

Foreword

The education of young Canadians to meet the demands of the knowledge-based economy, so that they may fulfil their individual potential as well as contribute to the development of their society, has emerged as a central policy issue at the end of the 20th century. At a time when budgets have shrunk, our education system is being challenged to educate more students, in new ways, to higher levels of skill. How we respond to this challenge will determine our success in the new century.

How well prepared are we to meet the challenge of the knowledge economy in Atlantic Canada? Central to this debate is the role which the universities play – in educating students, promoting research and contributing to a strong and innovative economy. With expectations rising on all sides, the universities are being asked to do more with less. Universities have the potential to make an enormously significant contribution to future growth. What are the issues which need to be considered if this potential is to be realized, and for the Atlantic region to maximize the benefits it can obtain from its university system?

In order to bring these issues to a wider public audience, the Atlantic Association of Universities (AAU) asked the Atlantic Provinces Economic Council (APEC) to examine the role of the universities in this region's economy. APEC and the AAU are pleased to offer this report as a basis for identifying some of the important implications of the knowledge economy for Atlantic Canada's universities, their students and the region's future.

January 2000

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Atlantic Canada's Universities

Universities in Atlantic Canada	Full-Time Enrolment 1998/99		Full-Time Faculty 1997/98
	Undergrad	Graduate	
New Brunswick			
<i>Mount Allison University</i>	2,230	8	122
<i>St. Thomas University</i>	1,985	0	80
<i>Université de Moncton</i>	4,247	340	353
<i>University of N.B.</i>	8,833	693	591
Total	17,295	1,041	1,146
Nova Scotia			
<i>Acadia University</i>	3,346	83	201
<i>Atlantic School of Theology</i>	62	9	10
<i>Dalhousie University</i>	9,333	1,805	883
<i>Mount Saint Vincent University</i>	2,073	57	148
<i>N.S. Agricultural College</i>	556	11	63
<i>N.S. College of Art and Design</i>	669	20	39
<i>Saint Mary's University</i>	4,904	227	210
<i>St. Francis Xavier University</i>	3,487	60	190
<i>University College of Cape Breton</i>	2,007	0	102
<i>University of King's College</i>	843	0	28
<i>Université Sainte-Anne</i>	252	0	36
Total	27,532	2,272	1,910
Prince Edward Island			
<i>University of Prince Edward Island</i>	2,401	42	180
Newfoundland and Labrador			
<i>Memorial University of Newfoundland</i>	12,133	1,004	909
Atlantic Total	59,361	4,359	4,145

Introduction

Economic opportunities and prosperity are increasingly tied to the creation, dissemination and application of knowledge. In a globally competitive environment, a well-educated workforce is a critical requirement for innovation and the development of knowledge-based activity. An education system which encourages the full potential of its students and recognizes the merits of excellence is paramount for success.

One of Atlantic Canada's greatest resources is its universities. The region is home to 17 degree-granting institutions, nearly a quarter of Canada's total. These range from multi-faculty institutions which incorporate professional and postgraduate programs to those with a more specialized focus. The excellence of the educational programs they offer attracts almost 64,000 full-time students, the highest proportion of youth enrolled in university programs anywhere in Canada.

Yet despite the increased demands being placed on our universities, the public resources which support them are increasingly constrained. There are concerns that if this persists, the quality and availability of a university education in Atlantic Canada may suffer.

This report examines the benefits of a university education to individual success; the universities' contribution to economic growth and development; the importance of university-based research and development; and the impact of funding cutbacks on accessibility and quality.

The report identifies an urgent need for a renewed commitment on the part of the provincial and federal governments to sustaining and enhancing the university system in Atlantic Canada, so that the region and its students will not be sidelined in the knowledge economy of the future.

The Knowledge-Based Economy: Implications for Students and Universities

- The Knowledge-Based Economy and Economic Growth
- Opportunities for the University-Educated
- Improved Employment and Earnings Potential
- Growth in Enrolment
- Changing Educational Needs
- Inter-Provincial Mobility
- Enrolment Projections
- R&D, Innovation and the Role of Universities
- R&D in Atlantic Canada

The Knowledge-Based Economy: Implications for Students and Universities

The Knowledge-Based Economy and Economic Growth

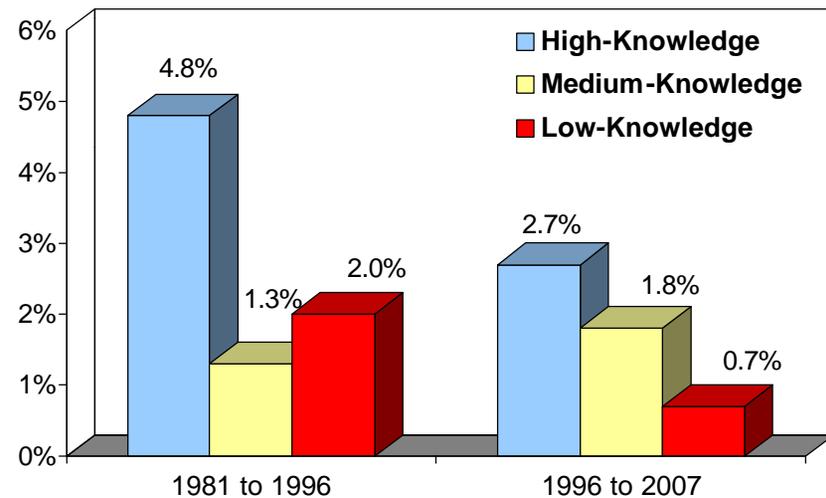
The new, global economy that is shaping the world of this century makes a strong university system the cornerstone of any responsible economic and social development policy for the future.

Economic growth across the globe is increasingly concentrated in industries which embody skills and ideas in their production technologies and organizational systems. More and more, industries are becoming dependent on the expertise, adaptability and openness to innovation of an educated and informed workforce in order to succeed in the global economy.

“High-knowledge” industrial sectors, which include computer and related services, communications, health and social services, business services and electronics, have been the fastest-growing sector in Atlantic Canada since the early 1980s. On average, real GDP in high-knowledge industries has grown by 3.5% annually throughout the 1980s and much of the 1990s, as opposed to 2.7% for medium-knowledge and 1.8% for low-knowledge industries.

Approximately 11,500 jobs were created in high-knowledge industries in Atlantic Canada from 1990 to 1996.

Annual Employment Growth in High, Medium and Low-Knowledge Industries, Atlantic Canada
(Historic & Forecasted)



Source: APEC/Informetrica

The shift towards knowledge-based activity is not limited to the high-knowledge industries. The survival and success of industries across the knowledge spectrum now depends on their ability to use new knowledge-based technologies effectively. The demand for highly educated and highly skilled workers to meet the needs of the knowledge-based economy is expected to remain strong throughout this decade.

The Knowledge-Based Economy: Implications for Students and Universities

Opportunities for the University-Educated

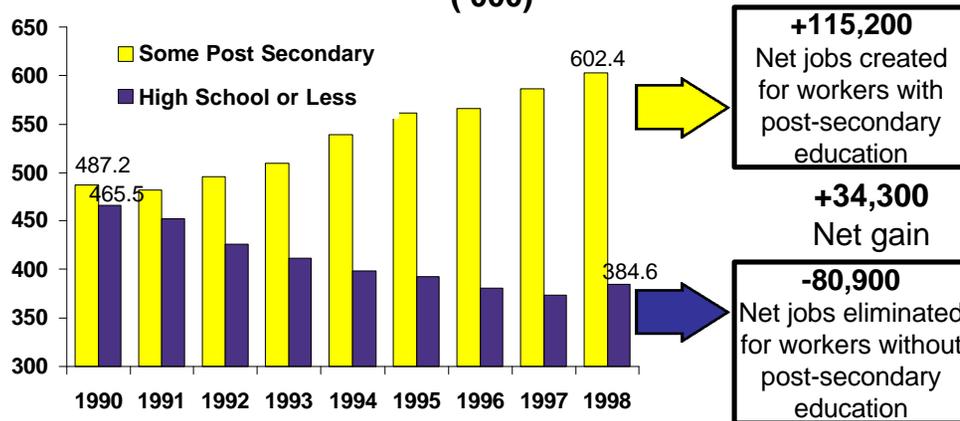
The new economy offers enormous opportunities for economic development. At the same time, however, it penalizes heavily those who are not equipped to compete, whether they are individuals, businesses or institutions.

For the individual, higher education has always been an advantage in securing high-income, full-time positions. In the knowledge-based economy, however, employability is increasingly contingent upon specific technical expertise, training in an intellectual discipline and/or mode of analysis, and general communications and problem-solving skills of the type provided by a university education.

While a university education may once have been a luxury and a privilege, it is quickly becoming a necessity if individuals are not to be left out of the new economy. In 1998, the unemployment rate for the region's university-educated population was only 4.9%. By comparison, the average unemployment rate for the entire Atlantic labour force was 12.9%.

