STUDENT FEES, SUBSIDIES AND ENROLMENT IN CANADIAN UNIVERSITIES, 1962-1995

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Abstract: This paper examines how student fees, subsidies and enrolment have evolved in Canadian universities over the period 1962 to 1995. A model is developed, and tested with a panel data set of ten provinces, wherein student fees (subsidies) are the outcome of provincial governments balancing the interests of students and taxpayers. Among the conclusions are that student fees initially fall as student numbers increase but then rise, that tighter provincial fiscal environments increase fees, and that more pressure for K-12 education increases fees. We also find that enrolments are more sensitive to changes in student aid than to changes in tuition.

Introduction

From the 1960's to the 1990's Canadian universities experienced unprecedented growth. For example, in 1962 full time enrolment was 129 thousand or approximately 1.17 percent of the adult population, but, by 1995, enrolment was 578 thousand or 2.86 percent of the adult population. Such large growth inevitably raises fundamental financing and public policy questions. How has the price paid by students changed and, since students pay less than the cost, how has the subsidy to students changed? What are the implications of these changes for the taxpayer? What are the enrolment consequences of changes in prices and subsidies?

In fact a main purpose of this paper will be to explain why the price students pay, or the subsidy paid by provincial governments for education, changes. To this end, we will develop a model wherein support to students is the outcome of Canadian provincial governments responding to and balancing the opposing interests of students and taxpayers. In addition, since changes in support to students affect net fees (the tuition or sticker price less student aid), we will explore, with a demand function, the enrolment consequences of changes in the subsidy or net fees. To test the hypotheses, regression analysis based on a panel data set of the ten provinces for

the years 1961-62 to 1994-95 will be employed.

As far as we know, no econometric studies have explored these issues for Canadian universities. In contrast, in the United States there have been numerous demand studies (see the survey of Leslie and Brinkman (1987)) and other studies examining the determinants of state spending on higher education. These spending studies, however, have focused more on how economic and demographic factors influence the level of state spending than on the forces behind per student net fees and subsidies.[1]

Among our conclusions are that student net fees depend on the size of the student constituency relative to the adult population. Specifically, as the student coalition increases, average per student fees decrease, but beyond some point further increases in the coalition increase net fees per student. This happens, we hypothesize, because taxpayer opposition eventually overcomes student support. One reason for this is that as the student share of the population increases, a point is reached where the subsidy per student is falling while the cost per taxpayer is increasing. We also find that tighter provincial fiscal environments (higher budget deficits) and more pressure for K-12 education (higher percentage of the population under 18 years) increase net fees per student. With respect to the demand equation, we find that enrolments are sensitive to net fees, but the effect is not large. When net fees are separated into gross fees and aid, there is weak evidence that enrolment is more sensitive to aid.

In the following sections we introduce background information on the Canadian university sector followed by the model, regressions and conclusions.

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[1] A recent example is Toutkoushian and Hollis (1998) who use panel data on the U.S. states.

A Survey of the Canadian University Sector

First, in the way of background, we note that, unlike the United States with its mix of private and public institutions, Canadian universities are public. The provinces are responsible for financing universities but receive federal financial support. For each province we can represent the annual costs of universities with annual operating expenditures of universities. These expenditures finance instruction, libraries, computing services, administrative services, plant maintenance, academic support and student services, and are the ones most directly connected to producing university education or teaching costs.[2] As mentioned, a characteristic of university education funding is that the student pays less than the full cost as defined by these operating expenditures. To represent this on a per student basis, we first define the cost per student as operating expenditures divided by the number of full time equivalent students (FTE's).[3] A part of this cost is charged to students through tuition fees, thus defining the "sticker price" to students as tuition fees divided by FTE's. Student aid programs, however, drive a wedge between this sticker price and the price actually paid. Accordingly this "discount price"

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[2]Operating expenditures fall short of the published figures for total expenditures principally because of spending on sponsored research (largely financed directly by the federal government) and capital construction. For the academic year 1994-95 operating expenditures were 8.16 billion while sponsored research was 1.78 billion and new capital expenditures, which fluctuate dramatically by year, were .46 billion The published figures do not include a cost for physical capital services. We shall assume that these costs are roughly in proportion to other educational costs over time.

