "job ladder" and took jobs that did not require their qualifications.

The data, however, strongly support the OECD view, as will be shown.

Unemployment rates provide the first test of these views (Table 1). The table makes two important points. First, unemployment rates have risen for all levels of educational attainment since 1970. Second, in every year shown in the table, university graduates had lower unemployment rates than any other group. This, indeed, is as near a universal finding as any in labour economics. It is particularly noteworthy that the employability of male university graduates has increased dramatically during the 1990s, and currently far exceeds that of men with less education. While all people in their late twenties have suffered in recent decades from weak Canadian macroeconomic performance--the popular concern about unemployment is not misplaced--the conclusion that university graduates have particular trouble finding jobs is refuted by all available labour market information.

But what kind of jobs do university graduates get? The rise of part time work has been a disturbing trend in recent years. Table 2 throws light on this issue by comparing the fraction of people working full time since 1970. For those without post-secondary credentials, there has been a marked shift to part time employment. There has been little significant movement in that direction for university graduates, however. Indeed, in most

years, a higher percentage of university graduates have had full time jobs than have people with less education.

Those who believe that universities are not relevant to the modern economy might respond that university graduates are, indeed, more desirable to employers than are people with less education. However, these critics might continue, the result is that university graduates are hired for work that could be satisfactorily performed by people with less education. As a result, the university education is wasted.

This view can be confronted with occupational and income data. Before looking at the evidence, however, it should be stressed that the view is based on a fallacy; namely, that there is a stable hierarchy of jobs for university graduates to slide down. In fact, the economy is changing rapidly creating new kinds of jobs while others are being destroyed. The main conclusion from looking at occupational and income data is that the supply of university graduates is keeping pace with the growth in their demand; they are not, in other words, working their way down the job ladder.

One way to see that the job ladder is changing (not static) is by tracking employment for broadly defined occupational classes. Table 3 contrasts the employment patterns of 25-29 year olds in 1980 and 1995. Managerial and professional jobs have increased their share the most, and that is the group that is

preeminently filled by university graduates. Service jobs have also increased their share of the total, while sales jobs have held their own, and clerical and blue collar jobs have declined in importance. If there had been a stable job ladder, these percentages would not have changed.

An examination of the jobs held by university graduates shows very little slippage in the quality of their jobs since 1980, although there was some downward drift in the 1970s (Table 4). In 1970, about 81% of university graduates aged 25-29 had managerial or professional jobs. That percentage dropped to 75% in 1980 and is now 71%. The fraction of university graduates holding clerical jobs also declined. These drops were matched by gains in sales and service jobs. The shift of employment in this direction is not a move down the skill ladder since many university graduates in sales and service make salaries considerably in excess of those made by people with less education. These very high paying sales and service jobs are probably connected with information and computer technologies as well as with corporate downsizing. When large firms contract out accounting, management or legal services, as they have in the recent past, the result is an increase in professional employment in the business service sector. The occupational data is inconsistent with any substantial movement down the job ladder, at least since 1980.

While instructive, the study of occupations is a blunt

instrument since the classification of jobs is so coarse--there are, after all, high level managers and low level managers, shoe salesmen and stock brokers. Income provides a finer measure of job quality--the higher the income, the better the job. Income also provides a purely economic way of formulating and testing the view that too many university graduates are being produced and are displacing people with less education from jobs they could perform. If that were so, then the greater employment of university graduates should be associated with a fall in their wage as they perform less skilled work. In other words, the increased supply of university trained labour could be absorbed by the labour market only by cutting the wage.

Figures 3 and 4 plots the relative wage of university graduates and of completers of trades, technical, and vocational programs. In both cases, the wage is expressed as the ratio of the post-secondary wage relative to the wage of a high school graduate. The figures point to two important conclusions. First, the relative increase in income from post-secondary education is much greater for women than it is for men. This point will be developed shortly. Second, university graduates have always earned more than people with less education. Moreover, there has been no decline in that premium; indeed, it may have advanced slightly. This finding is of cardinal import-ance, for it means that the labour market has not become over-

loaded with university graduates. It is true that their number has increased much more rapidly than that of people with less education. The fact that the labour market could absorb these graduates without a fall in their wage means that the demand for university graduates has increased as well. University graduates have not found jobs by working their way down the job ladder. The job ladder has changed and the demand for university graduates has grown as rapidly as their supply.

Not all is well in the job market for 25-29 year olds, however. We have already seen that unemployment has risen over time as has the incidence of part time work for those with less education. The income figures also paint a dispiriting picture. Table 5 shows the evolution of annual earnings since 1970. All figures are expressed in 1995 dollars for comparative purposes. From 1970 to 1980, there was a rise in real earnings for people in their late twenties. Since then, however, real earnings have fallen for all educational levels. For men, the decline has been 12%; for women, about 5%. In 1995, the average 25-29 year old man was doing only slightly better than his parents at the same age in 1970, and that meager advance was mainly due to the general rise in educational attainment since real earnings fell for most educational categories. The advance in average earnings for women, aged 25-29, was more substantial, and again it was due to a rise in the average level of education rather than to a rise

in earnings at each level of education. While the last twenty-five years have not been easy ones for young Canadians, too much university education has not been the problem. Indeed, the rise in college and university attendance has been the main factor offsetting the general tendency for income to fall.

The evidence reviewed here is consistent with two generalizations about the labour market experience of Canadians in their late twenties. First, as the OECD maintains, the demand for labour has fallen for those with a high school education or less while it has strongly increased for college and university graduates. The supply of people with post-secondary credentials has grown apace with the rise in their demand, so that relative wages have not changed. The income data are the strongest evidence for this conclusion, but it is also supported by the available information on occupation, unemployment, and full time work. The labour market evidence, in other words, contradicts the idea that there is an oversupply of university graduates and that they have obtained employment only by moving down the job ladder.

Second, the demand for labour in aggregate has grown less rapidly than the supply of people in their late twenties looking for work. The result has been a rise in unemployment, part time work, and falling real wages for all educational classes. University graduates have not been immune from these trends, but

the fact that people of all educational levels have suffered shows that the problems are not ones peculiar to university education.

IV. The Experience of Humanities and Social Science Graduates

While there can be little doubt that university graduates as a whole do well in the labour market, it is possible that success is confined to the graduates of professional programs, while the graduates of humanities, social science, education, or "academic" programs do poorly. These questions can be explored with the Census of Canada since it asks respondents their major field of study as well as the diploma or degree they have obtained. Microdata files from the 1996 census are not yet available, so I begin with the 1991 census. Since the labour market outcomes of university graduates as a whole have been improving in the 1990s, it is doubtful that any field's performance has declined in this period--an inference that will be confirmed in the next section.

Unemployment rates are important indicators of labour market success, and Table 6 shows unemployment rates for 25-29 year olds broken down by educational attainment and field of study. Generally, unemployment rates declined with the level of educational attainment with university graduates having lower rates than those who completed technical, vocational, or career programs.