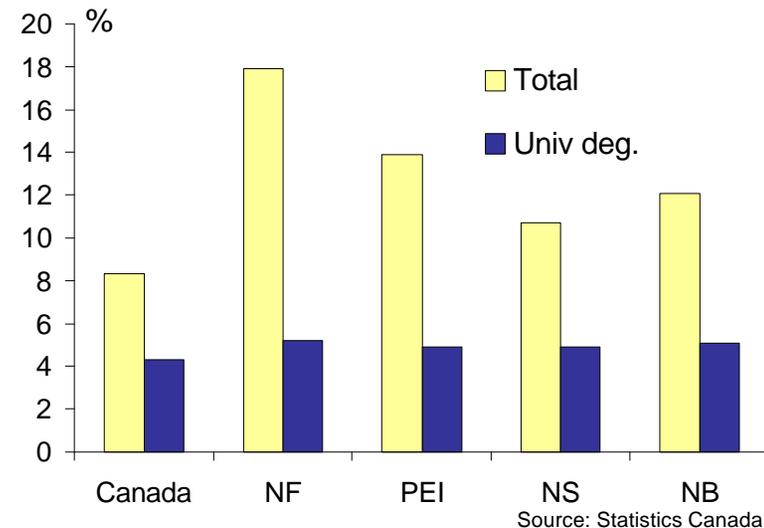
The job prospects for the population holding a university degree in Atlantic Canada are comparable to those across Canada; the unemployment rate in Atlantic Canada for this group compares favourably with rates in Alberta and Ontario.

Employment by Education Level, Atlantic Canada, 1990-98 ('000)



Source: APEC/Statistics Canada

Unemployment Rate by Level of Education, 1998



The Knowledge-Based Economy: Implications for Students and Universities

Improved Employment and Earnings Potential

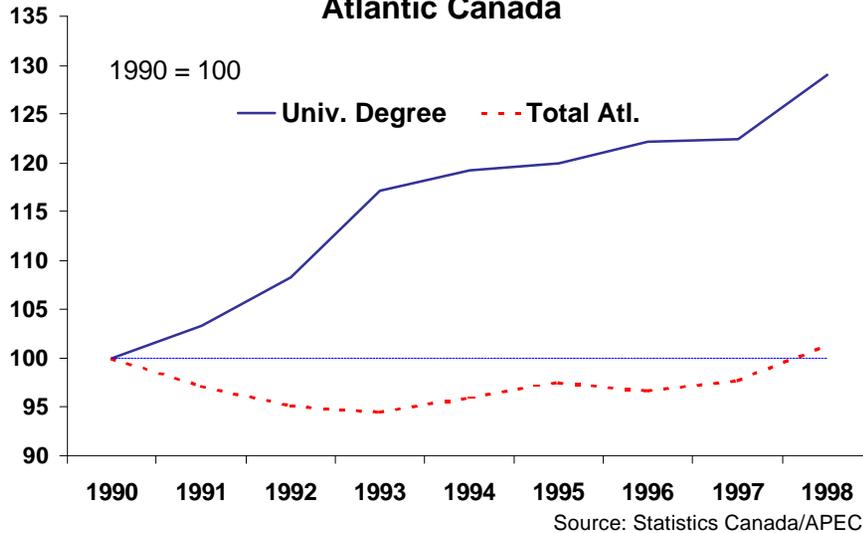
In addition to improving the chances of finding work, a university education also tends to ensure access to full-time rather than part-time jobs. Full-time employment growth for the labour market as a whole was stagnant in Atlantic Canada through the 1990s, but showed strong growth for those in the region holding a university degree. Full-time employment for Atlantic Canadians with a university degree grew by 29% from 1990 to 1998.

University graduates also have higher participation rates in the labour force. Throughout their lifetime, their increased

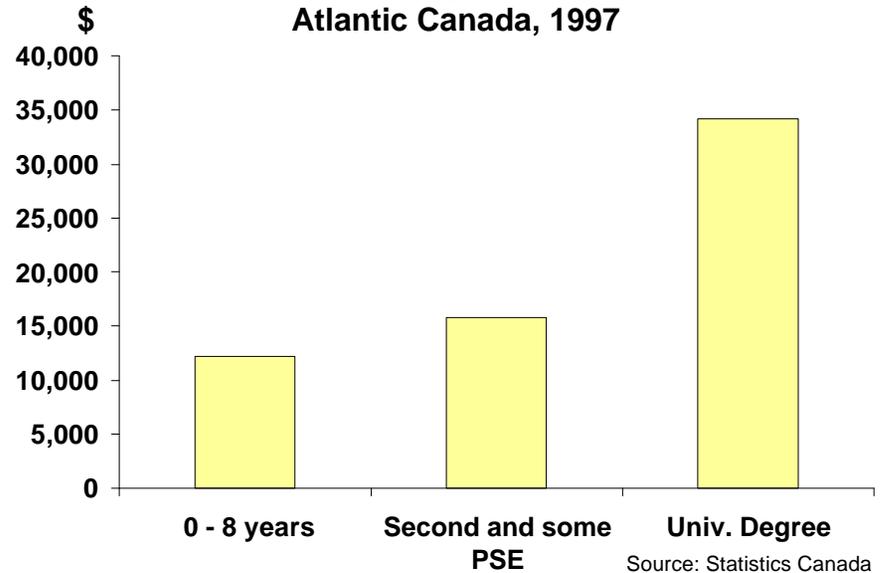
earnings and employment potential mean they are less likely to require government-provided income support.

In 1997, the median income in the Atlantic provinces for those with a university degree was \$34,225. This was more than double the median income for those who had finished high school or acquired some post-secondary training. More than a third of employed individuals with a university degree earned over \$45,000 in 1997, compared with only 7% of those with high school or some post-secondary education.

Full-Time Employment Growth by Education Level, Atlantic Canada



Median Income by Education Level, Atlantic Canada, 1997



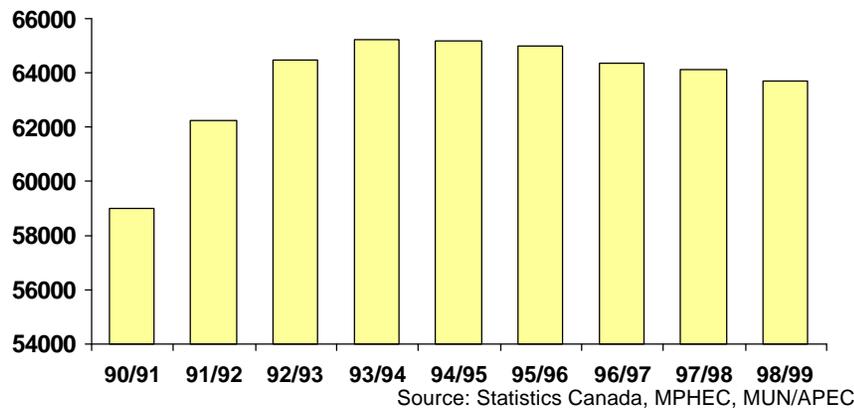
The Knowledge-Based Economy: Implications for Students and Universities

Growth in Enrolment

Atlantic Canadians are responding to the increased demand for knowledge and skills by pursuing educational opportunities, and enrolments in the region's universities have grown during the 1990s. After a sharp jump at the beginning of the decade, enrolment has dropped slightly from the peak reached in 1993/94. The 1998/99 full-time enrolment of 63,720 represents an increase of almost 5,000 over the start of the decade, despite a net decline of 22,000 in the 20-24 year age group across Atlantic Canada in the same period.

Increased enrolment is evident at both the undergraduate and graduate levels. From 1990/91 to 1998/99, undergraduate enrolment in the region grew by 7.9% while enrolment in Master's and Doctoral programs grew by nearly 10%. Part-time enrolment fell by 26% over that period in Atlantic Canada, following a national trend.

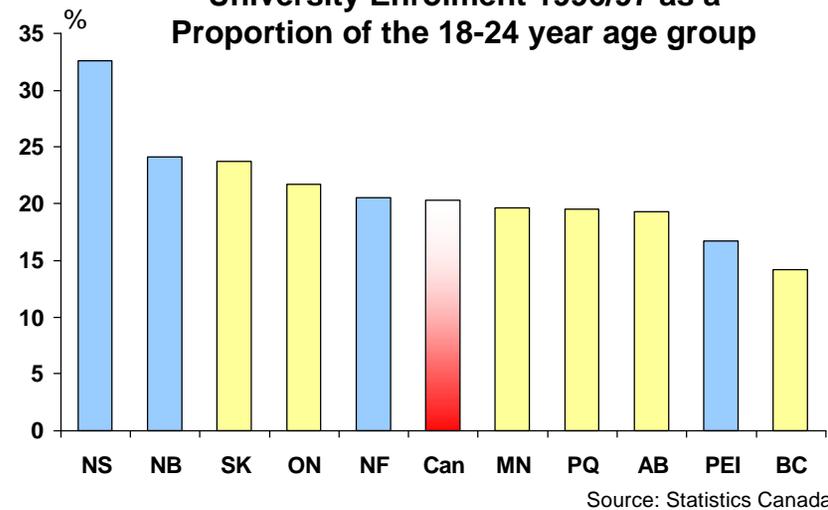
Full-Time Enrolment in Atlantic Universities



Within Canada, the proportion of young people enrolled in university is highest in New Brunswick and Nova Scotia. In Nova Scotia, for example, 32.6% of the 18-24 year population were enrolled in full-time studies at universities in 1996/97, significantly more than the Canadian average of 20.3%.

