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Institutional Variations in Faculty Demographic Profiles

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ABSTRACT

This paper proposes that many of the academic, financial and management challenges facing higher education are the result of a group of inter-related financial and demographic variables which are combining to produce a "ratchet" effect. Each twist of the ratchet reduces the institutional flexibility necessary for making adaptive responses with respect to revenue and expenses, renewal, and diversity which are required to avoid a further tightening of the ratchet. Another decade of decline may be ahead for Canadian Universities unless the dynamic interplay of the variables responsible for the ratchet can be reversed. Toward this end, the methodology of "institutional variations" is proposed, and is illustrated through an analysis of the faculty demographic profiles of nine Canadian universities. The proposed methodology requires focusing on collecting specific, descriptive information about individual institutions, rather than the usual strategy of collecting normative, aggregated information about higher education in general.

RÉSUMÉ

Les difficultés en matière d'enseignement, de financement et de gestion qui assaillent le domaine de l'enseignement supérieur découleraient d'un ensemble de variables financières et démographiques

interdépendantes qui, combinées, donnent lieu à une détérioration graduelle et irréversible de la situation. Chaque fois qu'on «serre la vis» à un établissement, celui-ci perd la latitude dont il a besoin pour prendre, en ce qui concerne les recettes, les dépenses, le renouvellement et la diversité, les mesures adaptatives nécessaires pour éviter un nouveau resserrement assorti d'autres conséquences tout aussi irréversibles. Les universités canadiennes pourraient avoir à subir un déclin pendant encore une autre décennie, à moins qu'on ne renverse l'interaction dynamique des variables en cause. À cette fin, les auteurs proposent une méthode fondée sur les variations liées à l'établissement, qu'ils illustrent au moyen d'une analyse de profils démographiques du personnel enseignant de neuf universités canadiennes. Cette méthode met en outre l'accent sur la collecte de données précises et descriptives sur un établissement donné, plutôt que sur le recours à la méthode habituelle de collecte de données globales cumulées sur l'enseignement supérieur en général.

INTRODUCTION

Canadian universities are facing serious academic, financial, and management challenges as they strive to adapt to the economic and social realities of the 1990s. A group of inter-related demographic and financial variables are combining to produce a "ratchet" effect that is progressively reducing their flexibility and capacity to meet these challenges. This demographic/financial ratchet results from escalating costs and decreasing revenues. As each 'twist' reduces flexibility, the ratchet 'tightens down' on institutions, squeezing from them greater and greater measures of the energy and vitality necessary for adaptations. Unless the dynamic interplay of the variables responsible for the ratchet is understood and reversed, another decade of decline may be ahead for Canadian universities. Not all institutions will experience the effects of the ratchet to the same degree. However, for some, the pressure of the ratchet may become quite severe, before its effects begin to loosen around 2007.

This paper will explore the demographic variables and the financial restraints that have created the ratchet and the degree to which different institutions will feel its effects, and suggest steps that specific institutions could take to lessen its impact. This paper will also illustrate how research conducted at the institutional level is the most useful methodology to adopt in the search for appropriate solutions.

Faculty Demographics

The foundation for the demographic/financial ratchet was laid in the rapid expansion of universities in the 1960s and 1970s (Bond, 1985; Davidson, 1991; Pfaffenberger, 1989; Renner, 1988). During this period, large numbers of young faculty were hired to teach the Baby Boomers and additional numbers of non-traditional students that were pursuing postsecondary education. This period of rapid expansion was followed by a period of slower growth (Leslie, 1980). As a result, a large number of faculty will begin to reach retirement age (taken as 65 years of age) after the year 2000, reaching a peak in the first decade of the next century (Bond, 1985; Renner, 1988). The present study will look at the age profile of faculty and its relationship to other variables.

One demographic effect of the ratchet has been to limit a university's capacity for renewal. Riffel (1994) began a discussion paper by asking if universities can adjust to continuing financial restraint and at the same time foster institutional renewal and vitality. The financial constraints facing universities have resulted in a long period of limited hiring that has reduced the infusion of "new blood" into the academy (Bond & Nadeau, 1992; Chronister & Truesdell, 1991; Lovett, 1983-84; Renner, 1995; Riffel, 1994). These writers have suggested that new blood brings with it a continual stream of creative research ideas and methodologies, innovative teaching techniques, and a general enthusiasm into the community, that results in "dynamism" (Renner, 1988). In addition, in the days of expansion, there were also high levels of faculty mobility, which largely disappeared in the 1980s. The present study investigated mobility by using a measure based on the proportion of the total career that had been spent at the current institution (Renner, 1987). Bond and Nadeau (1992) and Renner and Skibbens (1990) also looked at renewal in terms of the flexibility that universities have to create programs of study in areas that did not exist 20 years ago. They have suggested that the juxtaposition of financial constraints that universities are currently facing and the presence of a large number of senior, tenured faculty have reduced the flexibility of some universities to hire faculty to teach new courses. In effect these researchers were describing an effect of the ratchet. Of additional concern has been the increasing number of sessional appointments in higher education (Lortie, 1994) who are without job security (e.g., Breslauer & Gordon, 1989; Mangan, 1991) and a long-term commitment to the institution. The present study sought to

investigate renewal by looking at the distribution of university faculty by rank, tenure status, year of appointment, and mobility.

At the present time, there is less diversity in the faculty at North American universities than in the general population or student body (Barr & Tagg, 1995; Cameron, 1991; Chronister & Truesdell, 1991). The majority of faculty hired during the grand expansion period were predominantly white and male (AUCC, 1990; Renner, 1995). Since that time, affirmative action programs have sought to increase the hiring of women and minorities, but they have met with limited success due to the 'hiring freeze' that went into effect in the 1980s (AUCC, 1990; Bond, 1985). This stability in the demographic composition of the faculty was mainly due to the effects of the financial squeeze as the ratchet effect reduced access just as greater gender diversity became possible (Renner & Mwenifumbo, 1995). The present study will look at the diversity in faculty with respect to gender.