There are enough graduates with bachelor degree to make reliable comparisons across fields of study, and those comparisons show that graduates in education, the humanities, and social sciences had no trouble finding jobs. Graduates in education had very low unemployment rates. Unemployment among social science graduates was about average for university graduates and similar to that of people with bachelor degrees in commerce. The unemployment rate of humanities graduates was about the same as that for people who had completed technical, career, and vocational programs and was less than that of people with bachelor degrees in the agricultural and biological sciences. Overall, the unemployment experience of the graduates in the humanities, social sciences, and education was about equal to the university average and was superior to that of people with trades, technical, and vocational courses.

There are far fewer 25-29 year olds with graduate degrees, and the small numbers involved introduce some erratic features into the comparisons. Not much significance should probably be attached to the high unemployment among women in engineering or mathematics and physical science, for instance, since fairly small numbers were involved. Allowing for such randomness, humanities and social science graduates had records close to the average.

Most of the humanities, social science, and education

graduates were also employed in managerial and professional jobs. Table 7 shows the proportion of men and women with these types of jobs in 1990. Clearly, the fraction of people in managerial and professional work increases dramatically with educational attainment and is highest for men and women with a graduate degrees. People with a bachelor degrees are far more likely to have a managerial or professional job than are their counterparts who completed technical, career, or vocational programs. Indeed, the managerial and professional work obtained by completers of those programs was narrowly circumscribed with many of the women being employed as nurses and many of the men in applied engineering jobs.

So far as university graduates were concerned, those with clearly defined professional training were most likely to place their graduates in managerial and professional jobs since the graduates of those programs usually entered the professions they had studied. This pattern is particularly marked for women in nursing and other health programs--where 95%-100% were working as professionals--and for engineering graduates where 80%-90% were similarly employed. The same pattern characterized education programs for most (about 80%) of their graduates became teachers.

Lower percentages of the graduates of less tightly focused programs became managers or professionals, but the fraction still

greatly exceeded the corresponding percentage for those completing career, technical, or vocational programs. Between 50% and 60% of the men and women with bachelor degrees in the humanities and social sciences worked in managerial and professional jobs, and the fractions increased substantially for those holding masters and Ph.D.'s. Indeed, the percentages of humanities and social science graduates holding managerial and professional jobs are not much different from those of people with commerce degrees. Many of the commerce, humanities, and social science graduates without managerial or professional jobs worked in sales where the high incomes they earned show that their university degrees paid off. Humanities and social science degrees have been especially important for women entering management--about half of those careers are based on a humanities or social science degree.

The graduates of humanities, social science, and education programs also did well when income is the standard of assessment. Tables 8 and 9 show average annual incomes for full-time employees with a broad range of educational attainments. A full assessment of the effects of education on earnings requires a consideration of incomes earned at all ages since income increases with age to a peak between 40 and 60 when it starts to decline. The rate of increase varies from program to program, so different rankings arise for different ages. In Tables 8 and 9,

incomes are given for age ranges to show lifetime career paths.

As noted earlier, income increases with education, and, in particular, university graduates earn more than high school graduates or the completers of trades, technical, career, or vocational programs. Tables 8 and 9 confirm that observation. For instance, Table 8 shows that women high school graduates in their twenties earned $22,795 per year, completers of post-secondary technical, career, and vocational programs earned $25,519, women with bachelor degrees earned $33,906, while women with graduate degrees realized $37,398.

This success was shared by graduates in the humanities, social sciences, and education. I first consider the experience of those with a bachelor degree. For women in their fifties, the earnings of university graduates varied little from field to field. Thus, the average graduate with a bachelor degree earned $46 thousand. If the degree was in education or the humanities (including fine arts), the average was also $46 thousand. In the social sciences the average was $47 thousand. In contrast, the average was $48 thousand in commerce, $44 thousand in agriculture and biology, $46-47 thousand in nursing and other health, and $39 thousand in physical sciences and math. The census shows that the average woman in engineering in her fifties only earned $34 thousand, but there were very few such women, so the average may be misleading. Women in the humanities, social sciences, or

education were at no disadvantage in earning power when the comparisons are made at peak earning age.

There was more variation between fields for women in their twenties, with graduates in professionally oriented fields like nursing, other health, engineering, and commerce earning more than the average and other fields earning less. As a result, earnings increase much more steeply with age and experience for humanities and social science graduates than for others. Indeed, the gaps have largely disappeared for women in their thirties. The difference arises because the graduates of professionally oriented programs are immediately hired in those professions, as we have previously noted, and earn high salaries. These salaries, however, do not always increase substantially thereafter. This pattern is quite marked in nursing, where the earnings of registered nurses do not rise significantly with age. In contrast, many humanities and social science graduates construct their own career ladders. The time this requires means that the rewards are delayed, so earnings increase steeply with age and experience. However, Table 8 shows that women end up at about the same income irrespective of their field of study.

The same cannot be said for men, for their peak incomes depend on the field of study. Table 9 shows that men in their fifties with bachelor degrees can be divided into two groups: The most successful group earns roughly $70-$80 thousand dollars

per year and includes engineering ($79 thousand), followed closely by social science ($78 thousand), math and physical science ($70 thousand), and finally by commerce ($69 thousand). The less successful group earns close to $60 thousand and includes education ($56 thousand), humanities and fine arts ($57 thousand), agriculture and biology ($60 thousand), and other health ($54 thousand). The few men with nursing degrees averaged $46 thousand--much the same as women of the same age. It should be noted that social science is among the top earners for men in their fifties and many practically oriented programs do no better than the humanities.

It should also be noted that even the less successful fields are doing very well. The average earnings for men in their fifties who completed a trade, technical, career, or vocational program is $50 thousand--less than most "less successful" university graduates. Indeed, the earnings of those with post-secondary certificates or diplomas are little above those of high school graduates, so trade, technical, vocational, and career programs are the ones whose utility is really called into question by the census data. Furthermore, the high earnings of men in their fifties with humanities degrees challenges the notion that these programs do not prepare people for high salary work. The idea that the graduates of humanities and social science programs only have low wage jobs is refuted by the census

data.

The differentials in income between fields are roughly similar for men in their twenties. However, as with women, the health fields give the highest incomes to men in their twenties but show the lowest increase over time. Engineers do well, followed by people in math and physical sciences, commerce and social sciences. Education, the humanities, agriculture and biology form the next tier.

The health fields aside, the most striking feature of the data is the high rate of growth of income achieved by male university graduates. While men with a post-secondary certificate or diploma realize a 47% increase in their income from the twenties to the fifties, university graduates as a whole realize a 76% increase. This gain is shared by education (64%), the humanities and fine arts (78%), and the social sciences (106%). These increases compare well to those of men with degrees in commerce (78%), agriculture and biology (69%), engineering (80%), and math and physical sciences (71%). Graduates in education, the humanities, and social sciences show the same return to experience as other university graduates. This shows a capacity for lifelong learning which is essential in the rapidly changing, modern economy. So far as the income data provide evidence, university graduates possess this skill to a greater degree than do the completers of technical, vocational, and career programs.