For all the Atlantic provinces, with the exception of Prince Edward Island, the proportion of the 18-24 year age group attending university has expanded faster than elsewhere in the country. This growth reflects not only the increasing propensity towards higher education among young Atlantic Canadians but also the rising enrolment from out-of-province students who find universities in Atlantic Canada an attractive alternative to those in their home province.

University Enrolment 1996/97 as a Proportion of the 18-24 year age group



The Knowledge-Based Economy: Implications for Students and Universities

Changing Educational Needs

As growth in high-knowledge industries continues to outpace overall economic growth, there has been a corresponding increase in demand for programs in scientific and technical disciplines. Through the 1990s, the strongest enrolment growth in universities across Canada has been in agricultural and biological sciences, as well as in health sciences and engineering and applied sciences.

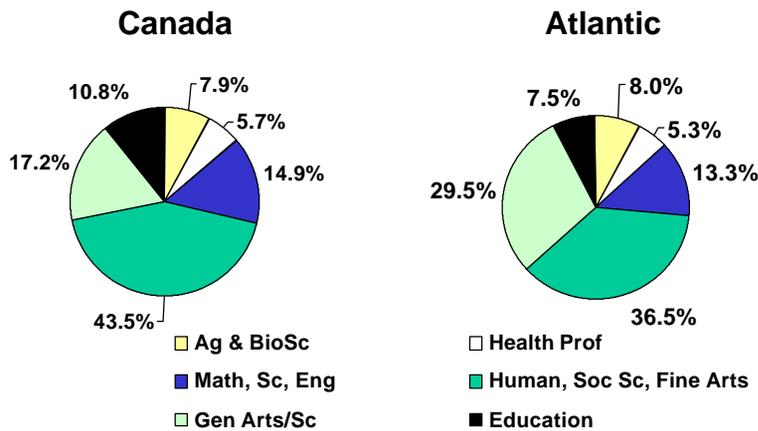
The core liberal arts programs continue to attract the largest numbers of students, although enrolment growth in these programs has been low. In 1996/97, 33.8% of full-

time undergraduate students in Atlantic Canada enrolled in Social Sciences and Humanities programs, while another 27.1% were general Arts & Science students, slightly above the national average.

The relationship between educational attainment and economic opportunities has also contributed to growing enrolments in graduate programs across Canada.

The number of young Atlantic Canadians holding graduate degrees has shown a marked increase in recent years. In 1996, 2.3% of Atlantic Canadians aged 25-34 held a graduate or medical degree compared with only 1.7% of that age group ten years earlier.

Full-Time Undergraduate Enrolment by Discipline, Canada and Atlantic Provinces, 1996/97 (%)



Source: Statistics Canada

However, while an increasing number of Atlantic Canadians hold graduate degrees, there are proportionately few graduate students in the region's universities. In 1998/99, only 4,359 full-time students enrolled in graduate studies at Atlantic Canadian universities. At less than 7% of the total full-time student population, the proportion of graduate students at the region's universities is about half the national average. Many Atlantic universities specialize in undergraduate programs or offer a limited range of professional and graduate programs; many Atlantic Canadians therefore have little option but to migrate out of the region if they wish to pursue an advanced degree.

The Knowledge-Based Economy: Implications for Students and Universities

Inter-Provincial Mobility

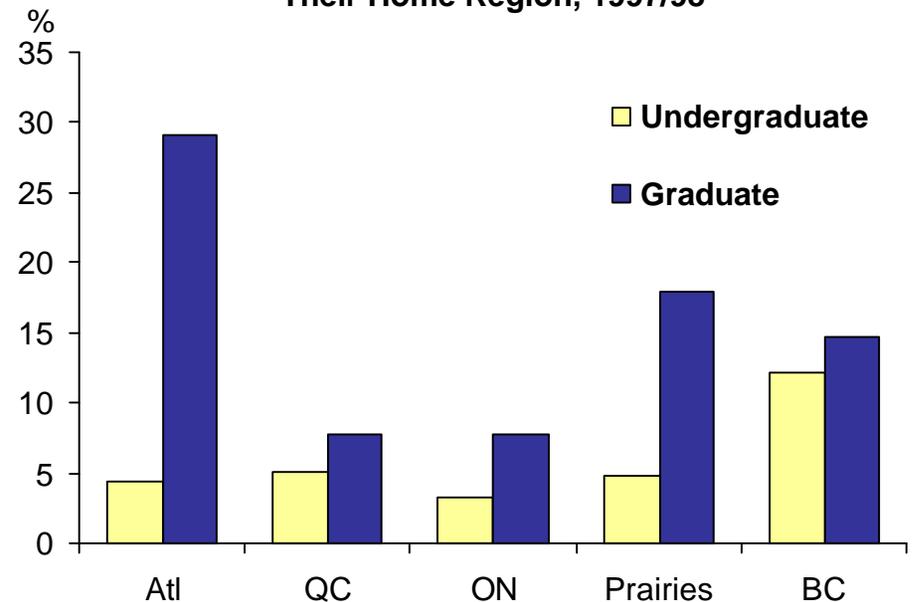
Although graduate students from Atlantic Canada may seek opportunities further afield, undergraduate students show a strong preference to study close to home. Only 4.3% of full-time Atlantic undergraduate students left to pursue their studies outside Atlantic Canada in 1997/98. There is, however, a substantial amount of intra-regional migration, with almost a fifth of Atlantic Canadian undergraduate students migrating to study in neighbouring provinces within the region.

Nova Scotia hosts a disproportionately large share of the region's student population. Over half the students leaving Newfoundland, Prince Edward Island and New Brunswick to attend university enrol in Nova Scotia institutions.

Atlantic universities also attract many out-of-region students, primarily for undergraduate degrees. Over 5,900 students from provinces outside Atlantic Canada enrolled in the region's universities in 1997/98, up 21.6% from six years prior. Including those from outside the country, out-of-region students now account for 13% of full-time enrolment in Atlantic Canada. This proportion was highest in Nova Scotia where out-of-region students represented 18% of full-time enrolment in 1997/98.

Ensuring that students have access to programs at universities across the country is an important cornerstone of the post-secondary education system in Canada. Mobility ensures the interchange of ideas and values, and contributes to a well-functioning labour force. For universities in Atlantic Canada, out-of-region alumni help them to build connections across the country with individuals, institutions and other potential partners.

Percentage of Students Attending University Outside of Their Home Region, 1997/98



Source: Statistics Canada

The Knowledge-Based Economy: Implications for Students and Universities

Enrolment Projections

Enrolment projections for Atlantic universities over the next twenty years indicate that enrolment will continue to grow, although the pace of growth will be slow.

The principal contributors to this trend are the slow rate of projected population growth combined with the demographic effects of an aging population. For example, in Newfoundland and Labrador, where the effect is strongest, the population of those in the 20-24 year age group is expected to fall from 19,836 in 1999 to 17,334 in 2003, a drop of 13%.

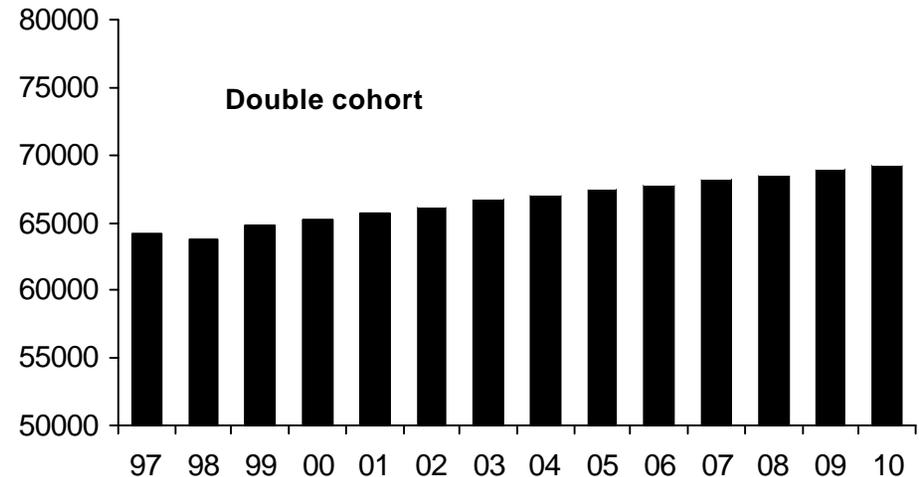
These declines are offset to some extent by the increased participation in university education and by a growing number of out-of-region students.

On the basis of current trends, APEC estimates a projected increase in enrolment of 8,200 students by 2010, to a total of almost 70,000.

However, it should be kept in mind that there are many other factors which could affect enrolment. For example, a decision by the region's universities to give greater priority to some of the fastest-growing disciplines could encourage expanded enrolments in these fields. Alternatively, similar initiatives outside the region could lure students away and further depress enrolments in Atlantic Canada.

One of the more immediate uncertainties surrounds the double cohort of Ontario students who will be entering the university system in 2003. Atlantic universities, particularly in Nova Scotia, are already popular destinations for Ontario students. Especially if capacity constraints occur in Ontario universities, the resulting spillover could lead to an increased demand for more than 9,000 places in Atlantic universities. How the universities will choose to respond to these demands is unclear, but it could lead to increased pressure on an already strained system.