[3]We follow the Statistics Canada definition which measures enrolment by full time equivalents (FTE's). A full time student registers 1 FTE whereas a part time student registers FTE's of one divided by 3.5. Data sources are provided in an appendix.

is defined as tuition fees minus the subsidy value of student aid, all divided by FTE's. The subsidy value of student aid is measured by scholarships , student grants and the interest cost-of-loans paid by federal and provincial governments.

The evolution of enrolments and cost from academic years 1961-62 to 1994-95, at five year intervals, is given in Table 1 in which the provincial figures on enrolment, real operating cost per student, real gross fees per student (the sticker price) and real net fees per student (the discount price) are aggregated and converted to national figures. Inspection of the enrolment and cost figures indicates that the 1960's, compared to other decades, were a time of fundamental change. From 1961-62 to 1971-72 enrolment increased by 186 percent, compared to increases of 30 percent for 1971 -72 to 1981-82 and 35.7 percent for 1981-82 to 1991-92. Similarly, operating cost per student increased by 70 percent ($5611 to $9560 in 1986 dollars) from 1961-62 to 1971-72 and then changed much less, never rising more than 6 percent higher or falling more than 8.4 percent below the 1971-72 figures. In particular, there is some run-up in cost per student during the late 1970's, followed by a downturn until the mid -1980's and another gradual increase since then.[4]

Table 1 also shows that gross fees per student, after changing little during the 1960's and falling during the 1970's, have increased steadily since the 1980's. The pattern for net fees (the

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[4] Looking at the evolution of cost per student, the 1960's appear to have been a time of adjustment to a new equilibrium defining how university education is produced. For instance from 1961 to 1971 the student-faculty ratio (FTE's divided by full time university teachers) fell from 19.9 to 14.4 and real salaries increased 29 percent. Such dramatic decade changes have not been seen since. In 1981 the student-faculty ratio was 13.6 and in 1991 it was 16.6. From 1971 to 1981 real salaries increased by7.4 percent and from 1981 to 1991 by 19 percent. The larger recent increases in real salaries have been attributed (Little (1997), Renner (1995)) to aging of faculty.

Table 1

University Enrolment, Spending and Fees: Selected Years*

Year	enrolment: full-time equivalents (FTE's)	costs: operating expenditures per FTE	sticker price: fees per FTE	discount price: net fees per FTE	net fees divided by operating expenditures
1961-1962	128641	5611	1708	1436	.256
1966-1967	254562	6887	1791	1215	.176
1971-1972	367422	9560	1797	704	.074
1976-1977	423253	10263	1389	428	.042
1981-1982	473875	9964	1297	442	.044
1986-1987	557557	9221	1375	350	.038
1991-1992	643475	9447	1743	623	.066
1994-1995	660176	9373	2164	923	.098

* FTE = full-time students plus part-time students divided by 3.5. Dollar figures are 1986 dollars.

discount price) is somewhat different, with a downward trend until the mid - 1980's before turning up. The last column measures how much of the teaching cost is borne by students by tracking net fees as a proportion of operating expenditures. Student's share fell dramatically during the 1960's, declined less during the 1970's and 1980's before increasing rather sharply after 1988 and reaching 9.8 percent in 1994-1995.[5]

Government Support and Student Demand

Why governments subsidize higher education is a question not easily answered. Some suggest (e.g. Creedy and Francois (1990)) that positive externalities are important and so governments subsidize higher education to exploit these externalities and therefore advance the public interest. Such externalities might include a more informed electorate resulting in more effective democracies, an economy with greater technological change, and an economy with higher future tax revenues from the higher earnings of a more educated population. Another idea (e.g. Shibata (1988)) is that higher education is a merit good valued by an elite who through the democratic process support subsidies. Or, as outlined in median voter models (e.g. Borcherding and Deacon (1972)), the subsidy reflects the preferences of the median voter.

While these arguments may have some role in explaining subsidies, we want an approach to help us focus more clearly on why subsidies vary across provinces and time. To do so we will

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[5]Winston (1999) reports that the price-cost ratio (net fees as a percentage of costs) was 12.4 percent for American public institutions and 45.9 percent for private institutions in 1994-95. This compares to our figure, extracted from Table 1, of 9.8 percent. Winston's figures include a calculated rental rate for the cost of physical services which averages about 25 percent of costs.

use the economic theory of regulation as outlined, for example, by Peltzman (1977). Consequently our answer is that, at the margin, public support will be determined by the forces of demand and supply in the political market place. Specifically, governments maximizing political support will supply a level of subsidy that is an optimizing response to groups (students) advocating more support and groups (taxpayers) opposing more support.