Comparisons of earnings and employment for recent graduates miss much of the return to university education in general--and, in particular, to education in the humanities and social sciences--since comparisons of recent graduates necessarily miss the long term returns to education.

Tables 8 and 9 also show that people with graduate degrees in education, the humanities, and social sciences also do very well. Their earnings exceed those of people who did not attend university and, in most cases, exceed the earnings of under-graduates in the same fields. For women, the rankings of fields parallel those for undergraduate degrees: For women in their fifties there is little difference between fields. For women in their twenties, social science graduates with graduate degrees had above average earnings, and education graduates were close to the graduates. Humanities graduates were a bit below average. Their earnings were similar to those of women with graduate degrees in agriculture, biology, and engineering. The records of women with graduate degrees in education, the social sciences, and the humanities were not very different from those of women in other fields. This is very important since most graduates in education, the humanities, and social sciences are women.

The success of men with graduate degrees in these areas was also satisfactory. Social science graduates generally earned above average incomes and did well by most standards--it is hard

to argue with an average income of $72 thousand per year for someone in his forties. Men with graduate degrees in education and the humanities did less well but again their average incomes--$59 thousand for men in their fifties with a graduate degree in the humanities and $65 thousand for education--significantly exceeded those of men who did not attend university ($50 thousand). It should be noted that there are far fewer men than women with graduate degrees in education and the humanities, and that the men and women with these degrees are working in the same institutions, above all schools, colleges, and universities. Since these men and women do similar work and are paid on the same scales, their earnings are similar. This is the reason that the earnings of men with graduate degrees in the humanities and social sciences are not higher, but it is also the reason that the earnings of men are not decisive in assessing the economic success of graduates in these fields. It is the experience of women who comprise the majority of graduates whose earnings are significant, and, as noted, their record is quite successful.

This review of unemployment, occupation, and income data shows that university graduates in education, the humanities, and the social sciences are highly employable. They find good jobs and earn high incomes. Of course, some people do better in life than others, and one can always find examples of unsuccessful humanities or social science graduates. However, the view that

most graduates in these areas have trouble finding work or are waiting on tables or driving taxis is contradicted by Census data.

V. Recent Evidence on the Success of Humanities, Social Science, and Education Graduates

There is evidence from the mid1990s that indicates little change in the experiences of humanities, social science, and education graduates from those suggested by the census. That evidence comes from Statistics Canada's 1995 survey of people who completed post-secondary programs in 1990. This five year follow-up survey provides information on employment and incomes distinguishing education levels and fields of study. Most of the respondents were in their twenties, so the survey does not indicate the full lifetime trajectories of earnings, but only the experience of people who have recently established themselves in the labour market. Furthermore, the results available to date do not distinguish between men and women.

Table 10 shows unemployment rates for people with post-secondary certificates or diplomas as well as for university graduates in various fields of study. This table bears out the earlier conclusion that unemployment rates decline with educational attainment. University graduates again had the lowest rate (6%). In the case of almost university field of study, that

rate was less than the rate achieved by the average person with a post-secondary certificate or diploma (10%). Education was tied with the health professions (principally nursing) for the lowest unemployment rate (3%). Unemployment among social sciences (6%) equalled the average for all university graduates. This was only slightly higher than engineering (5%). Humanities graduates, like graduates in agriculture and biology had higher rates (9%), while the highest was reported by fine arts graduates.

Table 11 reports median earnings for full time employees for the same educational levels and fields of study as well as the corresponding figure for high school graduates. Again earnings increased with education--The average high school graduate earned $27 thousand, the holder of a post-secondary certificate or diploma earned $29 thousand, and the average university graduate earned $40 thousand. When university earnings are broken down by field of study, the pattern is similar to that in Tables 8 and 9. The highest incomes were earned by graduates in engineering and health, while graduates in education and commerce earned incomes equal to the university average. These were followed by graduates in social sciences, then by those in agriculture and biology and the humanities. Fine and applied arts graduates earned the lowest incomes by a significant margin. Since the 1995 survey of 1990 graduates dealt only with recent graduates, the results shed no light on the exceptionally rapid growth in

income realized by humanities and social science graduates after they establish themselves.

Nonetheless, the comparison of earnings makes an important point. Even income in the least remunerative university program exceeds the income earned by the average college graduate, let alone the completer of a trade/vocational program or the typical high school graduate. For university programs like the humanities and social sciences with higher incomes, the gains are more substantial. The question is whether these gains are large enough to justify the costs of these programs--the next issue to be considered.

VI. the social rate of return to university education

The evidence from the 1991 census and the 1995 survey of graduates indicates that humanities, social science, and education graduates generally have better labour market experiences than people with less education. The question is: Are the outcomes of the humanities and social science graduates good enough? We can make this question precise by asking whether they earn enough extra income to cover the costs of their programs. This question has a long history in labour economics, for researchers have repeatedly estimated the internal rate of return to educational programs or, equivalently, compared the present value of the extra income from the program to the costs of the

program. When standard calculations of this sort are performed using 1995 Canadian data, they show that all university programs--including, in particular, those in the humanities, social sciences, and education--pay their way. This is true for graduate programs and for undergraduate programs. The calculations are most precise for the latter, so I will concentrate on them and consider the return to graduate programs subsequently.

Cost-Benefit analysis involves comparing the total costs incurred by society in educating a graduate with the total benefits to society of that person's education. The pertinent costs are those incurred by the government in operating the university and those incurred by the student in attending. The government's costs include the operating expenses of the university--principally salaries and supplies--and the interest and depreciation on the capital invested in its buildings, libraries, and equipment. The student's costs include the earnings given up to attend university rather than working and the books and supplies required for the university courses. While tuition fees are a cost to the student, they are income to the university, so they cancel out in a social cost-benefit calculation and will not be pursued here.

Table 12 shows the components of the government's costs of building and operating universities. In 1995/6, the operating expenses of Canadian universities amounted to $11,614,609,000.

These costs included wages, salaries and supplies. Capital costs were on the order of $3,260,740,000. This figure equals the interest and depreciation on the value of the capital stock of Canadian universities at the end of 1995. Total costs were consequently $14,875,349,000. Not all of this cost, however, is attributable to teaching. Various approaches to this question suggest that teaching costs equal about two-thirds of university operating expenses, as defined here. On this basis, teaching costs of Canadian universities equalled $10,412,744,300 in 1995/6.