University Finances

Pfaffenberger (1989) noted that in the 1980s, governments entered a period of financial restraint and reduced funding to universities. These financial cuts helped to create the decreasing funding side of the ratchet. He suggested that the hiring policy adopted during the expansion period of the 1960–70s created the salary structure that is currently causing difficulties for universities. The large numbers of young and inexpensive professors hired during the expansion period are now older and increasingly more expensive to maintain. This group will absorb an increasing amount of a university's total budget over the years remaining until these faculty reach retirement age (see also Renner, 1986a). Bond (1985) and Renner (1988), using projections of faculty salaries into the 21st century, reached similar conclusions to those of Pfaffenberger (1989). Here again, these researchers were describing the financial and demographic variables that create the ratchet effect. Davidson (1991), using Statistics Canada data, also looked at the salary structure of faculty. He proposed that in constant dollars, a university could have a fixed salary budget in present worth dollars if it had an equal number of faculty in each age group. He termed this the *ideal* faculty age distribution. In the present study, faculty salaries were investigated using simple projections which were compared to the costs of Davidson's Ideal faculty age distribution.

Some universities have sought to improve their financial situation by reducing the faculty salary budget. Since collective bargaining arrangements generally prevent lowering salaries and the tenure system prevents layoffs of faculty that have gained tenure, universities have resorted to other strategies (e.g., non-replacement of faculty that leave, hiring of part-time lecturers, and offering early retirement packages) to reduce the overall number of full-time faculty and therefore the contribution salary costs make to the ratchet effect (Cameron, 1991; Renner, 1986b, 1988; Riffel, 1994). The last part of this study focused on the monetary aspects of early retirement programs.

Institutional Variations

In research, a premium is often placed on aggregate data with the aim of providing a normative picture that will allow statements to be made that are generalizable to many individual situations. This type of research frequently involves the collection of information from random samples. However, to address the effects of the financial/demographic ratchet this may not be the best approach. Despite the fact that most Canadian universities have had common experiences during the past 15 years of post-expansion (e.g., reductions in government funding), each institution has a unique pattern of institutional demographics. This uniqueness will continue into the future as each institution makes individual decisions (e.g., its hiring policies) that will affect the profile of its faculty. Therefore, specific, descriptive, institutional information is often more useful and more powerful than national norms. Some writers in the field of higher education believe that universities have not been making sufficient use of this type of empirical data to investigate the problems facing them or the solutions they are currently implementing (e.g., Davidson, 1991; Pfaffenberger, 1989; Renner, 1988; Sibley, 1993; Uhl & MacKinnon, 1992).

Thus, the final purpose of the present paper is to illustrate, with concrete data, the benefits of data collected at the institutional level to show how each institution is a unique combination of factors that sets it apart from all others. One of the implications of this approach is that there is no single policy recommendation that will apply to 'higher education.' Indeed, it is possible that two institutions with virtually identical relative positions on each of the variables contributing to the ratchet may arrive at quite different, but still reasonable, conclusions, depending on other

factors associated with the type of institution or its mission (Hardy, 1992). For example, diversity takes on an entirely different dimension for urban centres which now have large populations of visible minorities (Samuel, 1992) in comparison to other institutions that are rural and isolated. Likewise, a continuous process of renewal may be considered more essential by a research than a teaching institution. These specific, and other similar, issues will be addressed by an analysis of the pattern of data unique to individual institutions. From the standpoint of the ratchet, the essential variance is in the distribution of institutions, not the standard deviation of aggregate data.

METHOD

In accordance with the methodological approach adopted, complete faculty populations were chosen from nine institutions, rather than a random sample of all Canadian faculty, to facilitate investigations of issues at the institutional level and comparisons between institutions. This methodological approach provides information at the institutional level that can be used to formulate highly specific local responses to the pressure of the unique local manifestations of the financial/demographic ratchet. For some analyses, the data from the individual universities were combined into an aggregate data file ($\underline{N}$ = 8881) to paint a picture of selected aspects of higher education at the national level, and, in so doing, to provide a normative reference point against which individual institutions can plot their comparative positions.

The Data Base

Raw data were obtained from Statistics Canada for full-time faculty at nine Canadian universities for the academic year 1992-93 upon agreement that the identity of the universities would be kept confidential. The nine universities were selected to reflect differences in location (Atlantic, Central, Western, and Pacific), size (small, medium, large), and type of institution (teaching, comprehensive, research). Full-time faculty were defined as faculty that were employed for a 12 month appointment and included teachers, researchers, and senior academic staff. University administrators, librarians, and non-academic support staff were not included.

Design of Study

Faculty demographics. This empirical study, based on data collected from nine institutions had a quasi-experimental design. It was part of a larger project conducted by Renner and Mwenifumbo (1995). The age profile of full-time faculty was investigated in terms of age, age group, and year of expected retirement. The issue of renewal was investigated using the rank, tenure status, appointment year, and mobility variables (i.e., proportion of career spent at current institution). Data analyses performed to describe the diversity in faculty included the numbers of women of all faculty, and in new and settled appointee sub-groups.

Salary projections. Projections of salary budgets, from 1993 to 2030 were done for the nine institutions and the aggregate data. These projections were based on starting salaries and yearly increments obtained from regressions of annual rate of salary on years since the highest degree was earned. The starting salary (replacement salary) was the intercept of the regression line and the yearly increment was the slope. The salary projections were also based on the number of faculty that would reach retirement age (taken as 65 years) for each year.

Costs and savings from early retirements. A simple projection model (Renner, 1986a, 1986b, 1988) was used that allowed inter-institutional comparisons of some of the costs and savings involved in offering early retirement programs to 55 year old faculty members. The variables involved in these analyses were actual salary, replacement salary (starting salary), replacement rate, yearly increment, period of time until age 65, gross savings (yearly salary of a faculty member summed over the period of time until age 65), early retirement incentive (calculated to be two months salary for each year of service remaining until age 65), gross cost of replacement (replacement salary plus yearly increments summed over the period of time until age 65), and net savings over expenses (gross savings minus gross cost of replacement plus early retirement incentive).

RESULTS AND DISCUSSION

This results and discussion section has been divided into three parts. In the first part there is a description of the full-time faculty teaching at nine Canadian universities in 1992-93, in terms of their age and characteristics (e.g., rank, tenure status and mobility) in relation to the issue of

renewal, and in terms of gender as one measure of diversity. Second, salary projections from 1993-2030 are provided for each institution, and the costs and savings associated with early retirement programs are evaluated. Finally, institutional variations and the unique power of institutional research is considered.