One insight from this literature is smaller (student) groups can be successful compared to larger groups. One reason is smaller groups have lower organization costs. Another is the asymmetry in per capita benefits and costs arising from a transfer from more numerous taxpayers to less numerous students. This implies students, or their families, will have a stronger interest in education than non-students and will be more likely to condition their support for elected officials on this single issue rather than a package of issues.

If small groups can be effective, one question is what happens to the per student subsidy as the small group becomes larger? This is an issue because a feature of the student coalition is that there are no natural coalition property rights that limit membership in the coalition.[6] As the group expands, perhaps for demographic reasons, we might expect, on the one hand, a broader base of support for subsidies, but, on the other hand, for any given transfer to students, we might also expect increased numbers will lower per student benefits and thereby weaken support. Moreover, to maintain or increase subsidies per student as student numbers grow implies increases in the cost per taxpayer and therefore, on this account, stiffer opposition.

To formally represent some of these influences, we introduce the following notation:

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[6]This point was made by Brown and Santoni (1978) with respect to subsidies to public schools in the United States.

G = government transfer or subsidy to university students

S = number of university students

NS = the non-student adult population

G/S = government subsidy per student

G/(S+NS) = average cost of subsidy per adult population

s = S/(S + NS) is university enrolment as a share of the adult population

From the above it follows that the cost per adult is the product of the subsidy per student and student share of the adult population.

$$G/(S+NS) = (G/S) * s \qquad (1)$$

Now imagine that at some small coalition size (s), there is a per student subsidy (G/S) chosen by a government balancing the interests of the two groups. Then, if s increases, the broader base of support may lead government to respond by increasing the per student subsidy. The consequence, however, from equation 1 is that the taxpayer burden (G/(S+NS)) must rise because both s and G/S are increasing. If share continues to increase, then at some level it may be that no further gains in per student subsidies can be secured, both because of the increasing taxpayer opposition provoked by the increasing transfers, and a diminishing returns effect with respect to the relationship between subsidy and student support. Since there are no excluding mechanisms, share can grow beyond a level that is optimal for the coalition, even to the point where a support-maximizing government will respond by choosing lower per-student subsidies than at some previous lower share. In fact, from equation 1, it could happen that a support-

maximizing government could be both reducing per student benefits, G/S, and increasing tax burden, G/(S+NS).

In summary, assuming diminishing returns to political support with respect to G/S and increasing political costs with respect to G/(S+NS), and, given no effective exclusionary rules, then larger shares can eventually produce smaller per student subsidies or larger net fees.[7] Put differently, the political support for subsidy is zero when student share is either zero or one (there is no outside group to tax) but will be positive in between, thus implying a turnover in the relationship between subsidy per student and share. The question is whether this turnover has been observed in the Canadian data.

Given the above, our next step is to introduce a regression to explore how student influence and other variables have influenced government subsidies or the fee structure. To index student influence, the key concern for students is net fees, or, for given operating expenditures per student, equivalently subsidy per student. We could use either, but decided on net fees per student since it is more straightforward to talk about this variable in the regression analysis.[8] Accordingly the influence function is:

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[7]More formally, the government maximizes votes per adult, $V=V_f+V_a$ where votes for by the beneficiary group is the first term and votes against by the non-beneficiary group is the second. Votes for are $V_f = s\, f(G/S)$ and votes against are $V_a = (1 - s)\, g(G/(S+NS))$ where f(.) measures the probability of a vote for the government as a function of the subsidy G/S, and g(.) measures the probability of a vote against as a function of the cost to taxpayers. The Peltzman model assumes diminishing returns in V_f with respect to subsidy per student ($f''(G/S) < 0$) and increasing costs in V_a with respect to cost per taxpayer ($g''(G/(S+NS)>0$) . For a given s, the support maximizing per student subsidy can be determined. When s changes exogenously this support maximizing subsidy changes.