Some university programs are more expensive than others, and this fact must be incorporated into the analysis to see whether undergraduate programs raise incomes enough to cover their costs. First, enrollments in undergraduate and graduate programs must be ascertained, and part time students converted to fulltime equivalents (fte's). Then, the fte's must be weighted by the relative costs of programs. Weights based on the experience of Ontario universities are conventionally used for these calculations. The weights, which reflect the relative cost of programs, range from 1.0 for first year humanities and social science students (the base case) to 6.0 for Ph.D. students. The cost of third and fourth year undergraduate humanities, social science, commerce, or education programs have weights of 1.5, while undergraduate science, engineering, and health programs have

weights of 2.0 reflecting the high costs of those programs. Multiplying each program's enrollment in fte's by the program weight and then totalling for all programs gives the number of students educated in Canadian universities in weighted full time equivalents (wfte's). In 1995/96, the total was 1,259,978.

Dividing total teaching costs of Canadian universities by 1,259,978 gives the teaching cost per wfte--$6403 in 1995/6. The cost of degrees can be calculated by totalling the weighted years required to get the degree. Since first and second year humanities and social science programs have a weight of 1.0, while third and fourth year humanities and social science programs have a weight of 1.5, the total cost of a humanities or social science degree is $32015 = $6403 x (1.0 +1.0 +1.5 +1.5). Science, engineering and health degrees are more expensive since they require 4 years, each weighted at 2.0, for a total of $51224 = 8.0 x $6403. The teaching costs of various bachelor degrees, computed in this way, are shown in the first column of Table 13.

A second cost of university programs are the books and supplies that students must buy. Estimates of these costs are shown in the second column of Table 13.

The third cost of university programs is the opportunity cost of the student's time. Instead of going to university, students could be working. If they worked, they would have produced output equal to their wage, so university attendance

reduces the gross domestic product by an amount equal to those lost wages. Those losses are estimated from the earnings of high school graduates. Since male wages are greater than female wages, it is necessary to compute a weighted average of the earnings of men and women where the weights reflect the proportions of male and female students in the various university programs. These wage costs are shown in column 3 of Table 13.

The total costs of undergraduate programs are shown in column 4 of Table 13. Education has the highest cost since it is modelled as a five year program (e.g. a four year undergraduate humanities or social science program followed by a year in the education faculty). Otherwise, program costs range from $64,178 for humanities to $86,883 for engineering. The differences reflect, principally, differences in the teaching costs of the programs and differences in the gender balance of the students in the programs: programs with a higher percentage of men, like engineering, have a higher cost in terms of foregone earnings.

These costs can be compared to the benefits of university education. Society reaps many benefits. Here I will focus only on the increased earnings that result. On the usual assumption that businesses pay their employees what they are worth, the increased earnings of university graduates indicate a higher level of productivity than that of high school graduates. For the same reason, the increased earnings of university graduates

indicate the increased gross domestic product attributable to the university education. This is one of the universities' contributions to economic growth. Others, such as inventions created by university researchers, are excluded from this analysis.

The increase in earnings due to university education has been measured from the 1995 Survey of Consumer Finance. The survey is a representative sample of Canadians and includes information on the income, age, and educational attainment. A regression analysis of these data was performed in which income was correlated with age for high school and for university graduates. Income was defined to be pretax wages and salaries plus the net income from self-employment. All people were included in the analysis--whether they worked or not and whether they were full time or part time employees--so that the statistical estimates include the incidence of these factors. All studies of this sort find that income increases with age until the 40s or 50s when it starts to decline. This pattern was incorporated into the analysis by correlating income with age and age squared. The regression equation shows that university graduates with a bachelor degree earned more than high school graduates at every age.

The 1995 Survey of Graduates was used to taylor the results of the regression analysis to the various fields of study. As noted previously, the Survey reported the average earnings of

graduates of each program five after completion. These averages were divided by the overall average for university graduates, to see how each program compared to the average university experience. The regression for income as a function of age for all university graduates (as estimated from the Survey of Consumer Finance) was shifted up or down by the percentage that average earnings in each program exceeded or fell short of the overall average for university graduates (as indicated by the Survey of Graduates). For instance, the 1995 Survey of Graduates shows that humanities graduates earned about 15% less than average five years after graduation. Hence, the relationship of income to age for all graduates was multiplied by .85 to estimate the corresponding function for humanities graduates. Figure 5 shows this estimate of the age-earnings profile of humanities graduates. In their midtwenties, they earn less than high school graduates, but their earnings surpass them in later years, in accord with Tables 8 and 9.

The benefits and costs of university education can be compared by calculating the rate of return to the investment. In the case of undergraduate programs, the costs are those shown in Table 13 spread over four years (five in the case of education), and the benefits are the increase in income from graduation to age 65, as implied by the estimated age-earnings functions just discussed. The implied rates of return are called "social rates"

since the benefits and costs are those of society as a whole.

Table 14 shows the social rates of return for university programs. For undergraduate programs, the rates vary from 5.6% for fine arts to 12.7% for nursing and health. These rates of return are real rates (assuming zero inflation) and so must be compared to market interest rates less the expected rate of inflation. The real rate in Canada is currently about 5%. Even the least profitable university program (fine arts) exceeds that benchmark, although only by a slight margin. It is impressive that programs like engineering, whose graduates earn high incomes and which are associated with high tech activity, do not have rates of return that exceed those of humanities or social science programs: The rate of return to engineering (7.9%) is less than the return to social sciences (9.0%) and barely above that of humanities (7.8%). The return to an education degree (10.2%) exceeds all of these. The returns to math and physical sciences (7.4%) and agriculture and biology (6.7%) fall short of the returns to humanities, social sciences, and education.

There are three reasons why education, humanities, and social science degrees have such high returns. First, science and engineering programs cost more than humanities, education, and social science programs. More teaching resources lead to more highly trained individuals who command a higher income. Second, the foregone earnings of students in engineering programs

are higher than the corresponding figure for humanities students since many more of the engineering students are men, and male high school graduates earn more than female high school graduates. This is a second reason that the costs of science and engineering programs are high. Third, the social benefit of a university program is not the earnings of its graduates but the increase in their earnings over and above those of high school graduates. Since, as just noted, most engineering students are men, their high earnings overstate their earnings gain. Taking account the gender balance of university programs raises the social rate of return of humanities, social science, and education programs relative to engineering. The combined effect of these factors is to make humanities, social science, and education programs just as profitable as engineering programs.

Table 14 also shows rates of return for graduate programs. These rates are less firmly established than the undergraduate rates. People with masters and Ph.D. degrees are educated for research, and the wages and salaries earned by researchers probably do not include the full social value of their discoveries. Furthermore, the available 1995 income data do not distinguish between people with a masters degree and those with a Ph.D., so a joint estimate of their profitability was computed. The cost was set as three years of a masters program as a value that was intermediate between a masters and a Ph.D.

The estimated social rates of return for graduate programs shown in Table 14 are more tightly grouped than those for undergraduate programs. The highest returns (7.6%) were earned by education and commerce, while the lowest return (5.9%) was realized by agriculture and biology. The social sciences were just behind commerce and education with a return of 7.3%. The humanities were tied with engineering and health at 6.9% As with undergraduate degrees, all of these rates exceed the real interest rate. Clearly, education, social science, and humanities programs are just as good investment as other programs.