Descriptive Demographics

Age Profiles of Faculty. The faculty age distribution in 1992-93 reflected an aging professoriate. On the aggregate data file, composed of the data from all nine institutions, the median age of the faculty was 50.0, the mode was 51.0 and the mean was 48.88 (SD = 8.78). The age distributions of faculty at each of the individual institutions were very similar to the distribution on the aggregate file. All institutions showed average ages that were within one year of the average age on the aggregate data. The median age in this study (50.0) can be compared with earlier data compiled by Statistics Canada (1983). In 1970-71 the median age of faculty was 37 years, a decade later (1980-81) it was 42 years. From these figures it is clear that the median age of faculty has been steadily increasing and will continue to do so until the large number of faculty hired during the expansion period retire and funds become available to replace them with new junior faculty.

Table 1 shows the proportions of faculty under 35, from 35 to 49, and 50 years or older. At each institution the smallest proportion of faculty was in the under 35 group with the range being from 4% to 8%. There was more inter-institutional variability in the other two age groups. At seven institutions, the greatest proportion of faculty was found in the 50 and over age group (range from 41% to 55%). Chi-square analysis showed significant institutional differences in age group, χ^2 (16, N = 8880) = 59.84, $p < .0001$. An alpha level of .01 was used in all analyses in this study to reduce the effect of the large sample sizes. Aggregate data can be used to put these figures into an historical perspective. The proportion of faculty in the under 35 age group has decreased from 38% in 1970-71 (Statistics Canada, 1983) to 7% in 1993, while the proportion of faculty over 50 increased from 17% (Statistics Canada, 1983) to over 50% in the same period.

The age distribution was, of course, reflected in the frequency distribution of the number of faculty by expected year of retirement, calculated for all institutions on an expected retirement age of 65 years. On

the aggregate data file, this distribution has a peak (i.e., mode) at 2007. Each of the nine institutions shows a peak in the numbers of retirements in the early years of the next century (see Table 1). These peaks ranged over an eight year period from 2004 to 2012. The timing at which the maximum numbers of retirements occur at an individual institution could be crucial if a shortage in the number of qualified applicants for faculty positions occurs during this period, as has been predicted by Davidson (1991). The current faculty age distributions are not just of concern to those that have an interest in the cost of faculty salaries, but these distributions also have contemporary consequences in terms of institutional renewal and diversity.

Renewal. Traditionally, educational institutions have relied on the hiring of new Ph.D.s., sabbaticals, and inter-institutional mobility (i.e., job transfers, visiting professors, guest lectures, postdoctoral programs) to facilitate the movement of new ideas and research methods between institutions. In recent years, many of these renewal efforts have been restricted because of government funding reductions and the general economic recession (Bond & Nadeau, 1992). Only limited hiring occurred after the expansion period of the 1960s and the majority of faculty currently teaching were hired during the expansion period (Bond & Nadeau, 1992, Renner, 1988, 1995). In the current study, the characteristics of the faculty were expected to reflect the presence of the large number that were hired during the expansion years, who would have progressed up the seniority ladder in terms of rank and tenure status.

Table 1 shows the distribution of university faculty by rank. In 1992-93, the proportion of faculty at the top rank of full professor ranged from a low of 29% at Teaching Institution B to a high of 57% at Research Institution C. Chi-square analysis showed that these institutional differences in rank were significant, χ^2 (24, $\underline{N}$ = 8881) = 468.00, $\underline{p}$<.00001. Symons and Page (1984) compiled a distribution of university teachers by rank for selected years from 1956-57 to 1980-81. Some of these data are shown in Figure 1 with the aggregate data from the present study for the academic year 1992-93. The most common rank at the peak of the expansion period (1970-71) was an Assistant Professor or Lecturer, after the period of expansion it was an Associate Professor, and now it is a Full Professor.

Tenure status is one of the constraints on the flexibility universities have for adjusting the distribution of faculty to reflect changing student

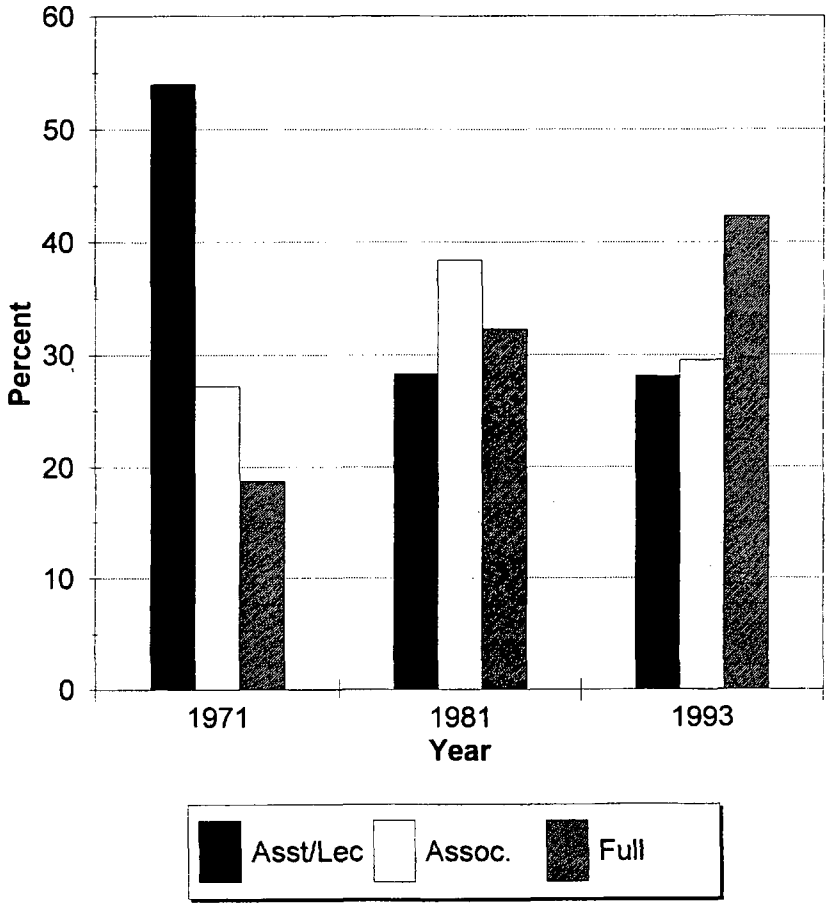
Table 1
Insitutional Variations on Selected Variables