**Enrolment Projections for Atlantic Canadian Universities
1999-2010**



Source: APEC

The Knowledge-Based Economy: Implications for Students and Universities

R&D, Innovation and the Role of Universities

The traditional role of universities as research institutions – creators of new knowledge – has acquired greater significance in the knowledge-based economy.

In addition to the direct research activities undertaken by university faculty and university-based research centres, universities play a much wider role in fostering a culture of innovation across society. They facilitate research and innovation linkages with the private sector and government and can play a key role in attracting investment in innovative new industries. Their graduating students, the innovators of the future, are an important link in the technology transfer chain.

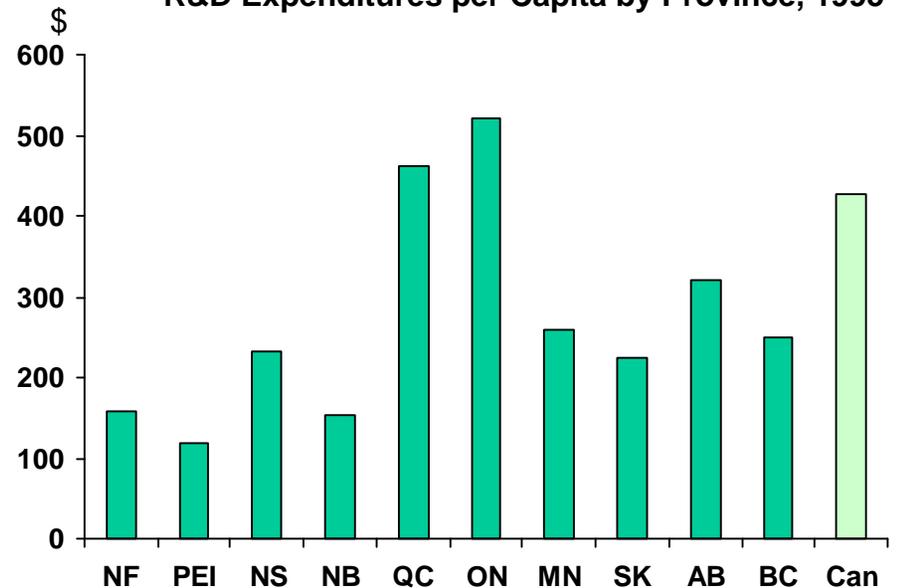
In the context of the new economy, it is of increasing concern that Canada lags other industrialized countries in its investment in research and development (R&D). In 1997, Canada spent 1.64% of its GDP on R&D – of the G7 countries, only Italy spent less.

The universities are a crucial component of Canada's R&D effort. Almost one quarter of Canadian R&D is accounted for by the higher education sector, the highest proportion amongst the G-7 countries. However, the share of national R&D accounted for by universities has been falling in Canada as R&D activity in the private sector has been growing much more rapidly.

This trend is in contrast to the pattern in the United States, for example, where expenditures on university research have grown faster than spending on both industrial and overall R&D.

Within Canada, the Atlantic region trails the rest of the country in expenditures on R&D. On a per capita basis, R&D spending in the four Atlantic provinces is the lowest in Canada. In 1996, Atlantic Canada accounted for less than four per cent of Canada's R&D expenditures.

R&D Expenditures per Capita by Province, 1995



Source: Statistics Canada

The Knowledge-Based Economy: Implications for Students and Universities

R&D in Atlantic Canada

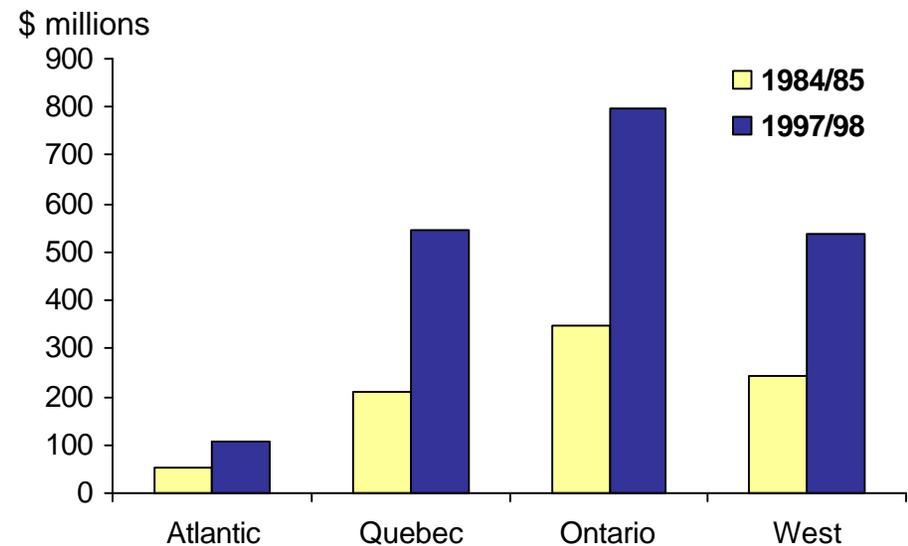
While universities are a significant part of the overall R&D effort in Canada, they play a proportionately greater role in research in Atlantic Canada, where business-generated and other private sector research is relatively small compared with other regions of the country. Atlantic universities accounted for 39% of the region's R&D in 1998, as opposed to 22% for Canada as a whole.

In 1997/98, Atlantic universities attracted research income of \$109 million, approximately 5.5% of the Canadian total. Of this amount, income from non-government sources such as donations and bequests made up 23%, while federal grants comprised nearly 55%, the highest proportion in the country.

With Atlantic Canada's greater reliance on federally sponsored research funding, reductions in public research grants have had a proportionately greater effect on R&D in the region. From 1988/89 to 1996/97, federal R&D expenditures grew by 17% across Canada. In the Atlantic region, however, expenditures fell by 11%. While recent initiatives such as the Canadian Foundation for Innovation and the 21st Century Chairs for Research Excellence are designed to increase the federal commitment to research at the national level, there are concerns that these monies will be allocated on the basis of current research strengths or will require a matching commitment. Both these conditions could disadvantage Atlantic Canada's potential to build new sources of research capacity.

The disproportionate number of smaller universities in the region correlates with smaller individual pools of researchers and a limited number of postgraduate programs, especially at the doctoral and post-doctoral levels at which much research is conducted. This constrains the existing capacity for research at many of the region's universities and, by limiting the base on which research capacity can be built, may be another factor restricting future growth in R&D activity.

Total University Research Income by Region



Source: CAUBO

Regional Economic Impact of Universities

- Direct Contributions to Economic Activity (1)
- Direct Contributions to Economic Activity (2)
- Indirect Contributions to Economic Activity

Regional Economic Impact of Universities

Direct Contributions to Economic Activity

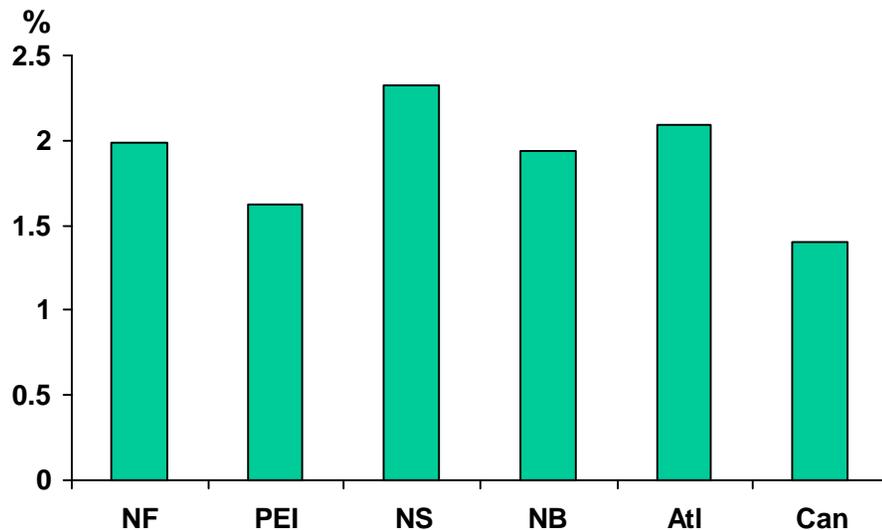
As major employers and purchasers of goods and services, universities are key contributors to local communities across Atlantic Canada. Spending by students and staff, as well as general operating expenditures, create income, revenues and profits in other industries in the region.

Direct university expenditures in 1997/98 totalled over \$1.04 billion, equivalent to 2.2% of regional GDP. Across Canada, university expenditures were equivalent to only 1.4% of GDP, over 35% less than in the Atlantic provinces.

About two-thirds of direct total expenditures of Atlantic universities are attributed to the wages and salaries of university employees. In 1997/98, these wages and salaries amounted to over \$689 million in the region, accounting for 2.6% of Atlantic labour income. By comparison, the national average was only 1.6%.