While these calculations show that university education is a good investment for Canadian society, they ignore the questions of tuition fees and the significance of student debt. Some of the costs of university education are paid by the provincial and federal treasuries (i.e. the cost of building and operating the universities), while others are paid by the student (i.e. the lost earnings and the cost of books and supplies). The benefits of the education are also split between the two parties: The treasuries are compensated by the additional taxes paid by university graduates and the graduates themselves benefit by the increase in their income after tax. In addition, tuition fees--which in this analysis are simply another tax--shift some of the net gains from university education from the student to the government. The tax system and the tuition fees, therefore,

divide the social rate of return into the students' rate of return and the treasuries' rate of return. If taxes and tuition fees are too high, then university education can be made unprofitable for the student even though it is a socially profitable investment. While a detailed analysis would be required to prove the point, the growing level of student debt raises the possibility that university education is becoming unprofitable for student even though it is profitable for Canada as a whole.

VII. Conclusion

A popular view in Canada contends that university programs in education, the humanities, and social sciences are irrelevant to economic success in the new world economy. Graduates of these programs, it is commonly believed, lack the specific skills necessary to find jobs and so face high unemployment. Alternatively, if humanities, social science, and education graduates are hired, it is only at low wage work that does not required their university education. Instead of wasting resources on these old fashioned, irrelevant programs--the common argument goes--money would be better spent on one and two year technical and vocational training programs that give students the skills that employers want.

The problem with the common argument is that it is wrong. Theories of this sort cannot be proven by alluding to the

experiences of single individuals since it is easy to find examples of successful, as well as unsuccessful, humanities graduates. Instead, claims about the economic success or failure of graduates from university and technical training programs must be tested with large, representative samples like the Census and Survey of Consumer Finance microdata files analyzed in this paper. Those data sets show that social science, humanities, and education programs are economically successful.

The surveys do substantiate some of the beliefs that underlie the popular concerns about education. The economic environment has, indeed, become more difficult from young Canadians in recent decades. Unemployment and part time work have increased and wages for most educational levels are probably lower now than they were for their parents when they were of the same age. University graduates are probably having more trouble finding work than their parents did.

However, the survey data make it quite clear that university education is part of the solution--not part of the problem. All young Canadians, whatever their level of education, face a weak labour market. University graduates do better than anyone else, even if times are tougher than they were twenty-five years ago. Moreover, the great expansion in university education since 1970 has alleviated the problems of young Canadians. The rise in average educational attainment has offset the fall in real

earnings at each level of education, as Canadians have moved up the educational ladder. Moreover, the expansion of colleges and universities has matched the shifted in labour demand toward more highly educated workers. Without that expansion, inequality in Canada would have soared as the salaries of university graduates were bid up by employers and the wages of high school graduates bid down. The expansion of universities in Canada, in other words, has been critical in preventing U.S. style inequality.

Detailed analysis of survey data shows that these favourable employment outcomes extend across all fields of study, including, in particular, education, the humanities, and social sciences. Graduates in these areas find good jobs and earn high incomes. They do better than people with less education.

Moreover, education, humanities, and social science programs, like university education in general, do well when they are evaluated as investment projects. The question, in this case, is whether they generate enough economic growth to justify the resources expended on them. All university programs analyzed here yield a social rate of return that exceeds the real interest rate in Canada today. The return on humanities programs is almost identical to that of engineering, and social science and education programs are even more profitable.

Humanities, social science, and education programs are good investments for Canada. They meet the needs of the new world

economy, and they warrant funding.

Table 1

Unemployment Rates, 25-29 year olds, 1970-95

	1970	1980	1985	1990	1995
Women					
high school noncompleters	9.5%	12.6	17.6	19.7	22.0
high school graduates	6.4	9.1	10.6	11.4	10.3
post-sec noncompleters	6.7	11.1	12.7	12.1	10.6
post-sec certificate/diploma	8.7	6.6	9.8	9.6	7.6
university graduates	5.0	6.1	7.7	7.9	6.7
average	7.9	8.8	11.7	11.4	9.1
Men					
high school noncompleters	6.9	9.1	15.4	18.7	20.9
high school graduates	3.9	5.6	8.8	11.9	14.0
post-sec noncompleters	6.0	6.1	10.7	13.5	12.4
post-sec certificate/diploma	6.0	5.2	8.9	10.1	11.2
university graduates	3.4	4.8	7.3	7.3	4.1
average	5.7	6.4	10.8	12.3	11.8

Sources:
1980-90:
Statistics Canada, Census of Canada, microdata file, 1980 definition of labour force activity.
1970:
Statistics Canada, Census of Canada, microdata file. Labour force activity, collected according to the 1970 definition, was converted to the 1980 definition, by using the ratio of unemployment rates for 1980 prepared according to the 1970 and 1980 definitions.
1995:
Statistics Canada, Survey of Consumer Finance, microdata file, 1980 definition of labour force activity.

Table 2

Full time Work, 25-29 year olds, 1970-95

	fraction of those working with full time jobs			
	1970	1980	1990	1995
Women				
high school noncompleters	78.7%	74.4	74.9	64.1
high school graduates	78.9	79.2	79.1	76.9
post-sec noncompleters	79.0	79.7	80.9	77.9
post-sec certificate/diploma	78.1	77.9	81.4	77.8
university graduates	82.2	85.7	89.0	85.4
Men				
high school noncompleters	93.9	93.6	93.2	88.6
high school graduates	97.3	96.5	94.6	92.5
post-sec noncompleters	96.5	95.7	93.8	94.7
post-sec certificate/diploma	97.0	96.2	95.8	93.4
university graduates	95.5	96.0	95.8	94.9

Note:
The table excludes people attending school. No comparable figures available for 1985.

Sources:
1970-90:
Statistics Canada, Census of Canada, microdata file.
1995:
Statistics Canada, Survey of Consumer Finance, microdata file.

Table 3

Occupations of 25-29 year olds, 1980 and 1995

	1980	1995	change
professional/managerial	422,543	511,384	88,841
clerical	350,347	229,470	-120,877
sales	136,095	141,706	5,611
service	168,887	231,435	62,548
blue collar	566,147	466,573	-99,574
total	1,640,019	1,580,568	-59,451

Table 4

Occupations of University Graduates, 1970-95

	fraction of university graduates aged 25-29 in each category				
	1970	1980	1985	1990	1995
professional/managerial	82.8%	75.1	72.5	72.7	70.6
clerical	6.2	10.2	11.1	10.6	7.7
sales	5.1	7.3	7.4	8.4	10.5
service	2.7	2.9	4.2	4.4	6.9
blue collar	3.2	4.5	4.8	3.9	4.3

Table 5

Annual earnings, fulltime employees, 25-29 year olds, 1970-95
(1995 dollars)

	1970	1980	1985	1990	1995
Women					
high school noncompleters	$18789	22705	22479	21686	19191
high school graduates	23183	25858	25076	24286	23404
post-sec noncompleters	25336	27074	26079	25344	22601
post-sec certificate/diploma	22684	28808	27580	27333	26420
university graduates	32994	35516	34081	34749	32669
average	22740	28232	27159	27494	26812
Men					
high school noncompleters	29184	34348	31281	29918	28621
high school graduates	33498	36513	34440	31970	30579
post-sec noncompleters	33458	36194	35096	32356	31320
post-sec certificate/diploma	33456	38821	36367	35842	33889
university graduates	39414	42002	40491	39724	37067
average	32541	37628	35310	34385	33006

Notes:
All figures have been expressed in 1995 dollars by using the Canadian consumer price index.