[8] In fact since cost per student (OPEX/S) is an independent variable in the regression equation, the regression coefficients for subsidy per student (OPEX-F)/S are identical to those for net fees but with opposite sign. We note that subsidy per student is slightly greater than the

$$F/S = \beta_1 + \beta_2 s + \beta_3 s^2 + \beta_4 POP65 + \beta_5 POP18 + \beta_6 Y + \beta_7 BD/Y + \beta_8 OPEX/S \quad (2)$$

In equation 2, s represents university enrolment as a percentage of the adult population, POP65 and POP18 are respectively the percentage of population over 65 and under 18 years, Y is real GDP per capita, BD/Y is the provincial government budget deficit as a share of GDP, and OPEX/S are real operating expenditures per student.

For the coalition share, s, we expect a diminishing returns effect so that increases in share reduce F/S but with decreasing effectiveness, i.e., $\beta_2 < 0$ and $\beta_3 > 0$. Diminishing returns to group size are expected because the cost of organizing support, overcoming free riders and combating an opposition energized by rising tax burdens rises faster than group size. The question is whether the quadratic in s turns over within the range of observed s's so that further increases in coalition share increase student fees.

The two population ratio variables proxy the strength of other interest groups (senior citizens and K-12 education) that compete for funds and we therefore expect β_4 and $\beta_5 > 0$. Higher per capita income may make it easier for provinces to respond to demands for increased support of students, $\beta_6 < 0$. The budget deficit variable measures fiscal pressures on governments. At the margin, government response to interest groups is influenced by the fiscal environment. When budget deficits are large, governments may find that maximizing political support means responding less to interest groups advocating spending and more to interest

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taxpayer financed subsidy because a small amount of operating expenditures are financed by investment income and private donations. In addition to fees or subsidy per student, there are other ways to index student influence. One candidate we explored was student share of cost , i.e., net fees as a proportion of operating expenditures. The results with this variable did not differ meaningfully from those reported.

groups opposing, so that $\beta_7 > 0$. Finally real operating expenditures per student are included to see if increases in cost have influenced net fees.

Given that net fees have been changing , in part because of the forces outlined above, the next question is what has been the effect on enrolment. To explore this, we introduce a simple demand function for university education where enrolment in a province depends on fees charged, income and population characteristics. Accordingly the per capita demand function or enrolment rate for the adult population is

$$(S/ADULT) = \alpha_1 + \alpha_2 (F/S) + \alpha_3 Y + \alpha_4 UNR + \alpha_5 POP18\text{-}23 \qquad (3)$$

where S, as before, is student enrolment, ADULT is the 18 year and over population, F/S is net fees charged per student (1986 dollars), Y is real GDP per capita , UNR is the provincial unemployment rate and the last variable is the percentage of the population between 18 and 23 years. We expect $\alpha_2 < 0$, $\alpha_3 > 0$ (education is a normal good), $\alpha_4 > 0$ (tight employment conditions encourage movement from the labor force to universities), and $\alpha_5 > 0$ (the return on investment in higher education is greater for youth).

Finally we note that F/S measures the discount price or net fees and this can be decomposed into gross fees (the sticker price) and the value of student aid. To see if the enrolment rate is sensitive to this decomposition, we also estimate a demand function that replaces net fees with gross fees per student (GF/S) and aid per student (AID/S).

Empirical Results

We now introduce the regression estimates of the influence and demand functions. The estimates are for a panel data set of the ten Canadian provinces with annual data from 1962 to 1995. For each regression we include dummy variables for the provinces to account for cross-sectional differences not captured by the independent variables, and a linear trend variable to control for unmeasured secular changes.

An obvious problem for the regressions, as presented, is simultaneous equations bias which we deal with by formulating a recursive system. Specifically, since fees are typically announced in the spring for the following school year, it makes sense to treat student share in year t as influencing student fees in year t+1. Therefore we enter the share variables in the influence function with a one year lag. This also implies that in the demand function, the dependent variable and the net fees per student variable are not jointly determined.[9]

A last point is that linear functional forms rather than logarithmic forms were chosen because the budget deficit and net fees variables were often negative. A negative budget deficit variable indicates a surplus while a negative net fees variable indicates that student aid on average exceeded the sticker tuition price. In fact for the 340 observations, 10 provinces over 34 years, negative net fees occurred 39 times, largely in Newfoundland (16 times) and Quebec (13 times).