In addition to spending, universities in Atlantic Canada also contribute to the economy through job creation. Nearly 15,000 Atlantic Canadians are employed directly by the region's universities, about 1.5% of the total employed labour force compared to 1.1% nationally.

Total Expenditures by Universities as a % of GDP, 1998



Source: CAUBO, Statistics Canada, APEC

Expenditures by Atlantic Universities 1997/98			
	Total Exp	Wages & Salaries	
	(in \$000s)	(in \$000s)	% of Total
NF	227,090	150,824	66.42
PEI	43,471	31,445	72.34
NS	486,756	317,756	65.28
NB	284,857	189,074	66.38
Atl	1,042,174	689,099	66.12

Source: CAUBO

Regional Economic Impact of Universities

Direct Contributions to Economic Activity

In addition to the direct spending by universities and the people they employ, university students also make a significant contribution to economic activity in the region through spending on room and board, books, transportation and a range of personal expenses. Using the residence costs as a proxy for average student spending, it is estimated that students injected \$315 million into the region's economy in 1998/99.

Universities also attract visitors to the local community, either to visit students or to attend conferences, cultural activities or sporting events. It is estimated that visitor

spending related to university activities was \$41 million in 1998/99.

Both these estimates should be regarded as conservative. They are based on methodology used in previous studies, adjusted for current enrolment levels and costs of services. As there is only limited data available on certain aspects of student and visitor spending, the impacts of these two categories of spending are not fully accounted for in these estimates. For further details, refer to the Appendix.

Estimated Non-Tuition Student Expenditures, 1998/99

	Full-Time Enrolment	Average Residence Fee (\$)	Total Expenditures (\$000s)
NF	13,137	3,936	51,707
PEI	2,443	5,404	13,202
NS	29,804	5,197	154,891
NB	18,336	5,205	95,439
Atlantic	63,720	4,947	315,239

Sources: Statistics Canada, MPHEC, MUN, APEC

Out-of-Province Visitors, 1998/99

	Expenditures (\$000s)
NF	2,760
PEI	1,505
NS	23,952
NB	12,518
Atlantic	40,735

Sources: Statistics Canada, Handa *et al.* (1993), Harvey *et al.* (1995), APEC

Regional Economic Impact of Universities

Indirect Contributions to Economic Activity

In order to estimate the direct contribution of universities to the local economy, estimates were made as to the proportion of university spending taking place within the province. Of the \$1.04 billion in direct expenditures by Atlantic universities, an estimated \$745 million was spent within the region.

Including the effects of university, student and visitor spending, direct expenditures in the local community linked to the presence of universities totalled an estimated \$1.10 billion in 1998/99.

A large part of this direct spending in turn becomes wages and profits in other industries and is then spent again on other goods and services. In 1998/99 the universities and their employees created \$321 million in induced spending in the region. Student spending generated an additional \$183 million and visitors to the region an additional \$24 million in induced spending in the regional economy. (See Appendix for detailed calculations.)

In total, the region's universities created an estimated \$1.63 billion in direct and induced spending.

University spending, on wages and salaries as well as on other expenses, maintained 12,502 jobs in the region, in addition to the 14,900 positions directly held by university faculty and staff. Student spending contributed another 7,131 jobs to the region while the effects of visitor spending added another 921.

Universities in Atlantic Canada directly employed or maintained 35,454 jobs in 1998/99, equivalent to 3.6% of the region's employed labour force that year.

Total Economic Impact of Atlantic Universities, 1998/99			
	Spending (\$000s)		
	Direct	Induced	Total
Universities	745,471	320,553	1,066,024
<i>Wages & Salaries</i>	551,279	237,049	788,328
<i>Other</i>	194,192	83,504	277,696
Students	315,239	182,839	498,078
Visitors	40,735	23,626	64,361
Total	1,101,445	527,017	1,628,462
Employment			
Universities	14,900	12,502	27,402
<i>Wages & Salaries</i>		10,394	10,394
<i>Other</i>		2,108	2,108
Students		7,131	7,131
Visitors		921	921
Total	14,900	20,554	35,454

Sources: CAUBO, Statistics Canada, Harvey *et al.* (1995), O'Sullivan (1991), APEC

The Funding Challenge Faced by Atlantic Canada's Universities

- The Decline in Public Funding (1)
- The Decline in Public Funding (2)
- Increased Tuition Fees
- Impact on University Expenditures
- Maintaining Program Quality

The Funding Challenge Faced by Atlantic Canada's Universities

The Decline in Public Funding

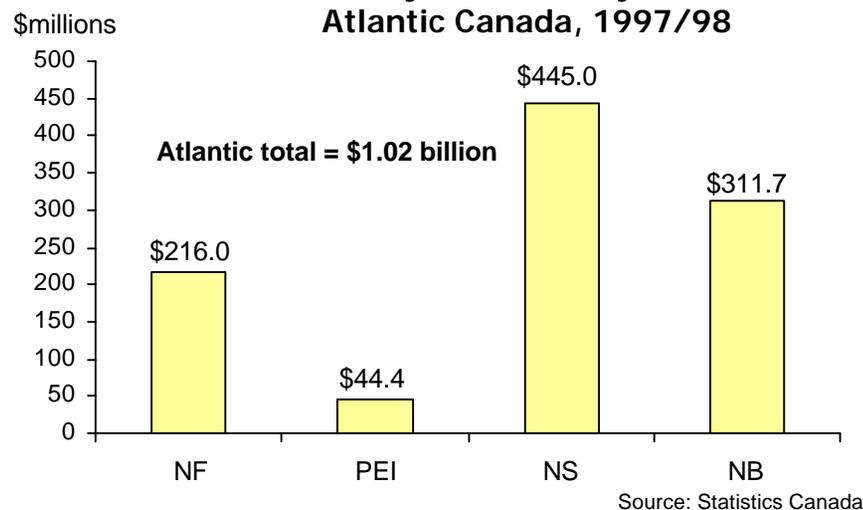
For many years in the post-war period, the expanding economy and growing welfare state resulted in an increasing flow of state support to Canada's universities. However, this has changed as government restraint has restricted this flow of support. In Atlantic Canada, this has been exacerbated by a slow-growing population. Although provincial governments are still the single largest funding partner in each province, the universities are increasingly turning to other sources to build up revenues.

In Atlantic Canada, total university funding in 1998 was \$1.02 billion. In nominal terms, total funding levels changed very little over the decade. However, in constant dollar terms, this represents a decline of 7% since 1992.

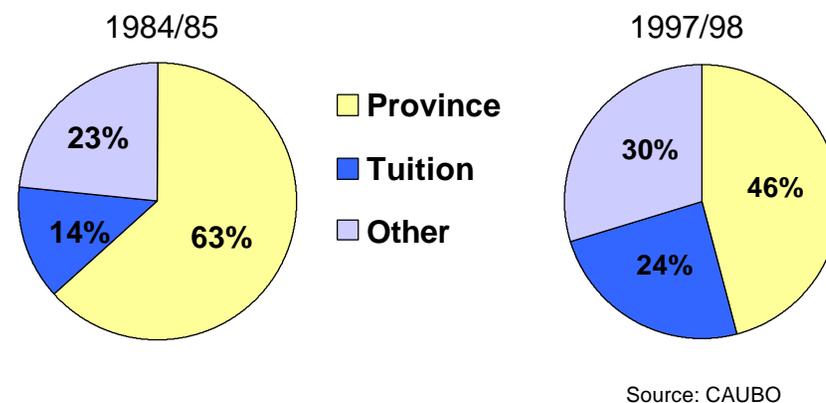
The priority assigned to funding universities has been falling across Canada, but this trend has been more pronounced in the Atlantic region, where the university share of total provincial spending on education fell by 7.4% from 1991 to 1996, as opposed to a decline of 5.3% in the rest of Canada.

As a result of government funding cutbacks, the composition of university revenues has changed in the 1990s. In 1984/85, provincial grants represented 63% of Atlantic university operating revenues (excluding research); by 1997/98 they accounted for 46%. At the same time, the significance of tuition fees to university revenues has increased considerably – from 14% in 1984/85 to almost a quarter in 1997/98.

University Revenues by Province, Atlantic Canada, 1997/98



University Revenues by Source, Atlantic Canada (% share)



The Funding Challenge Faced by Atlantic Canada's Universities

The Decline in Public Funding

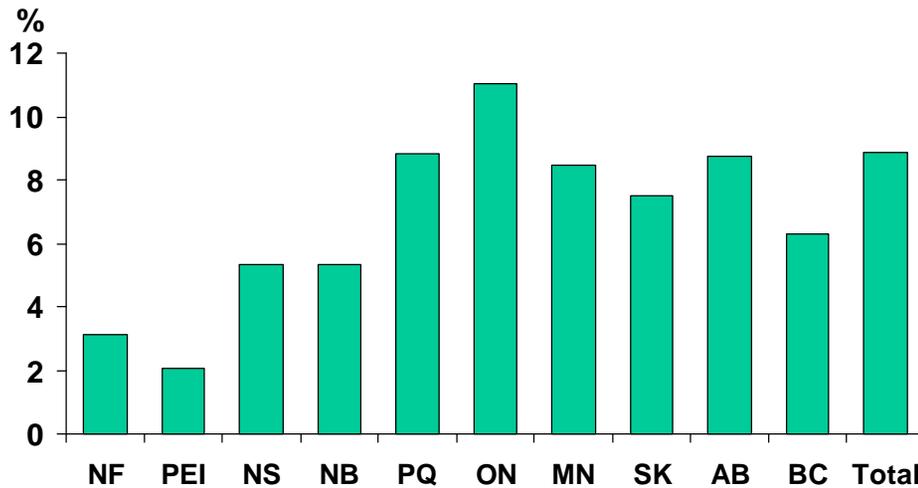
On a per-student basis, Atlantic Canadian universities receive comparatively less funding than other regions of the country. Provincial operating grants in Atlantic Canada in 1997/98 averaged \$7,366 per full-time student, 13% below the Canadian average of \$8,479. Regionally, these range from a low of \$6,154 in Nova Scotia to a high of \$11,312 in PEI.