Sources:
1980-90:
Statistics Canada, Census of Canada, microdata file, 1980 definition of labour force activity.
1970:
Statistics Canada, Census of Canada, microdata file. Labour force activity, collected according to the 1970 definition, was converted to the 1980 definition, by using the ratio of unemployment rates for 1980 prepared according to the 1970 and 1980 definitions.
1995:
Statistics Canada, Survey of Consumer Finance, microdata file, 1980 definition of labour force activity.

Table 6

Unemployment Rates by Field of Study, 25-29 year olds, 1991

	men	women
high school noncompleters	18.7%	19.0%
high school graduates	11.6	11.4
post secondary certificates and diplomas	9.4	9.2
bachelor degree	4.8	6.5
education	2.5	4.9
fine arts	5.4	9.9
humanities	10.0	8.4
social sciences	5.6	5.7
commerce	4.1	6.8
agriculture/biology	10.8	11.5
engineering	3.5	4.0
nursing	***	5.5
other health	2.2	4.7
math/physical science	3.6	6.2
graduate degree	5.3	6.6
education	9.1	9.5
fine arts	0.0	11.1
humanities	8.1	4.8
social sciences	5.3	11.3
commerce	6.1	2.0
agriculture/biology	5.9	7.7
engineering	6.3	9.1
nursing	***	0.0
other health	4.2	3.1
math/physical science	0.0	18.8

note: *** indicates insufficient data

source: Census of Canada, 1991, microdata file

Table 7

Managerial and Professional Occupations by Field of Study, 25-29 year olds, 1991
(Percentage of fulltime workers with a managerial or professional job)

	men	women
high school noncompleters	7.3%	12.5%
high school graduates	15.2%	19.2
post secondary certificates and diplomas	24.1	35.4
bachelor degree	65.1	72.3
education	74.7	86.9
fine arts	60.4	65.9
humanities	50.0	55.6
social sciences	51.8	64.5
commerce	59.7	64.8
agriculture/biology	60.4	69.1
engineering	80.0	87.0
nursing	***	95.4
other health	84.4	95.9
math/physical science	75.1	74.6
graduate degree	81.8	87.5
education	72.7	95.0
fine arts	80.0	60.0
humanities	64.9	74.4
social sciences	74.4	81.4
commerce	75.0	76.5
agriculture/biology	76.5	96.3
engineering	90.5	91.7
nursing	***	100.0
other health	94.7	100.0
math/physical science	81.8	93.3

note: *** indicates insufficient data
computed for full time full year workers not attending school

source: Census of Canada, 1991, microdata file

Table 8

Annual Income of women by education and field of study, 1991
(1995 dollars)

	age groups			
	20-9	30-9	40-9	50-9
high school noncom	20470	23951	24753	24321
high school grad	27795	28338	29628	29321
post-secondary cert. or diploma	25519	31125	33044	32440
bachelor degree	33906	42424	46722	45846
education	32369	41130	46096	46095
human/Fine Arts	30084	39708	47275	45788
social science	31427	42197	48923	46597
commerce	36001	46171	44184	47618
ag/bio	34065	37518	41715	44491
engineering	39767	52087	55234	33515
nursing	38237	41948	45495	46728
other health	39239	44467	48002	45747
math/phys sci	37617	48548	50394	38875
graduate degree	37398	48089	54774	53759
education	35560	47149	54037	55107
human/Fine Arts	31287	42516	52132	50341
social science	37830	48853	56669	56058
commerce	41404	53805	63690	51886
ag/bio	33502	47419	51403	52057
engineering	33403	45338	48053	58682
nursing	42791	51879	54475	52912
other health	44145	53541	57535	45500
math/phys sci	39933	47916	57396	58300

note: These are total wages and salaries earned in 1990 by people employed fulltime for 49 or more weeks in the year. Self-employed are excluded. Degrees in medicine and dentistry are excluded. Graduate degree includes PhD., masters, and graduate certificates.

Source: Census of Canada, 1991, microdata file.

Table 9

Annual Income of Men by education and field of study, 1991
(1995 dollars)

	age groups			
	20-9	30-9	40-9	50-9
high school noncom	27753	35934	39923	39487
high school grad	29530	40579	47576	49541
post-secondary cert. or diploma	34024	43849	49773	49949
bachelor degree	39337	54236	63741	69181
education	33981	46031	53584	55694
human/Fine Arts	32383	45990	57554	57484
social science	37705	53903	65794	77556
commerce	38942	56783	65986	69215
ag/bio	35323	50628	56323	59764
engineering	43989	59547	72471	79275
nursing	51017	47259	48960	46362
other health	44478	53920	56643	53606
math/phys sci	41259	55374	67266	70398
graduate degree	42186	57254	68575	74304
education	36231	51323	60300	64615
human/Fine Arts	29497	43110	57266	58771
social science	39196	57622	71972	76673
commerce	45848	67865	81916	90204
ag/bio	38307	48975	62551	77349
engineering	46700	59135	73869	81549
nursing	***	***	***	***
other health	41452	55629	76761	101432
math/phys sci	43379	54622	67679	78269

note: These are total wages and salaries earned in 1990 by people employed fulltime for 49 or more weeks in the year. Self-employed are excluded. Degrees in medicine and dentistry are excluded. Graduate degree includes PhD., masters, and graduate certificates.

Source: Census of Canada, 1991, microdata file.

Table 10

Unemployment Rates: Five year follow-up

post-secondary	
certificate or diploma	10%
university	6%
education	3%
fine arts	12%
humanities	9%
social sciences	6%
commerce	4%
ag/bio	9%
engineering	5%
nursing/health	3%
math & phys science	6%

source:

Statistics Canada and Human Resources Development Canada, The Class of '90 Revisited, Statistics Canada catalogue 81-584-XPB.

