"AN ANALYTICAL FRAMEWORK FOR EVALUATING THE BENEFITS AND COSTS OF FOREIGN STUDENTS AT THE UNIVERSITY OF MANITOBA"

by

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To my lovely sister

Mika

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ABSTRACT

In this thesis we develop an analytical framework for evaluating the benefits and costs of the presence of foreign students at a Canadian university; in particular the University of Manitoba.

Using some theoretical tools such as: the theory of clubs and the export multiplier, combined with a survey of some 160 foreign students on campus, we arrived at a tentative conclusion that the benefits of a foreign student presence exceeds the costs.

We examine two alternative frameworks for cost-benefit analysis: a strictly Canadian framework and an international framework. In the Canadian framework there is no significant difference between the present value of costs and benefits from foreign students. However, the international framework which includes the benefits to foreign students as well, shows a significant net benefit from the presence of foreign students in Canada.

Our analysis of the quantifiable and the non-quantifiable benefits from foreign students studying in Canada, reaches the conclusion that foreign students do not impose a burden on Canadian society and may well confer a net benefit.

CONTENTS

CHAPTER I

Introduction and Overview

As the highest institution for education, university has a leading role in educating high school graduates towards a degree and/or whatever profession they desire.

This requires large amounts of funds and resources for faculty salaries, capital, facilities and support staff. If the tuition fee is to cover all of these costs, then, only wealthier people would be able to attend universities.

In Canada and many other advanced industrialized countries, the tuition fee is subsidized by the government. Moreover, universities depend on donations and support from private and public institutions which usually donate funds in order to build new facilities and acquire modern accessories such as computers, laboratories and so on.

A trend in recent years is the increase in the number of foreign students who come to study in North America's universities. Some years ago when the local enrollment was well below capacity, there was a need for more students in order to increase revenues (the marginal cost is decreasing when adding more students to "empty" universities), and therefore, foreign students were welcome.

However, the recent recession and the high rate of unemployment have changed the picture and many unemployed Canadians have returned to school. The opportunity cost of

education in such a case is approaching zero, which in turn reduces the cost of education to domestic students. As the number of students goes up, we have the phenomenon of a congested good.

The enrollment at the University of Manitoba is at its peak, and foreign students are asked to pay more in most of the provinces in Canada. Ontario and Quebec have decided to increase the tuition fees for foreign students with very little subsidy. In most other provinces, foreign students pay $1,000 to $2,000 more than Canadian students. Only Manitoba and Saskatchewan have yet to increase the tuition fees for foreign students. (American students are also considered to be foreign students when applying to universities in Canada).

Is it "fair" for Canadian taxpayers to subsidize foreign students? This question is asked again and again but is difficult to answer. The demand for education by the local population has increased and more space is needed in order to accommodate this demand; therefore, a related question to pose is whether Canadians should have priority when applying to a Canadian university.

Before proceeding further, we should examine the economic benefits that foreign students bring to Canada as well as the costs which they impose. Whichever is greater will suggest whether, on balance, foreign students under a highly subsidized tuition fee structure create an economic burden on Canadian society. A final judgement about

admission and tuition fee policy with respect to foreign students would have to consider, as well, the non-economics (i.e. cultural) benefits inferred by the presence of foreign students in Canada.

In this thesis we develop an analytical framework for evaluating the benefits and costs of the presence of foreign students at a Canadian university; in particular, the University of Manitoba.

As will be shown later, the assessment of the costs which foreign students impose on the economy is easier and more accurate than the assessment of the benefits which they generate. Our modest objective is, therefore, to shed some light on the application of a cost-benefit analysis to this issue, by using some theoretical tools and then by combining them to try and come to a tentative conclusion concerning university policy with respect to foreign students.

Sims and Stelcner developed a methodological framework for analyzing the costs and the benefits of foreign students to Canada. Our study differs from theirs in so far as we undertake an empirical analysis within the same basic methodological framework. Moreover, they confine their framework strictly to the costs and benefits to Canadians while we consider as well a broader framework which includes the involving costs and benefits to the foreign students themselves.

The cost-benefit measure is highly subjective when many groups and individuals are involved. Moreover, one needs accurate data and information in order to analyze the issue and come to a definite conclusion.