Atlantic Canada has the lowest proportion of university revenue coming from bequests, donations and non-government grants – 4.7% of total income in 1997/98, as opposed to 9.2% in the rest of Canada.

Newfoundland & Labrador	\$9,141
Prince Edward Island	\$11,312
Nova Scotia	\$6,154
New Brunswick	\$7,555
<i>Atlantic Region average</i>	<i>\$7,366</i>
Canada average	\$8,479

Source: CAUBO

Bequests, Donations and Non-government Grants as a Percentage of Total University Funds, 1997/98



Source: CAUBO

Across Canada, bequests, donations and non-government grants have been growing in importance as a source of university revenues, especially in the funding of research activities. Starting from comparable shares of revenues in 1992/93, the rest of Canada has outpaced the Atlantic universities in the rate at which income from these sources has been growing. In 1997/98, bequests, donations and non-government grants in Atlantic Canada were 260% the size of 1992/93 levels, but for Canada as a whole these revenues had increased fourfold.

The Funding Challenge Faced by Atlantic Canada's Universities

Increased Tuition Fees

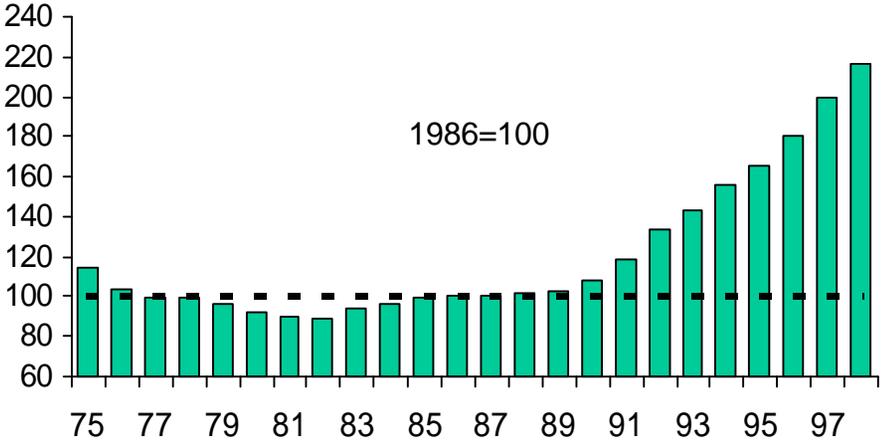
Declining government support poses serious challenges for the accessibility and quality of the region's universities. As government funding falls, universities are increasingly turning to tuition and other fees to make up the revenue shortfall.

Tuition fees in Nova Scotia have more than doubled since the start of the 1990s, and fees have increased sharply in the other provinces as well. At \$4,113 annually for undergraduate arts students, Nova Scotia has the highest tuition fees of any province.

Tuition fee increases have been greatest for those in professional and other programs where the payback to the individual is highest in terms of subsequent earning power.

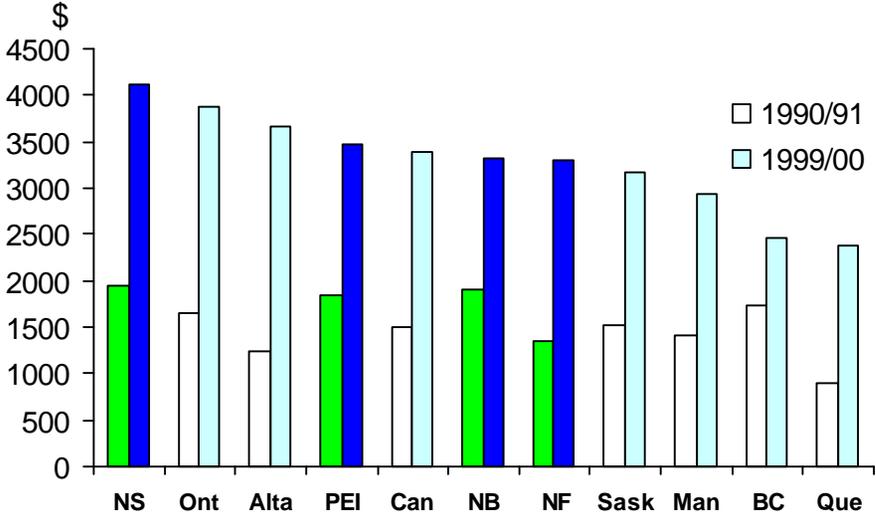
The increases in tuition have been matched by increasing student debt levels, in particular rising student loans. For many students in Atlantic Canada, there are increasing concerns that rising tuition will place a university education beyond the reach of them and their families.

Canadian University Tuition Fee Price Index, 1980-1998



Source: Statistics Canada

Average Undergraduate Arts Tuition by Province



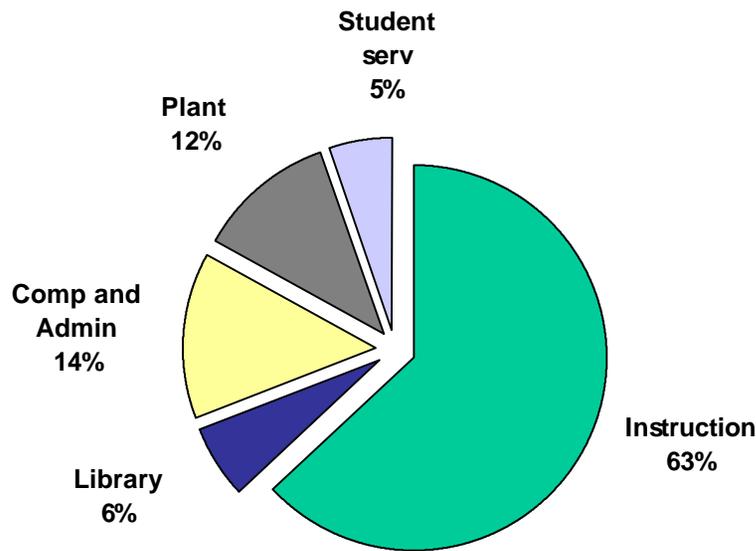
Source: Statistics Canada

The Funding Challenge Faced by Atlantic Canada's Universities

Impact on University Expenditures

The decline in public funding has triggered a tightening of expenditures in universities across Canada. Two areas of university budgets which have been most affected are plant and equipment (including maintenance and new capital investments) and faculty and programming.

University Expenditures, Atlantic Canada, 1997/98



Source: CAUBO

The average life of university buildings in campuses across Atlantic Canada has increased steadily, more than doubling since the late 1960s. With limited access to public funds for new building construction, most universities across the region have increasingly relied on repairs or renovations to existing facilities. However, since the start of the 1990s, even these expenditures have become increasingly difficult to manage, leading to a significant level of deferred maintenance. The Atlantic universities now estimate that there is over \$400 million in deferred maintenance required across the four provinces.

The lack of appropriate facilities, including classrooms and laboratories, has led to enrolment caps or other program constraints in a number of key areas, in particular some of the scientific fields which require more sophisticated research facilities. The universities estimate that approximately \$275 million is required in new capital investment to allow them to build the required new facilities. In addition, the universities are increasingly hard pressed to match the demand for new equipment and technology-based services.