Table 11

Average Annual Earnings: Five year follow-up

high school	$27 thousand
post-secondary	
certificate or diploma	29
university	40
university graduates by field of study	
education	$40 thousand
fine arts	31
humanities	34
social sciences	37
commerce	40
ag/bio	35
engineering	45
nursing/health	45
math & phys science	42

source:
high school-computed from Statistics Canada, Survey of Consumer Finances, 1995, micro data file. For the age ranges for total university graduates in The Class of '90 Revisited, average earnings for high school graduates without further education and employed full time, full year were computed. The figure of $27 thousand is the weighted average of the averages for the age ranges where the weights are the proportions of people in each age range.
all others--Statistics Canada and Human Resources Development Canada, The Class of '90 Revisited, Statistics Canada catalogue 81-584-XPB.

Table 12

Costs of University Education

operating expenses, 95/96	$9,824,237,000
interest and depreciation of facilities..	3,260,740,000
total cost.....	13,084,977,000
cost assignable to teaching.....	8,908,061,000
teaching cost per WFTE student.....	$7,070

notes and sources:
operating expenses--Statistics Canada. expenditures by type and fund, including general operating, special purpose and trust, and ancillary enterprices.
interest and depreciation--The gross value in current prices of the capital stock of Canadian universities ($23.291 billion from Statistics Canada, Cansim, D886508) multiplied by an interest rate (9%) plus a depreciation rate (5%). The interest rate on long term Canadian bonds was between 8% and 9% in 1995, so the use of 9% in the calculations tends to overstate capital costs. Likewise, using the gross value of the capital stock has the same effect. Statistics Canada also computes three net capital stock figures that depreciate capital more rapidly. These are all smaller than the figure used here. Hence, the choice of any other figure would lead to a lower cost of university education and a higher rate of return on the investment.
cost assignable to teaching--total cost less research costs. The latter were computed with the Hettich formula (Dickson, Milne, and Murrel 1996, p. 320) from data supplied by Statistics Canada.
teaching cost per wfte student--total teaching cost divided by 1,259,978 wftes. See text for discussion of the concept.

Table 13
Costs of Bachelor Degrees

	opportunity cost of students' time		books & supplies		university capital & operating cost		total cost
education	34781	+	6250	+	45955	=	86986
fine arts	27043		5000		42420		74463
humanities	27163		5000		35350		67513
social science	27418		5000		35350		67768
commerce	27418		5000		35350		67768
ag/bio	27232		6000		56560		89792
engineering	29659		6000		56560		92219
nursing/health	25883		5600		56560		88043
math/phys sci	29076		5600		56560		91236

Table 14
Social Rate of Return of University Degrees

	bachelor degree	graduate degree
education	10.2%	7.6%
fine arts	5.6	6.5
humanities	7.8	6.9
social science	9.0	7.3
commerce	10.6	7.6
ag/bio	6.7	5.9
engineering	7.9	6.9
nursing/health	12.7	6.9
math/phys sci	7.4	6.7

Figure 1

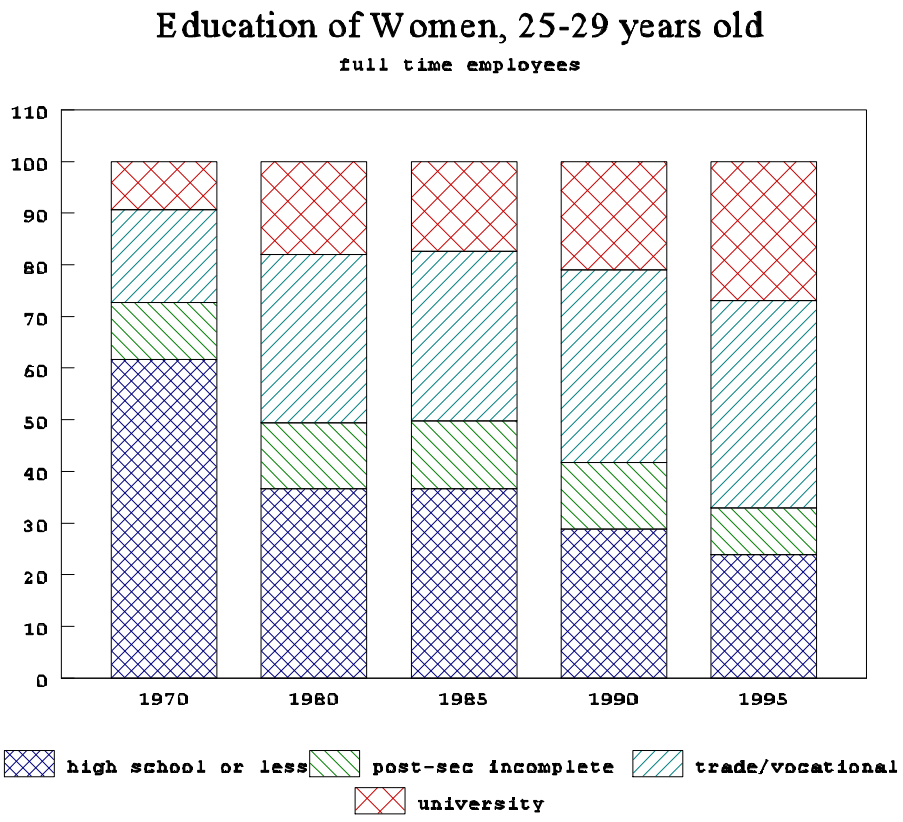

Education of Women, 25-29 years old
full time employees
110
100
90
80
70
60
50
40
30
20
10
0
1970
1980
1985
1990
1995
high school or less
post-sec incomplete
trade/vocational
university