Institution Type	Teaching			Comprehensive		Research				All	All Institutions	
Institution	A	B	C	A	B	A	B	C	D	Faculty	Mean	SD
Variable List												
N	213	260	244	742	613	890	2533	1509	1877	8881	987	771
Age Group												
< 35	0.06	0.05	0.05	0.08	0.07	0.04	0.06	0.04	0.07	0.06	0.06	0.01
35–49	0.43	0.45	0.54	0.37	0.45	0.48	0.43	0.43	0.44	0.44	0.45	0.04
50+	0.51	0.50	0.41	0.55	0.48	0.48	0.51	0.53	0.49	0.50	0.50	0.04
Retirement Year (Mode)	2007	2007	2012	2004	2012	2007	2007	2005	2009	2007	2008	2.62
Rank												
Professor	0.36	0.29	0.34	0.38	0.41	0.38	0.41	0.57	0.40	0.42	0.39	0.07
Associate	0.37	0.41	0.30	0.38	0.32	0.34	0.26	0.27	0.27	0.29	0.32	0.05
Assistant	0.19	0.28	0.18	0.18	0.20	0.23	0.21	0.16	0.27	0.22	0.21	0.04
Other	0.08	0.02	0.18	0.06	0.07	0.05	0.12	0.00	0.06	0.07	0.07	0.05
Tenure Status												
Tenured	0.75	0.76	0.68	0.83	0.70	0.71	0.56	na	0.73	0.72	0.72	0.07
Tenure Track	0.12	0.22	0.15	0.14	0.25	0.14	0.08	na	0.22	0.17	0.17	0.05
Term	0.13	0.02	0.17	0.03	0.05	0.15	0.36	na	0.05	0.11	0.12	0.11
Appointment Year												
Settled	0.72	0.65	0.65	0.71	0.68	0.75	0.60	0.71	0.67	0.68	0.68	0.04
New	0.28	0.35	0.35	0.29	0.32	0.25	0.40	0.29	0.33	0.32	0.32	0.04

Table 1 (continued)
Insitutional Variations on Selected Variables

Institution Type	Teaching			Comprehensive		Research				All	All Institutions	
Institution	A	B	C	A	B	A	B	C	D	Faculty	Mean	SD
% Career at Institution	0.89	0.87	0.92	0.88	0.88	0.83	0.80	0.87	0.83	0.84	0.86	0.03
Proportion Women												
Of Total N	0.24	0.17	0.27	0.22	0.21	0.24	0.22	0.19	0.21	0.22	0.22	0.03
Of Settled	0.18	0.09	0.19	0.16	0.17	0.20	0.18	0.14	0.16	0.16	0.16	0.03
Of New	0.39	0.33	0.42	0.39	0.31	0.37	0.30	0.33	0.31	0.35	0.35	0.04
Voluntary Separation												
Salary (Age 55) ($)	74,706	95,152	90,700	89,605	86,488	76,962	98,198	88,543	85,304	89,298	87,292	7,214
Replacement Salary ($)	42,225	49,387	31,921	52,858	52,657	41,349	52,106	49,825	56,495	50,256	47,647	7,262
Yearly Increment ($)	1,203	1,695	2,177	1,361	1,253	1,319	1,706	1,434	1,067	1,446	1,468	320
Separation Incentive ($)	124,510	158,587	151,167	149,342	144,147	128,270	163,613	147,572	142,173	148,830	145,487	12,023
Savings per person ($)	200,300	299,064	436,624	218,128	194,163	227,860	297,007	239,609	145,917	241,590	250,964	79,911
Maximum % Difference	111%	108%	115%	107%	107%	112%	108%	109%	106%	108%	109%	3%

Figure 1
Distribution of ranks



enrollment patterns, departmental finances, and to accommodate requests for new areas of study (Bond & Nadeau, 1992). Tenure information was not available for Research Institution C, and this university was excluded from all analyses involving the tenure variable. As can be seen in Table I there were significant institutional variations in tenure status, χ^2 (14, $\underline{N}$ = 7372) = 1138.20, $\underline{p}$ <.00001. Faculty with tenure ranged from 56% to 83%; the lowest being at Research Institution B and the highest at Comprehensive Institution A. The faculty on tenure-track ranged from 8% (Research Institution B) to 25% (Comprehensive Institution B). Research Institution B stands out as very different from the other institutions with respect to its distribution of tenure status of faculty. It has less faculty in tenure and tenure track positions and more faculty in term positions.

Statistics Canada (1993) reported that in the 15 years prior to 1992, the rate of recent appointments (including vacancies and new position) was very low. To investigate this for specific institutions, the frequency distributions of the years that faculty were appointed to their current institution were plotted. At each institution, the shape of these distributions was bimodal. As expected there was a large number of appointments during the expansion period, and a second large group of appointments (about 32% of all appointments) occurred since 1986. This dramatic increase in the rate of recent appointments had not been documented previously in other Canadian research. However, a preliminary report by Magner (1996) on a large faculty study conducted in the United States in the same year (i.e., 1992-93) also found that about 33% of all faculty had been appointed in preceding six years. As Table 1 shows, there is wide variation in the proportion of new faculty hired recently (1986-92) in comparison to the proportion of settled faculty hired before 1986 χ^2 (8, $\underline{N}$ = 8881)= 94, $\underline{p}$ <.00001). As would be expected from the findings on tenure status (Table 1), Research Institution B had hired more of its faculty recently (40%) than the other institutions. Therefore, if one factor that influences institutional renewal is the presence of new faculty at an institution, then the universities in this study are currently entering a period of change and rejuvenation with Research Institution B leading the way.