The Funding Challenge Faced by Atlantic Canada's Universities

Maintaining Program Quality – Faculty and Course Offerings

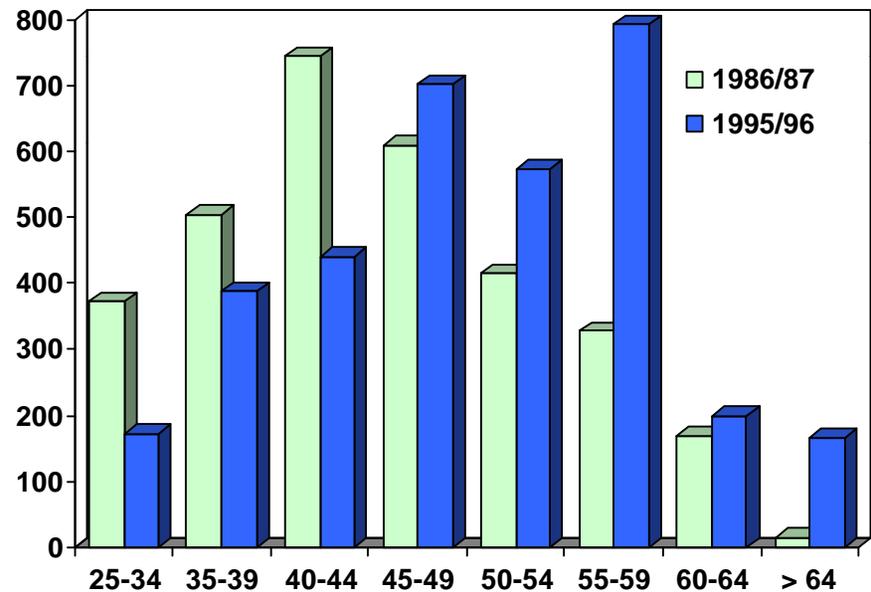
With salaries and wages of teaching and research faculty the largest component of university expenditures, it is hardly surprising that this category has been a target of expenditure cuts in recent years. Across Atlantic Canada, retiring tenured faculty have either not been replaced or have been replaced by temporary or part-time instructors. As a result, the number of full-time faculty fell by more than 11% between 1990/91 and 1997/98. In 1997/98, there were 511 fewer full-time faculty in universities in Atlantic Canada than at the start of the decade.

The changing distribution of faculty in favour of younger or contract faculty has had a marked impact on the average earnings of university teaching staff. In Nova Scotia, for example, where average weekly earnings of university teaching staff had typically exceeded Canadian levels, they have now fallen to well below Canadian levels.

However, with a large number of faculty entering retirement over the next ten to fifteen years, it may be difficult for universities to maintain this trend without affecting program quality. The retirement of faculty across north America in this period is expected to result in a bidding up of salary levels for incoming young faculty.

This trend is already evident with respect to more senior faculty, and Atlantic universities are already at a disadvantage in the salary levels they can offer to attract those with an established research and teaching record. A recent AAU survey cited the availability of faculty as the most significant factor impeding growth in program choice and enrolment levels.

Number of University Faculty in the Maritime Provinces, 1986/87 and 1995/96 (by age group)



Source: MPHEC

Investing in Atlantic Canada's Future

Investing in Atlantic Canada's Future

The challenges facing Atlantic universities in the context of knowledge-based growth are considerable. In a period of decreased public funding when capacity constraints are already being felt, universities are faced with increased enrolments and demand for new and innovative programs, especially in science and technology disciplines and multi-disciplinary fields that link traditional disciplines to new technologies, such as IT.

In order to meet the increased demand for enrolment, more specialized programs and research, Atlantic Canada's universities must be prepared to make major investments in new facilities, on-going maintenance, faculty and program offerings. This cannot occur without a greater commitment from government.

The funding requirements are significant, as they must address both the increased demand for university-based education and research as well as redress the under-investment that has occurred over a significant period of time.

This implies a shift in public policy priorities, with a greater recognition and greater public awareness of the role which the universities can play in speeding up the rate of transformation to a knowledge-based economy.

The funding challenge must be directed at both senior levels of government, given the reductions which have taken place in federal transfer payments to the provinces for post-secondary education. Existing levels of funding must be increased, but new funding arrangements, collaborative approaches and programs of support should also be explored.

The universities, too, will have to build on existing initiatives as well as develop new mechanisms to harness their resources effectively to meet the changing needs of their students and researchers.

Atlantic Canada has the advantage of a strong university system – a legacy of past investment that can be the base for future prosperity. Although the universities have always had an important part to play in the region's economy, their role has changed considerably in recent years. Over the next few years, more young Atlantic Canadians than ever before will be looking to the region's universities to provide them with the education and skills they need. An enhanced university system is necessary in order to achieve success and promote the region's prosperity in the new knowledge economy. To maximize the benefits of an enhanced university system for all of Atlantic Canada will require creativity and commitment from all stakeholders in the region.

Notes and References

Data Note

Every effort has been made to present up-to-date information in this report. Unfortunately, data limitations and incomplete series prevented the use of a uniform reference period. However, in all cases the data used are the most recent available. Most charts utilized data from the CAUBO and various Statistics Canada sources cited below, most commonly the Labour Force Survey and *Education in Canada*.

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Appendix: Methodology of Economic Impact Estimates

- University Spending Effects (1)
- University Spending Effects (2)
- University Spending Effects (3)
- University Employment Effects
- Student Spending Estimates
- Visitor Spending Estimates
- Total Economic Impact
- Total Economic Impact –
Newfoundland & Labrador and Prince Edward Island
- Total Economic Impact –
Nova Scotia and New Brunswick

Appendix -- Methodology of Economic Impact Estimates

University Spending Effects

The economic impact of universities in the Atlantic region results from three categories of direct spending: by universities and their employees, by students, and by out-of-province visitors. *Direct spending* refers to expenditures made by the universities, staff, students and visitors themselves in the local economy and on imported goods. The direct expenditures within the community become revenue, wages and profits in other industries which in turn spend this income themselves. These subsequent phases of spending are referred to as *induced spending*.

In this report, estimates were made for direct and induced spending within the region for each of the three categories identified above, in order to estimate the total economic effect arising from the presence of universities in the region.

To do so required using data from different periods. While enrolment and tuition data was available for 1998/99, the most recent information available on out-of-province students and university expenditures was 1997/98. To accommodate these differences, this report assumes that university expenditures in 1998/99 were the same as in the previous year. Methodology concerning out-of-province-student data is discussed on page A6.

Beginning with university and employee expenditures, the methodology behind the direct spending estimates for each of these three categories will be detailed in turn, along with the resulting induced spending and employment effects. The methodology is drawn from previous studies on the economic impacts of the Nova Scotia and New Brunswick university systems. The process is described first using the Newfoundland & Labrador case as an example. Similarly calculated results for the other three Atlantic provinces can be found on the following page.

Appendix -- Methodology of Economic Impact Estimates

University Spending Effects

Total direct expenditures by Memorial University came to \$227 million in 1997/98, of which 66% was on wages and salaries. Based on the findings of a New Brunswick study (1999), it is estimated that 80% of these wages and salaries are spent within the province and the remaining 20% are spent on imported goods and services. The same report estimated that 55% of non-wage university expenditures were spent within the province, while the remaining 45% were spent on imported goods and services. Applying these ratios yields the estimate of direct university spending within Newfoundland & Labrador (\$163 million).

To determine the induced spending which results from these university expenditures, the income-generated multiplier (0.430) developed by O'Sullivan (1991) was applied to determine the induced income created as a result of direct university expenditures.

In this manner, APEC estimates induced spending in Newfoundland & Labrador to be \$70 million in 1997/98. Adding this to that portion of university wages and salaries and other direct expenditures which is spent in the region yields overall spending of \$233 million in the province resulting from the presence of universities. The induced spending multiplier from universities is the ratio of overall spending to direct university wages and salaries; for Newfoundland & Labrador it is 1.54 (\$232 million ÷ \$151 million). This ratio is slightly lower than ones that have been used in other studies.

Table A - 1

Estimated Direct and Induced Spending Effects of Newfoundland & Labrador Universities (in \$000s), 1998/99							
	Total Expenditures	% in * Province	= Direct Spending *	Income-generated * Multiplier	= Induced Spending	Total Spending (Direct + Induced)	Induced Spending Multiplier
Wages & Salaries	150,824	80%	120,659	0.430	51,883	172,543	
Other Expenditures	76,266	55%	41,946	0.430	18,037	59,983	
TOTAL	227,090		162,606		69,920	232,526	1.54

Sources: Statistics Canada, Harvey *et al.* (1995), O'Sullivan (1991), APEC

Appendix -- Methodology of Economic Impact Estimates

University Spending Effects

Table A - 2

Estimated Direct and Induced Spending Effects of Prince Edward Island Universities (in \$000s), 1998/99							
	Total Expenditures	% in * Province	= Direct Spending	* Income-generated Multiplier	= Induced Spending	Total Spending (Direct + Induced)	Induced Spending Multiplier
Wages & Salaries	31,445	80%	25,156	0.43	10,817	35,973	
Other Expenditures	12,026	55%	6,614	0.43	2,844	9,458	
TOTAL	43,471		31,770		13,661	45,432	1.44

Table A - 3

Estimated Direct and Induced Spending Effects of Nova Scotia Universities (\$000s), 1998/99							
	Total Expenditures	% in * Province	= Direct Spending	* Income-generated Multiplier	= Induced Spending	Total Spending (Direct + Induced)	Induced Spending Multiplier
Wages & Salaries	317,756	80%	254,205	0.43	109,308	363,513	
Other Expenditures	169,000	55%	92,950	0.43	39,969	132,919	
TOTAL	486,756		347,155		149,277	496,431	1.56

Table A - 4

Estimated Direct and Induced Spending Effects of New Brunswick Universities (in \$000s), 1998/99							
	Total Expenditures	% in * Province	= Direct Spending	* Income-generated Multiplier	= Induced Spending	Total Spending (Direct + Induced)	Induced Spending Multiplier
Wages & Salaries	189,074	80%	151,259	0.43	65,041	216,301	
Other Expenditures	95,783	55%	52,681	0.43	22,653	75,333	
TOTAL	284,857		203,940		87,694	291,634	1.54