In analyzing the cost side of the question of foreign students in Canadian universities, we can identify several distinct groups which incur costs. First, the foreign students themselves incur expenses relating to their presence at a Canadian university; for example, tuition fees and living expenses. Federal and provincial governments provide a higher subsidy to universities because of the presence of foreign students, (assuming that the university's enrollment would be reduced if foreign students were not admitted); this subsidy constitutes a cost borne by Canadian taxpayers. In addition, foreign aid agencies such as Canada International Development Agency (CIDA) provide financial assistance for some foreign students; the funds for CIDA are of course, derived from Canadian taxpayers.

On the benefit side, we can identify both quantifiable and non-quantifiable benefits. For foreign students, the quantifiable benefits are reflected in the value that they attach to higher education. Such benefits can be estimated by deriving a demand curve for foreign students for higher education. The non-quantifiable benefits from the presence in Canada of foreign students accrue to both Canadian and foreign students as well as to Canadian society at large

from cultural interaction. The major quantifiable benefit to Canada from the presence of foreign students is the income generated by their expenditures on Canadian goods and services through the export multiplier. The concept is discussed in principle and some tentative estimates of this benefit are provided. The money that foreign students spend in Manitoba may well utilize otherwise unemployed resources, but it is highly complicated to measure its net effects.

Each chapter is largely self-contained, introducing various aspects of the issue of foreign students in a Canadian university. However, all chapters are interrelated in focusing on different aspects of the same issue.

We begin Chapter II by introducing some relevant theoretical models based on the theory of clubs. The two main contributors to this literature are James Buchanan and Y.K. Ng. Buchanan's club constitutes an "organization of membership or sharing arrangements where 'exclusion' is possible."[1] The club can be a sport club or a university in our particular case. The central question in the theory of clubs is that of determining the optimal capacity of the facility and the optimal size of the membership; in our example, the issue is the optimal capacity of the university or a particular faculty and the optimal number of students to be accepted.

Buchanan's model assumes that the goal of members of a club is to maximize the average net benefit per individual

member. In contrast to this, Ng's model examines the welfare implications of the club maximizing total net benefit. Buchanan is more concerned with the club members' interest whereas Ng adopts the viewpoint of society at large.

If the economic literature on the theory of clubs is to be of use to policy makers, they must identify which groups are appropriately modelled as club members in their analysis of university policy, for example, should the students in a professional faculty comprise the club membership? Or should the club comprise a particular professional group? Or should the club be viewed as Canadian society as a whole? We have adopted the approach of analyzing the issue from the perspective of each of the parties involved.

It is interesting to note that it is not uncommon for an individual's attitude and perspective to reflect his own interests. Thus, a new student who wishes to enter the Law Faculty may advocate a relaxation in entry standards, while his attitude after being accepted to the Law Faculty may well be to make entry much more difficult. After becoming a lawyer it may be in his economic interest to limit still further the number of students entering the Law Faculty.

In Chapter III, we estimated how much money foreign students spend in Manitoba, and how much they would be willing to spend on tuition fees by means of a survey. A questionnaire was distributed among 200 foreign students

currently enrolled at the University of Manitoba. Of this number, 160 usable replies were received. The questionnaire asked the students to outline their expenditures in Canada such as tuition fee, books, rent, food, clothing, entertainment, transportation, and other costs.

From the above information, we calculated the amount of money which foreign students spent in Manitoba. This information provided the basis for determining the income generate in Manitoba by foreign students. Such a provisional quantitative exercise was undertaken even though an accurate calculation requires knowledge of the export multiplier as well as knowledge of the extent to which resources employed by foreign student expenditures would otherwise have been idle.

It is important to note that foreign students can engage only in limited types of work when staying in Canada, and therefore, most of the money which they spend here originates outside Canada, thereby increasing Canada's foreign exchange reserves, particularly reserves of American dollars (since in most cases, the money which foreign students bring from abroad is American currency).

The second part of the questionnaire was designed to determine how much of the foreign students' income is derived from sources outside Canada and how much is earned from jobs permitted by the University of Manitoba and the immigration authorities.