Davidson (1991) and Renner (1987) looked at renewal in terms of the mobility of full-time Canadian faculty. As an indicator of faculty mobility in the current study, the years at the current institution were expressed as a proportion of the years since the highest degree was

earned. This analysis was restricted to *settled faculty,* those who had been hired at their current institution in 1985 or before. Because of the restricted hiring in the early 1980s, the settled faculty group was numerically dominated by the faculty hired during the expansion period in the 1960s and 1970s. This is the group for whom restricted mobility has been raised as an issue. More recently appointed faculty, particularly those in tenure track appointments, have had limited opportunity for mobility and represent renewal as new appointments. Some settled faculty were appointed to their current institution before receiving their highest degree. For these individuals their mobility score was adjusted to 1.0 by assuming that they become mobile with the attainment of their highest degree. Thus, the mobility index is a conservative estimate since some faculty have actually been at their current institution for a longer period of time than they have had their highest degree (usually the Ph.D.). At the institutional level, the time that settled faculty members had spent at their current institution since they had received their highest degree ranged from a high of 92% at Teaching Institution C to a low of 80% at Research Institution B ($\underline{F}$ (8, 5857) = 22.58,.$\underline{p}$ <.0001). Despite the range of institutional variations, most faculty had spent the greater part of their academic career at their current institute (Table 1).

Diversity. Several studies have documented that there is currently less diversity in faculty at universities in Canada and the United States than in the student population (e.g., Barr & Tagg, 1995; Cameron, 1991; Chronister & Truesdell, 1991; Hackman, 1992). The majority of the faculty that were hired during the expansion of the 60s and 70s were predominately white and male (Renner, 1995). Although diversity needs to be discussed in terms of gender, race, cultural origin, and disability status, the present study was restricted to an examination of the faculty only with respect to gender which is the only variable for which Canada collections national data.

Chi-square analyses revealed that there were no significant differences in the numbers of male and female faculty based on the institution at which they were employed, χ^2 (8, N = 8881) 15.96, p = .04. However, there has been a steady increase in the proportion of women teaching at Canadian universities, increasing from 11% in 1960-61 (Statistics Canada, 1993) to 22% as found in this study. Inspection of Table 1 reveals that there were consistent differences in the proportions of women in the settled and recently appointed faculty ($\underline{F}$ (1, 8863) = 205, $\underline{p}$ <.001). As would be expected, the proportion of women recently

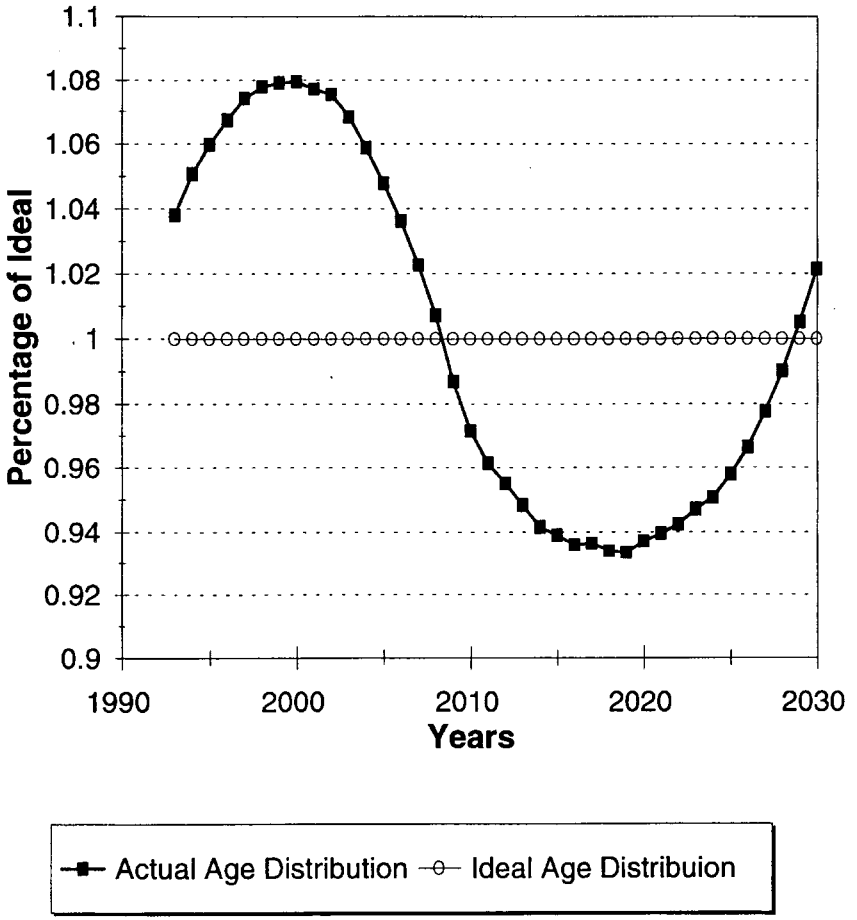
appointed (30%-42%) was higher at each institution than the proportion of women in the settled group (09%-20%).

Financial Issues

Salary projections. One consequence of the large numbers of aging faculty has been the rising costs of the salary budget, due to pay scale increases that accompany advances in rank and additional years of service. The costs of faculty salaries were investigated using simple projections in which all current faculty progress to retirement age at 65 and are replaced by an equal number of new faculty at the bottom of the pay scale. These analyses were restricted to the faculty with Ph.D.s because this was the common degree between all types of institutions. Salary was regressed on the years since the highest degree was obtained after preliminary investigations showed that this variable had a strong linear relation with salary (correlations were .68, .75, .86, .87, .85, .73, .74, .71 and .52). The intercept of this regression line was used as the starting or replacement salary and the slope was the yearly increment. This projection procedure was adapted from Renner (1986b) and it should be reiterated that these simple projections were based on the actual numbers and salaries of faculty as they existed at one point in time (in this case 1992-93), which were then projected into the future without modifications to the total number of faculty or changes in the existing salary structure.

The actual costs of the salaries were compared to the costs of Davidson's (1991) Ideal faculty age distribution in which there are equal numbers of faculty at each age level. Under this Ideal distribution, during each calendar year a relatively constant number of faculty would drop off the older end of the distribution through retirement and would be replaced by an equal number of younger faculty at the bottom. Davidson's (1991) Ideal distribution would result in a salary budget that would remain constant in present worth dollars. The actual costs of faculty salaries will be higher than the costs of this Ideal distribution (see Figure 2) until most of the faculty that were hired during the boom period of the late 1960s and early 1970s retire in the first decade of the next century. After this retirement peak, the actual costs will be lower than the Ideal distribution because the replacement faculty will be at the bottom of the pay scale. The actual costs will continue to be less than the Ideal costs until the new faculty progress up the salary scale with age. Therefore, this pattern of peaks in hiring, retirements, and actual costs will repeat.