Figure 2

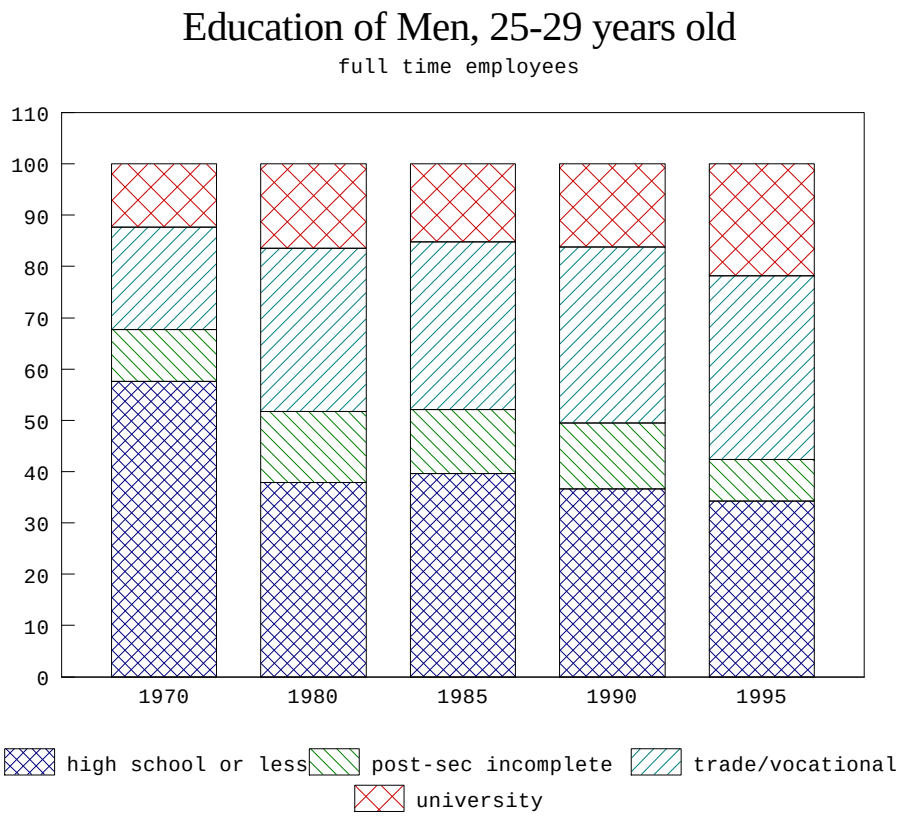

Education of Men, 25-29 years old
full time employees
110
100
90
80
70
60
50
40
30
20
10
0
1970
1980
1985
1990
1995
high school or less
post-sec incomplete
trade/vocational
university

Figure 3

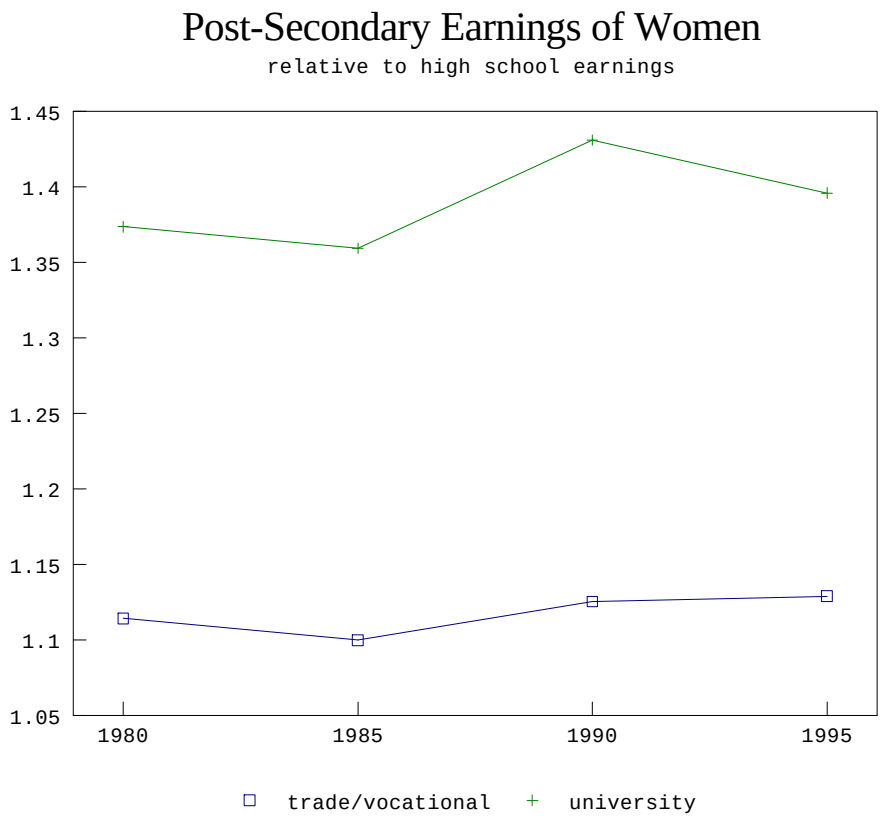
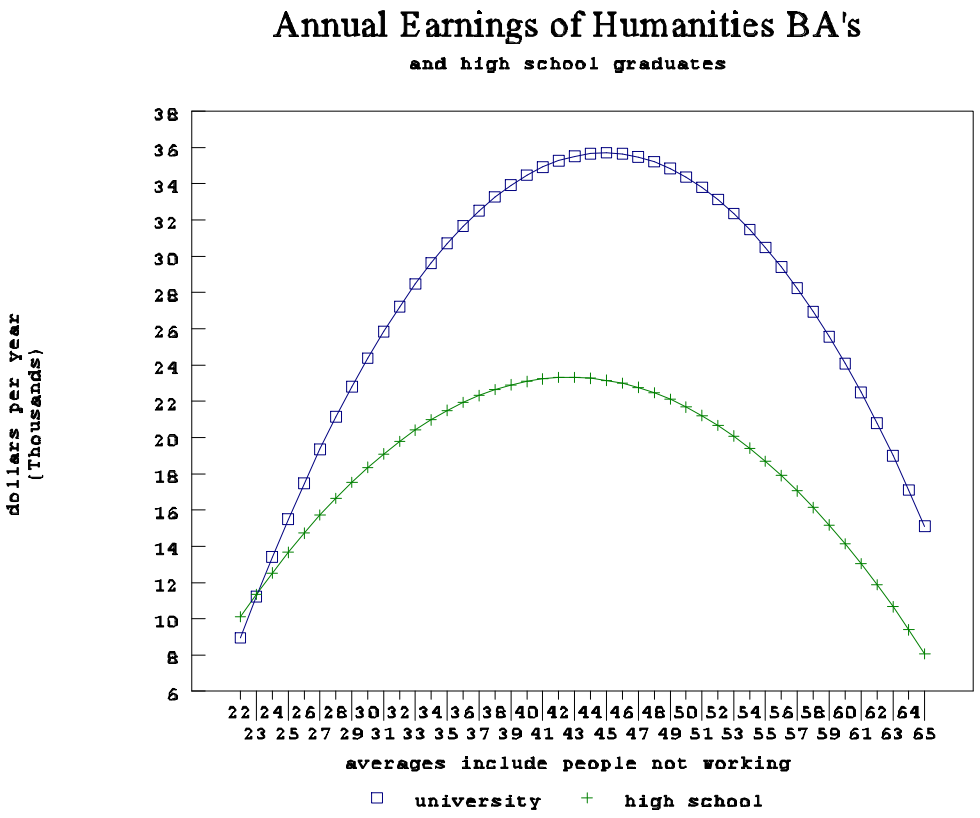

Post-Secondary Earnings of Women
relative to high school earnings
1.45
1.4
1.35
1.3
1.25
1.2
1.15
1.1
1.05
1980
1985
1990
1995
trade/vocational
university

Figure 4


Post-Secondary Earnings of Men
relative to high school earnings
1.26
1.25
1.24
1.23
1.22
1.21
1.2
1.19
1.18
1.17
1.16
1.15
1.14
1.13
1.12
1.11
1.1
1.09
1.08
1.07
1.06
1.05
1.04
1980
1985
1990
1995
trade/vocational
university

Figure 5


Annual Earnings of Humanities BA's
and high school graduates
dollars per year
(Thousands)
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64
23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65
averages include people not working
university
high school