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[9]Essentially we assume this year's student share determines next years fees and any demand shocks in the next year will affect enrolment in that year but not fees. The alternative is not to lag the share variable and account for joint dependence with two-stage least squares. This was tried with results similar to those reported.

With respect to the regression procedures, because this is panel data, certain problems may arise. For example there may be group-wise heteroscedasticity across the provinces, cross-group (province) correlation in the disturbances and within province autocorrelation. Accordingly, as indicated by liklihood ratio tests for cross-group heteroscedasticity and cross-group correlation, and high autocorrelation coefficients, all regressions were corrected for group-wise heteroscedasticity, cross-group correlation and within province autocorrelation using the procedures outlined in the Limdep 7.0 software package (Greene 1995).

Table 2 presents descriptive statistics for the regression variables while Table 3 presents regression results for the influence function and the two versions of the demand function, one with net fees as the price variable, and the other with net fees split into gross fees and aid.[10]

The influence function results in regression 1 generally agree with our expectations although three variables (the over 65 population ratio, per capita income and operating expenditures per student) were not significant at the five percent level. The remaining variables are significant at the one percent level and the results support the view that higher budget deficits (tougher fiscal environments) increase student fees, as do higher percentages of the under 18 population (increased competition for education funds). The economic significance of these variables can be inferred from the size of the coefficients. For example we see that a one percentage point increase in the budget deficit to income ratio and under 18 population percentage increases fees by $20 and $100 respectively.

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[10]The provincial dummy variable results are not reported. Summarizing these, most provinces charged lower fees than Ontario, the omitted province. The lowest fee provinces were respectively Newfoundland, Prince Edward Island, Quebec and Saskatchewan. For the demand equation, most of the provincial dummies were insignificant at the five percent level.

Table 2

Mean and Standard Deviation for Regression Variables*

Variable	Mean	Standard Deviation
net fees per student, F/S	571	499
gross fees per student GF/S	1555	320
aid for student, AID/S	984	420
operating expenditures per student, OPEX/S	8991	1955
student percentage of adult population, s	2.65	.64
provincial GDP per capita, Y	13909	4825
provincial budget deficit-GDP percentage, BDY	-.74	2.04
provincial unemployment rate, UNR	8.70	4.02
population percentage over 65, POP65	9.84	2.02
population percentage under 18, POP18	32.17	5.98
population percentage 18-23, POP 18-23	12.14	1.54

* Dollar figures are 1986 dollars.

Table 3

Regression Results*

regression 1	dependant variable	constant	s_{-1}	s^2_{-1}	POP65	POP18	Y	BDY	OPEX/S	TIME
coefficients	F/S	-1.73	-.924	.166	.053	.100	-.016	.020	-.007	.04
t-statistics		(-1.62)	(-453)	(4.51)	(.85)	(4.83)	(-1.04)	(2.82)	(-.46)	(2.38)

regression 2		constant	F/S	POP18-23	Y	UNR	TIME
coefficients	S/Adult	2.15	-.077	.043	-.015	-.007	.059
t-statistics		(3.77)	(-4.04)	(2.23)	(-2.06)	(-1.42)	(10.1)

regression 3		constant	GF/S	AID/S	POP18-23	Y	UNR	TIME
coefficients	S/Adult	1.89	-.046	.086	.054	-.016	-.006	.058
t-statistics		(3.42)	(-1.20)	(3.67)	(2.76)	(-2.25)	(1.30)	(9.96)

* F/S, Y, OPEX/S, GF/S and AID/S are measured in units of thousands of 1986 dollars. The remaining ratio variables are measured as percentages.