Figure 2
Salary Projection Costs of Current Faculty



The average data, based on the aggregate file, were not characteristic of all the institutions. The salary data for the nine institutions in the current sample showed wide variations in the average salary of faculty with doctoral degrees, ranging from a low of $62,155 (SD = $11,995) to a high of $86,371 (SD = $20,925). When the Actual and Ideal budgets for the current faculty at each university were projected using the technique described previously for the aggregate data, all the universities approximated the basic pattern described for the aggregate data. To provide a common basis for comparison regardless of institutional size and average wage, the percentage of the Actual to the Ideal costs was calculated for each institution. These data are presented in Table 2 for the three teaching, two comprehensive, and four research institutions, respectively. Teaching Institution C and Research Institution A, for a period of years, will be in the extreme situation of having extra projected costs that are nearly twice that of other institutions in comparison to the corresponding Ideal distribution.

Costs and savings from early retirement programs. The procedures used to calculate the costs and savings of early retirement programs were developed and described in detail by Renner (1986a, 1986b, 1988). The salary projections described previously were used as part of this analysis. The costs and savings of early retirement packages were calculated for faculty aged 55 and again these analyses were restricted to faculty with Ph.D.s. For illustrative purposes, the replacement rate was set at 100%, which maximizes renewal while restricting financial savings. The replacement (starting) salary and yearly increment were obtained from the regression line described previously in the section on salary projections. The early retirement incentive was the maximum amount of money that the university was willing to spend to induce an individual to retire and was arbitrarily calculated to be two months salary for each year of remaining service to a maximum of 10.

To illustrate the application of the procedure on an institutional basis, the costs and savings of an early retirement were calculated for a 55 year old faculty member. Teaching Institution C with a low starting salary and high yearly increments was in a position to achieve large savings from each early retirement (see Table 1). In marked contrast, Research Institution D with a high starting salary and low yearly increments was in a totally different situation, with very little net savings to be achieved through an early retirement incentive (see Table 1). These

Table 2
Salary Projections as Percent of Ideal for Nine Institutions and Aggregate

Year	Teach A	Teach B	Teach C	Comp A	Comp B	Res A	Res B	Res C	Res D	All Fac
1993	1.03	1.03	1.03	1.03	1.02	1.03	1.06	1.04	1.03	1.04
1994	1.04	1.05	1.06	1.04	1.03	1.05	1.07	1.05	1.04	1.05
1995	1.05	1.06	1.07	1.05	1.03	1.06	1.08	1.07	1.05	1.06
1996	1.06	1.07	1.08	1.07	1.05	1.07	1.08	1.07	1.05	1.07
1997	1.07	1.07	1.11	1.07	1.05	1.08	1.08	1.08	1.06	1.07
1998	1.07	1.07	1.13	1.07	1.06	1.09	1.08	1.08	1.06	1.08
1999	1.08	1.07	1.14	1.07	1.07	1.10	1.08	1.09	1.06	1.08
2000	1.10	1.07	1.15	1.07	1.07	1.11	1.08	1.08	1.06	1.08
2001	1.10	1.07	1.14	1.06	1.06	1.12	1.07	1.09	1.06	1.08
2002	1.10	1.07	1.13	1.07	1.07	1.11	1.07	1.08	1.05	1.08
2003	1.11	1.08	1.12	1.06	1.06	1.11	1.06	1.08	1.04	1.07
2004	1.09	1.08	1.14	1.05	1.05	1.10	1.05	1.06	1.04	1.06
2005	1.08	1.07	1.13	1.04	1.03	1.09	1.04	1.05	1.03	1.05
2006	1.08	1.08	1.12	1.02	1.02	1.08	1.03	1.04	1.02	1.04
2007	1.06	1.06	1.06	1.00	1.01	1.06	1.02	1.02	1.01	1.02
2008	1.03	1.06	1.04	0.99	1.01	1.03	1.00	1.01	1.00	1.01
2009	1.00	1.02	1.03	0.97	1.00	1.00	0.98	0.99	0.99	0.99
2010	0.99	0.99	1.01	0.96	0.99	0.97	0.96	0.97	0.98	0.97
2011	0.97	0.99	0.98	0.96	0.99	0.96	0.95	0.96	0.96	0.96
2012	0.96	0.96	0.98	0.96	0.98	0.95	0.95	0.95	0.96	0.96

Table 2 (continued)
Salary Projections as Percent of Ideal for Nine Institutions and Aggregate

Year	Teach A	Teach B	Teach C	Comp A	Comp B	Res A	Res B	Res C	Res D	All Fac
2013	0.94	0.95	0.97	0.95	0.98	0.93	0.94	0.95	0.96	0.95
2014	0.91	0.94	0.93	0.95	0.96	0.93	0.93	0.95	0.95	0.94
2015	0.91	0.93	0.90	0.95	0.95	0.93	0.92	0.94	0.96	0.94
2016	0.90	0.91	0.87	0.95	0.95	0.92	0.92	0.94	0.96	0.94
2017	0.89	0.92	0.87	0.95	0.95	0.92	0.93	0.94	0.95	0.94
2018	0.91	0.92	0.88	0.96	0.95	0.91	0.92	0.93	0.95	0.93
2019	0.91	0.92	0.89	0.95	0.95	0.91	0.93	0.93	0.96	0.93
2020	0.91	0.93	0.89	0.96	0.95	0.91	0.94	0.93	0.95	0.94
2021	0.92	0.93	0.88	0.95	0.96	0.91	0.94	0.93	0.96	0.94
2022	0.94	0.93	0.89	0.96	0.95	0.91	0.95	0.93	0.96	0.94
2023	0.94	0.93	0.89	0.96	0.95	0.92	0.95	0.94	0.96	0.95
2024	0.95	0.93	0.88	0.97	0.95	0.92	0.96	0.94	0.96	0.95
2025	0.96	0.94	0.88	0.97	0.96	0.94	0.97	0.94	0.97	0.96
2026	0.96	0.94	0.91	0.98	0.97	0.94	0.98	0.95	0.98	0.97
2027	0.97	0.96	0.92	0.98	0.98	0.96	0.99	0.96	0.99	0.98
2028	0.98	0.98	0.95	0.98	0.98	0.97	1.00	0.98	1.00	0.99
2029	0.99	0.99	0.98	1.00	0.99	0.99	1.02	0.99	1.01	1.01
2030	1.01	1.01	1.00	1.01	1.01	1.01	1.04	1.01	1.02	1.02

results suggest that an institution considering an early retirement incentive plan needs to carefully examine the factors that provide savings leverage for their situation, and whether the strategy is an appropriate one to consider.