Appendix -- Methodology of Economic Impact Estimates

University Employment Effects

In 1998, universities in the Atlantic region directly employed 14,900 people. To determine the induced employment effects, the methodology of Harvey et al. (1995) was used. Induced income was divided by average industrial wage in each province to determine the number of jobs indirectly created in each province (12,502). The total number of jobs maintained by university expenditures is then 27,402 (14,900 + 9,987). The employment multiplier – the ratio of total jobs to direct university employment – is therefore estimated to be 1.84 for the region as a whole (27,402 ÷ 14,900). (See Table A - 5)

Table A - 5

Estimated Direct and Induced Employment Effects of Atlantic Universities, 1998/99

	Direct Employment	Induced Spending (\$000s)	Avg Industrial wage (\$)	Induced Employment	Total Employment	Employment Multiplier
Newfoundland and Lab.	3,000	69,920	25,797	2,710	5,710	1.90
Prince Edward Island	600	13,661	23,343	585	1,185	1.98
Nova Scotia	7,400	149,277	25,667	5,816	13,216	1.79
New Brunswick	3,900	87,694	25,867	3,390	7,290	1.87
Atlantic Canada	14,900	320,552		12,502	27,402	1.84

Sources: Statistics Canada, Harvey *et al.* (1995), O'Sullivan (1991), APEC

Appendix -- Methodology of Economic Impact Estimates

Student Spending Estimates

In this report, non-tuition student spending in Atlantic Canada was estimated using average university room and board expenses as a proxy for overall student spending. Based on this measure, students contributed \$315 million in direct expenditures to the Atlantic economy.

The induced spending created as a result of these expenditures was estimated using O'Sullivan's income-generated multiplier of 0.580. Using the method described on the first page of the Appendix, induced spending in the region is calculated to have totalled \$183 million and maintained 7,131 jobs (see Table A - 6).

It should be pointed out that these estimates do not include student spending on books, transportation, clothing, personal care or entertainment. As such, it is acknowledged that these estimates probably under-represent the full picture of student spending and should therefore be regarded as conservative estimates. Unfortunately, although there were some older studies on the student spending patterns, it was felt these were too out of date to provide accurate estimates on current student spending.

Table A - 6

	Induced Effects of Non-Tuition Student Spending, 1998/99					
	Total Student Exp (\$000s)	Income-Gen * Multiplier	Induced = Spending (\$000s)		Avg Ind Wage (\$)	Induced = Employment
NF	51,707	0.580	29,990		25,797	1,163
PEI	13,202	0.580	7,657		23,343	328
NS	154,891	0.580	89,837	÷	25,667	3,500
NB	95,439	0.580	55,355		25,867	2,140
Atlantic	315,239	0.580	182,839			7,131

Sources: Statistics Canada, MPHEC, MUN, Harvey *et al.* (1995), O'Sullivan (1991), APEC

Appendix -- Methodology of Economic Impact Estimates

Visitor Spending Estimates

The economic impact of out-of-province visitors on the regional economy is based on work done for McGill University by Handa *et al.* (1993) and subsequently adapted by Harvey *et al.* (1995) and other studies as well.

Harvey *et al.* assumed that each out-of-province student in Nova Scotia received, on average, 4 visits per year and that, based on visitor survey data, each visitor spent \$484 in the province in 1991/92. The same methodology is used in this report, but the average outlay of each visit has been increased to \$600, in line with inflation (CPI) growth for transportation costs.

The most recent data available on out-of-province enrolment is for 1997/98. In order for visitor spending estimates to be consistent with student and university expenditures, out-of-province enrolment for 1998/99 was estimated using the 1997/98 proportions and applying them to 1998/99 aggregate enrolment levels.

By applying these estimates to all four Atlantic provinces, APEC arrives at the estimate for direct visitor expenditures in the region's economy – \$41 million. These expenditures generate a further \$24 million in induced spending, which in turn maintains an additional 921 jobs in the region.

Table A - 7

Estimated Spending by Out-of-Province Visitors, 1998/99				
	Est. Out-of-Province Enrolment *	Avg Number of Visits *	Avg Expenditure per Visit *	Total Visitor = Spending (\$000s)
NF	1,150	4	600	2,760
PEI	627	4	600	1,505
NS	9,980	4	600	23,952
NB	5,216	4	600	12,518
Total				40,735

Table A - 8

Induced Effects of Visitor Spending, 1998/99					
	Total Visitor Exp (\$000s) *	Income-Gen Multiplier *	Induced Spending = (\$000s)	Avg Ind Wage ÷	Induced Employment =
NF	2,760	0.580	1,601	25,797	62
PEI	1,505	0.580	873	23,343	37
NS	23,952	0.580	13,892	25,667	541
NB	12,518	0.580	7,260	25,867	281
Atlantic	40,735	0.580	23,626		921

Sources: Statistics Canada, Handa *et al.* (1993), Harvey *et al.* (1995), O'Sullivan (1991), APEC

Appendix -- Methodology of Economic Impact Estimates

Total Economic Impact

Table A - 9

Adding together the direct and induced effects for the three categories of spending in each of the Atlantic provinces yields APEC's estimate of the overall economic impact of universities in the region.

In total, direct spending resulting from the presence of universities is estimated at \$1.10 billion while induced spending is estimated at \$527 million. As well, the university presence in Atlantic Canada maintains an estimated 20,554 jobs in addition to the 14,900 positions directly held by university staff. Tables for individual provinces can be found on the next two pages.

Although this economic impact is considerable, it may in fact be underestimated. In addition to the underestimate of student spending discussed above, the allowance which was made for leakages from the region was likely an overestimate. Estimates of intra-provincial and import spending were made for each province separately, without accounting for the close linkages which exist within the region. As a result, a portion of each province's lost import spending may be recovered in another Atlantic province, bringing the actual regional economic impact even higher.

Total Economic Impact of Atlantic Universities, 1998/99			
Spending (\$000s)	Direct	Induced	Total
Universities	745,471	320,552	1,066,023
<i>Wages & Salaries</i>	551,279	237,049	788,328
<i>Other</i>	194,192	83,503	277,695
Students	315,239	182,839	498,078
Visitors	40,735	23,626	64,361
Total	1,101,445	527,017	1,628,462
Employment			
Universities	14,900	12,502	27,402
<i>Wages & Salaries</i>		10,394	10,394
<i>Other</i>		2,108	2,108
Students		7,131	7,131
Visitors		921	921
Total	14,900	20,554	35,454

Appendix -- Methodology of Economic Impact Estimates

Total Economic Impact – Newfoundland & Labrador and Prince Edward Island

Table A - 10

Total Economic Impact of Newfoundland & Labrador Universities, 1998/99			
Spending (\$000s)	Direct	Induced	Total
Universities	162,606	69,920	232,526
<i>Wages & Salaries</i>	120,659	51,883	172,543
<i>Other</i>	41,946	18,037	59,983
Students	51,707	29,990	81,697
Visitors	2,760	1,601	4,361
Total	217,073	101,511	318,584
Employment			
Universities	3,000	2,710	5,710
<i>Wages & Salaries</i>		2,011	2,011
<i>Other</i>		699	699
Students		1,163	1,163
Visitors		62	62
Total	3,000	3,935	6,935

Table A - 11

Total Economic Impact of Prince Edward Island Universities, 1998/99			
Spending (\$000s)	Direct	Induced	Total
Universities	31,770	13,661	45,432
<i>Wages & Salaries</i>	25,156	10,817	35,973
<i>Other</i>	6,614	2,844	9,458
Students	13,202	7,657	20,859
Visitors	1,505	873	2,378
Total	46,477	22,191	68,669
Employment			
Universities	600	585	1,185
<i>Wages & Salaries</i>		463	463
<i>Other</i>		122	122
Students		328	328
Visitors		37	37
Total	600	950	1,550

Appendix -- Methodology of Economic Impact Estimates

Total Economic Impact – Nova Scotia and New Brunswick

Table A - 12

Total Economic Impact of Nova Scotia Universities, 1998/99			
Spending (\$000s)	Direct	Induced	Total
Universities	347,155	149,277	496,432
<i>Wages & Salaries</i>	254,205	109,308	35,973
<i>Other</i>	92,950	39,969	132,919
Students	154,891	89,837	244,728
Visitors	23,952	13,892	37,844
Total	525,998	253,006	779,004
Employment			
Universities	7,400	5,816	13,216
<i>Wages & Salaries</i>		4,259	4,259
<i>Other</i>		1,557	1,557
Students		3,500	3,500
Visitors		541	541
Total	7,400	9,857	17,257

Table A - 13

Total Economic Impact of New Brunswick Universities, 1998/99			
Spending (\$000s)	Direct	Induced	Total
Universities	203,940	87,694	291,634
<i>Wages & Salaries</i>	151,259	65,041	216,301
<i>Other</i>	52,681	22,653	75,333
Students	95,439	55,355	150,794
Visitors	12,518	7,261	19,779
Total	311,897	150,310	462,207
Employment			
Universities	3,900	3,390	7,290
<i>Wages & Salaries</i>		2,514	2,514
<i>Other</i>		876	876
Students		2,140	2,140
Visitors		281	281
Total	3,900	5,811	9,711