The results for the student share variables indicate that fees initially decrease with share but at a decreasing rate. The question is whether the quadratic in share turns over within the sample range, so that further increases in student share lead to higher fees and smaller subsidies. Accordingly, we find the turnover share value (s*) for regression 1 by setting the partial derivative of the dependent variable with respect to s equal to zero. Doing so leads to s*= 2.78 which is significantly different from zero at the one percent level as indicated by the Wald procedure. This number is just above the sample mean and indicates, as student share of the provincial adult population approaches three percent, that net fees per student increase. In addition, taking the other independent variables at their means, the path of F/S, for the province of Ontario, against share traced out by the quadratic is that net fees are $1712 (in 1986 dollars) when share in the sample is at its lowest (s=.84), then fall to $1088 when share is at its best for students (s=2.78), and then rise to $1623 when share is at its highest (s=4.57). Finally, we have already indicated that a support maximizing government may find itself both reducing per student subsidy (increasing per student net fees) while the cost of higher education per adult is also increasing. This is implied by our regression result, where beyond s=2.78, fees per student increase and, it turns out, cost per taxpayer also increase within the observable range of shares.[11]

Having examined how net fees per student are determined, the next question, addressed in regressions 2 and 3, is how have fees influenced enrolment? Looking first at the non-price variables, we see that the unemployment rate has a negative coefficient but is insignificant at the

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[11] From equation 1, the increase in cost per taxpayer from an increase in s is $d(G/(S+NS))/ds = G/S + s\, d(G/S)/ds$. Holding spending per student (OPEX/S) fixed means $d(G/S)/ds = - d(F/S)/ds = .924 - .332\, s$ (from regression 1) and taking G/S at its sample mean of 8.419, means, after substitution, that cost per taxpayer do not fall until s reaches 7.11 percent.

five percent level, that the 18 to 23 population percentage has a positive and significant ,at the one percent level, effect on enrolment, and real GDP per capita has a negative, significant at the five percent level, effect on enrolment. This last result is somewhat surprising given our prior that higher education is a normal good.[12] One argument is that per capita GDP may proxy the availability of attractive employment opportunities for graduating high schoolers.

Our major interest are the price variables. In regression 2 the net price has the expected negative sign and is significant at the one percent level. When net price is broken up into the sticker price and the aid component in regression 3, the aid variable appears more important than the sticker price since its positive coefficient is significant at the one percent level, while the sticker price coefficient, although still negative, has a smaller absolute value and is significant only at the 23 percent level. Although enrolment appears to be more responsive to aid, which we might expect since aid is need-based, the absolute values of the coefficients are not, at the five percent level, significantly different from one another.[13]

Even though fees have a significant statistical effect, the coefficients imply that their quantitative significance is small. For example in regression 2 a $100 increase in net fees would reduce enrolment per capita by only .0077 percentage points which is .29 percent of mean enrolment per capita. The small tuition price effects, at least within the range observed, is consistent with the view that higher education is an investment dominated by expected lifetime

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[12]MacPherson and Shapiro (1991) also report a negative income effect for their panel study of student aid and college enrolment in the United States.

[13]Aid does appear to be used to soften sticker price increases. A regression of aid against sticker price indicated 20 percent of increases in sticker prices are offset by increases in aid.

net benefits rather than current tuition costs. The small effects, however, are at odds with those observed in the United States where, unlike Canada, there have been many demand studies. The consensus, as reported by Leslie and Brinkman (1987) in a review of twenty-five demand studies, is that a $100 (1982-83 dollars) increase in tuition reduced enrolment by 1.8 percent of mean enrolment. Our price effects may be smaller because many of the American studies are cross-sections where opportunities to substitute among colleges may increase elasticity estimates, because the well-developed network of junior colleges may provide better substitution opportunities than in Canada, and because most U.S. studies relate fees to the enrolment of presumably more price-sensitive freshmen.

Conclusion

We have looked at how prices charged for university education, and therefore subsidies, have changed across the provinces over the period 1962 to 1995. We have explained variation in fees with a model that uses the relative size of the student coalition, income, demographic variables and the provincial fiscal circumstance as proxied by provincial budget deficits. We have also explored how university enrolment is affected by net fees and the breakdown of these fees into gross fees and aid.

Our conclusion is that the size of the student coalition does influence fees. At very small shares of the adult population, there is an advantage to growing student numbers, but as numbers continue to increase this advantage disappears as governments struggle to balance the interests of students and taxpayers. We also find that jurisdictions with lower budget deficits and smaller

under - 18 populations will charge lower fees. With respect to the demand for university places, higher net fees do reduce enrolment but the effect is small. There is also some weak evidence that enrolment is more sensitive to aid than to sticker prices.