Institutional Variations

The methodological position taken in this study is that complete faculty populations from individual institutions provide information at the institutional level that can be used to direct local action. The need for discussion of data at the institutional level, rather than at the aggregate or national level, is perhaps best illustrated in the present study by the financial data just described. The potential impact of the demographic/financial ratchet can be seen through a series of case studies that contrast the position of any specific institution with respect to the other institutions with which they must compete for faculty and students.

Both Teaching C and Research A institutions are in the position of having actual salary budgets that, over the course of the next decade, will increase appreciably over and above the costs of inflation. The salary projections (see Table 2) show that in comparison to the other institutions, these institutions will be in the unenviable position of having, for several years, very high salary costs in relation to the Ideal distribution. At these two institutions, institutional policy will be more likely to be driven by financial than academic considerations, unless the effects of ratchet can be lessened. Yet, these two institutions are in very different positions with respect to what each may gain through early retirement programs. For each senior faculty who accepts an early retirement incentive, Teaching Institution C has the potential to generate nearly twice the savings that Research Institution A does from the same event.

In addition to high salary costs, Teaching Institution C has an additional problem. Teaching Institution C and Comprehensive Institution B will be the last two institutions to gain academic flexibility through the natural retirement process, with 2012 as the modal year of retirement for their faculty (see Table 1). However, Comprehensive Institution B has one of the lowest net savings to be achieved through early retirement programs, so this solution is unlikely to be a viable one for this institution. In contrast, as has already been mentioned, Teaching Institution C has the most to gain through using early retirement programs as a strategy to lessen the effects of the financial/demographic ratchet and to remain competitive.

Research Institution D has a projected salary budget that is relatively close to the Ideal salary distribution, thus experiencing relatively less annual budget pressure. However, when compared to some of the other institutions, this university had a high proportion of tenured staff (.73 in Table 1). Therefore, this institution might have less flexibility in the distribution of faculty and could be at a disadvantage in terms of accommodating any desired academic changes. Inspection of Table 1 reveals that this institution has the least to gain by offering early retirement programs and will have to look at other mechanisms for generating increased academic and financial flexibility. One strategy might be to change the parameters in the early retirement model. In the case of this institution, the high starting salary was probably being driven by the high cost of living in an urban setting. It might be possible, as an illustration, for this institution to attract new young faculty by providing university housing for an initial period in lieu of a high starting salary. This would generate larger savings that could be used to gain flexibility in the tenure distribution. This is an example of the type of highly specific local response that may not be applicable to any other institution.

Decreasing the replacement rate below 100% has the effect of increasing the savings generated by an early retirement program. But again, the effects are institution specific, not universal. In institutions with small savings per person, such as Research D, a large number of non-replacements would be required to achieve the same total amount of financial savings as a smaller number of non-replacements at other institutions, such a Research B, with an obvious differential academic impact. The ratchet effect is illustrated by the dynamic interplay of the variables whereby the savings resulting from non-replacement of voluntary separations may, for some, impose an excessive toll by squeezing on the integrity of academic programs.

Other aspects of the faculty demographic profile can be combined with the financial data and used by an individual institution to plan for other forms of institutional change. Institutional renewal and diversity in faculty (in terms of age, gender, race, cultural or ethnic background, and area of scholarship) are emerging areas of academic concerns. With respect to renewal, at Comprehensive Institution A the faculty that were hired before 1986 (i.e., settled) have spent 88% of the time since they received their highest degrees at that institution. Further, most of the staff at this university were hired before 1986 (71%). These factors combine to make the Comprehensive Institution A faculty the least mobile of

all the institutions included in the present study, and could make renewal a high priority for this university. In contrast, Teaching Institution B has the lowest proportion of women faculty at 17% (see Table 1). Thus, diversity in terms of gender may be an important area of academic concern with respect to institutional priorities for renewal at Teaching Institution B.

CONCLUSIONS

The purpose of this study was not to discover or even propose the 'correct' answers for higher education in general, or even for any specific institution. In fact, it is our explicit position that it is unlikely there are any such absolute answers. Rather, the purpose was to illustrate the capacity for institutional data, in the context of institutional variations, to provide information that can be used for change at the local level.

The variables selected for inclusion in Table 1 were dictated by the data available in the Statistics Canada annual faculty survey, and their usefulness in conceptualizing the effects of the demographic/financial ratchet. The specific issues selected, of course, are not the only ones facing Canadian institutions of higher education. What is required to complete this task is identification of the issues that are important at any particular institution. The critical analysis for local planning is to examine the dynamic interplay between those variables to counter the mechanism that tighten the institutional ratchet. National normative data does not serve this purpose.

One obvious example of the need for an extension of the methodology used in the present study is with respect to diversity. The only national data available are for gender. Yet, in terms of Canadian immigration patterns, Grayson (1995) has pointed out that between 1981-91 the numbers of immigrants from Africa and the Middle East increased by approximately 400%; from Asia and the Pacific by 300%; and from Central and South America by 200%. Universities will need to be prepared to meet the needs of the large numbers of non-whites that are currently beginning their integration into Canadian institutions of higher learning. It will be necessary to conduct systematic, demographic research so individual universities will know the extent and nature of the services required (Grayson, 1995).

However, for an individual institution to create a comprehensive picture of current issues, it also needs to have access to similar information

from other institutions. Similar to Table 1, the larger and the more complete of a national data table that can be constructed, the more information each institution will have for creating an internal, locally coherent sense of self-direction. In such a master table, the columns allow for comparison with other institutions and with the aggregate values. This information allows individual institutions to position themselves relative to other institutions and to evaluate the degree to which they are in an advantageous or vulnerable position.

The opposite pairs of general and specific, normative and descriptive, and aggregate and institutional are related to each other; in each case, the opposing pairs have important implications for research methodology and for how issues of faculty demographics are considered. In academic research, a premium is often placed on general, aggregate, normative data, collected through random samples, because the information is considered more 'scientific' than the opposite of the pair. However, for the issues addressed in this paper, we have argued this a mistake. Specific, descriptive, institutional information is often more useful and more powerful.

In less abstract terms, higher education does not have a campus, a president, a student body, a Board of directors, or even a budget. But, institutions do. Any general, normative aggregate statistic, while it is true of all, is descriptive of none. As an example, the demographic profile of the Canadian faculty tells us something about the state of higher education, as a 'faceless collective,' but nothing about the implications for a given institution. On the other hand, a sample of institutions (not individuals) gives descriptive data about specific places, and, taken together, a rough sense of the state of higher education that is also useful for comparative analysis. Thus, it is institutional data that is the most useful, since actual decisions can be made only at institutions.

References

AUCC. (1990). *Trends: The Canadian university in profile.* Ottawa, ON: Author.

Barr, R.B., & Tagg, J. (1995). From teaching to learning — A new paradigm for undergraduate education. *Change, 27,* 13–25.

Bond, S.L. (1985). *Responses to the aging of academic staff in Canadian universities.* Paper prepared for the Canadian Association of University Business Officers.

Bond, S.L., & Nadeau, G.G. (1992). The staff of postsecondary institutions. In A.D. Gregor & G. Jasmin (Eds.), *Higher education in Canada* (pp. 37–46). Ottawa, ON: Minister of Supply and Services Canada.

Breslauer, H., & Gordon, J. (1989, June). *The two-gender university: Catching changes in the clientele.* Paper presented for a joint session of the Canadian Sociology and Anthropology Association and the Canadian Society for the Study of Higher Education, Laval University, Quebec, PQ.

Cameron, D.M. (1991). *More than an academic question: Universities, government and public policy in Canada.* Halifax, NS: The Institute for Research on Public Policy.

Chronister, J.L., & Truesdell, T.C.M. (1991). Exploring faculty issues and institutional planning for the twenty-first century. *The Review of Higher Education, 14,* 467–483.

Davidson, R. (1991). *Averting faculty shortages. A discussion paper on the Canadian academic labour market in the 1990s.* Research and Policy Analysis Division, Association of Universities and Colleges of Canada.

Grayson, J.P. (1995) Does race matter? — Outcomes of the first year experience in a Canadian university. *The Canadian Journal of Higher Education, 25,* 79–109.

Hackman, J.D. (1992). What is going on in higher education? Is it time for a change? *The Review of Higher Education, 16,* 1–18.

Hardy, C. (1992). Retrenchment strategies in two Canadian universities: A political analysis. *Canadian Journal of Administrative Sciences, 9,* 180–191.

Leslie, P.M. (1980). *Canadian universities — 1980 and beyond: Enrollment. structural change and finances.* Ottawa ON: Association of Universities and Colleges of Canada.

Lortie, R. (1994). Part-time university teachers — a growing group. *Educational Quarterly Review, 1,* 30–34.

Lovett, C.M. (1983-84). Vitality without mobility: The faculty opportunities audit. *Current Issues in Higher Education (Vol.4).* American Association for Higher Education.

Magner, D.K. (1996). New generation of professors is changing the face of academe. *The Chronicle of Higher Education, 42* (Feb. 2), 17–18.

Mangan, K.S. (1991). Many colleges fill vacancies with part-time professors, citing economy and uncertainty about enrollments. *The Chronicle of Higher Education, 37,* A9, A10.

Pfaffenberger, W.E. (1989). Our aging professoriate: What it may mean to our universities. *CAUT Bulletin, 36,* 8.

Renner, K.E. (1986a). Career alternatives: A model for calculating financial costs and for making policy decisions. *Research in Higher Education, 25,* 42–54.

Renner, K.E. (1986b). Career alternatives: providing a cafeteria of choices through career alternative dollars. *Research in Higher Education, 25,* 227–244.

Renner, K.E. (1987). Academic decision making: Faculty appointments and reappointments. *Research in Higher Education, 26,* 363–372.

Renner, K.E. (1988). Replacing retrenchment with dynamism through a program of career alternatives. *Canadian Psychology, 29,* 342–354.

Renner, K.E. (1995). *The new agenda for higher education.* Calgary, AB: Detslig Enterprises.

Renner, K.E., & Mwenifumbo, L. (1995). Renewal, costs and university faculty demographics. *Education Quarterly Review, 2,* 21–34. (Statistics Canada Cat. No. 81-X-502E).

Renner, K.E., & Skibbens, R. (1990). Position description analysis: A methodology for describing academic roles and functions. *Canadian Journal of Higher Education, 20,* 43–56.

Riffel, J.A. (1994). The struggle to find a future: Money, politics and leadership in universities. *The Canadian Journal of Higher Education, 24,* 115–123.

Samuel, T.J. (1992). *Visible minorities in Canada: A projection.* Toronto, ON: CAF.

Sibley, W.M. (1993). The university in the 1990s: Crisis or predicament? *The Canadian Journal of Higher Education, 23,* 114–132.

Statistics Canada. (1983). *A statistical portrait of Canadian higher education.* Ottawa, ON: Minister of Supply and Services Canada. (Statistics Canada Cat. No. 81-X-502E).

Statistics Canada. (1993). *Teachers in universities.* Ottawa, ON: Minister of Industry, Science, and Technology. (Statistics Canada Cat. No. 81-241).

Symons, T.H.B., & Page, J.E. (1984). *Some questions of balance: Human resources, higher education and Canadian studies.* Ottawa, ON: Association of Universities and Colleges of Canada.

Uhl, N., & MacKinnon, A.M. (1992). Students. In A.D. Gregor & G. Jasmin (Eds.), *Higher Education in Canada* (pp. 47–58). Ottawa, ON: Minister of Supply and Services Canada.