On balance , it therefore appears, as long as university enrolments continue to be near historically high levels, that the consequent cost burden for the taxpayer work against higher subsidies and lower fees in the future, *ceteris paribus*.

Appendix

Data by provinces for operating expenditures, fees and student aid (scholarships, student aid cost of loans, federal and provincial) are from the following Statistics Canada publications: *Decade of Education Finance 1960-1969* (Catalogue no. 81-560), *Decade of Education Finance 1970-71, 1979-80* (Catalogue no. 81-560), *Financial Statistics of Education 1984-85 ; 1989-90* (Catalogue no. 81-208), *Education Quarterly Review* (Catalogue no. 81-003, vol. 2 and 4). Data for student aid for the years 1991-92 to 1994-95 were provided by request to Statistics Canada.

Data by province for full time and part time university enrolment for 1961-62 to 1974-75 are from *Historical Compendium Of Education Statistics from Confederation to 1975*, for 1976 to 1990-91 from annual issues of *Universities: Enrolment and Degrees* (Catalogue no. 81-204), and for 191-92 to 1994-95 from issues of *Education Quarterly Review* (Catalogue no. 81-003).

Population by province and age categories are from Statistics Canada, Cansim data base, matrices 6431-6440 for 1961-1971, matrices 6368-77 for 1972 to 1994. Provincial GDP are from Cansim, matrices 2611-2619, 6949. Provincial net lending (budget deficit) are from Cansim, matrices 6769-6778.

Provincial unemployment rates are from issues of Statistics Canada's *Historical Labour Force Statistics* (Catalogue no. 71-201 XPB) . There are no unemployment data for the four Atlantic and three Prairie provinces before 1966. The Atlantic and Prairie regional unemployment rates are used in those years.

The provincial GDP figures are deflated by the implicit price index for final domestic demand, base year 1986. The fees, operating expenditures and aid variables are deflated by the implicit price index for personal expenditures on consumer goods and services, base year 1986. The respective price index figures are, since 1971, from Cansim, matrix 2596. Before 1971 the price index figures are from Statistic Canada's *Provincial Economic Accounts, Historical Issue 1961-1986* (Catalogue no. 13-213 S).

Data on faculty numbers (footnote 3) are from Statistics Canada's *Teachers in Universities 1990-91* (Catalogue no. 81-241). Data for salaries (footnote 3) are from various issues of Statistics Canada's *Salaries and Qualifications of Teachers in Universities and Colleges* (Catalogue no. 81-203).

References

Borcherding, T. & Deacon, R. (1972) The demand for the services of non-federal governments, ***American Economic Review,*** 63, pp. 280-296.

Brown, W. and Santoni, G. (1978) Economic competition and political competition: a comment, ***Public Choice***, 35, pp. 27-36.

Creedy, J. and Francis, P. (1990) Financing higher education and majority voting, ***Journal of Public Economics,*** 43, pp. 181-200.

Greene, W. (1995) ***Limdep. Version 7.0 User's Manual***. (Bellport, N.Y. Econometric Software Incorporated).

Little, D. (1997) Financing universities: why are students paying more?, ***Education Quarterly Review***, 4, pp. 10-26, (Catalogue no. 81-203, Statistics Canada) .

Leslie, L. & Brinkman, P. (1987) Student price response in higher education: the student demand studies, ***Journal of Higher Education,*** 58, pp. 181-204.

McPherson, M. & Shapiro, M. (1990) Does student aid affect college enrolment? New evidence on a persistent controversy, ***American Economic Review,*** 81, pp. 309-318.

Peltzman, S. (1977) Toward a more general theory of regulation, ***Journal of Law and Economics,*** 20, pp. 229-263.

Renner, K. (1995) Renewal, costs and university faculty demographics, ***Education Quarterly Review***, 2, pp. 21-34, (Catalogue no. 81-203, Statistics Canada) .

Shibata, H. (1988) Merit goods and public choice: the case of higher education-comment, ***Public Finance,*** 43, pp. 466-469.

Toutkoushian, R. & Hollis, P. (1998) Using panel data to examine legislative demand for higher education, ***Education Economics,*** 6, pp. 141-157.

Winston, G. (1999) Subsidies, hierarchy and peers: the awkward economics of higher education, ***Journal of Economic Perspectives,*** 13, pp. 13-36.