Foreign students were also asked to estimate their demand for higher education in Manitoba. The demand curve that we estimated differs from the usual demand curve and explanations for its introduction and a detailed discussion of its properties is also provided in Chapter III.

As noted above, the benefits that foreign students bring to Manitoba are of both the quantifiable and non-quantifiable variety. To use the cost-benefit approach, only quantifiable benefits can be compared with the costs impaired by foreign students. The comparison of non-quantifiable benefits and costs is a very subjective exercise. In Chapter IV we provide an analytical framework for determining the economic benefits generated by foreign students expenditures on Canadian goods and services. Although such economic benefits are, in principle, quantifiable, they are in practice extremely difficult to calculate with much confidence, because information about the export multiplier needed for the analysis is highly unreliable.

Chapter IV describes in general terms the economic theory of fiscal policy introducing the reader to the concept of the national income multiplier. The second part of this chapter calculates the present value of the national income generated by expenditures by foreign students in Canada. The data was gathered from the survey described in Chapter III; utilizing the multiplier contained in the RDX2 model we derived an estimate of

national income generated by foreign students expenditures in Canada.

Moreover, the total net benefit to foreign students was derived from the expectational demand curve discussed in Chapter III, and was included in the more comprehensive international framework of cost-benefit analysis.

The costs to taxpayers of educating a foreign student (and indeed any student) is the subsidy to that student by the Canadian government. The private resource cost of educating a student minus the tuition fee he/she pays is the public subsidy provided for that particular student. Chapter V examines and compares the concepts of average student cost and average incremental student cost. Using constant 1981 dollars, we calculated the average cost and the average incremental cost of a student during the past five years at the University of Manitoba. It is obvious that the average student cost is considerably higher than the tuition fees paid by the students.

Finally, the comparison of the estimated benefits with the costs of educating foreign students is presented in Chapter VI, where we reach some tentative conclusions.

CHAPTER II

Some Relevant Theoretical Tools

A university is a non-profit organization with the objective of producing the service of higher education. The manager of a non-profit organization is expected to maintain a balance between the efficiency of resource allocation and the effective achievement of the production of services.

The university can also be treated as a labour-managed enterprise. The objective of the enterprise is "to maximize the welfare of its members subject to the production functions, the budget constraint and any other externally imposed constraints."[1]

The actual allocation of resources in universities tends to be made on a historical basis within the political process.[2] The result is not always an efficient allocation of resources. To achieve efficiency one should determine resource allocation (e.g., the size of faculties) on the basis of the demand for and supply of particular courses and professional training.

In order to determine the efficient size of universities and the optimal number of students, the theory of clubs, as introduced by James Buchanan,[3] will be discussed. This theory is useful in shedding light on the

issue of whether, in fact, restriction on foreign students' enrollment should be implemented.

It should be noted that what is meant by the "socially optimal number of students" enrolled at the university depends upon whether we adopt a strictly national (i.e., Canadian) viewpoint and exclude the net benefits derived by foreign students from higher education in Canada, or whether we adopt a comprehensive international viewpoint and include the net benefits accruing to foreign students. This issue will be further examined in the final section of this chapter.

The Formal Theory of Clubs

We begin by defining some relevant terms. Public goods are commodities which provide benefits to more than one individual at the same time. Such goods as services of defence and flood control are jointly consumed.[4] Some goods can be called pure public goods when one individual's consumption of a particular good does not detract at all from the benefits of other people. Moreover, the use of pure public goods may be non-excludable. It may be impossible or very costly to exclude individuals from the consumption or use of the public good.[5]

Impure public goods are neither private nor public. They exhibit the phenomenon of "congestion" in the economic literature.[6] One such congested good is what Buchanan has

called "club goods", such as golf courses, swimming pools, and so on. The capacity of a club good is limited and subject to congestion costs. Moreover, as an impure public good, a club good is a good from which exclusion is possible.[7]

The analysis of the theory of clubs is concerned with the optimal size of a club good and with the optimal number of users. Local government services have the characteristics of club good; for example, public libraries, fire and police protection, and a public swimming pool are all club goods.

In this thesis, we take the view that the university is also a club good, and therefore the theory is highly relevant to the analysis of university policy. In Buchanan's model, which is the foundation of the theory of the club, all members are assumed to be homogeneous and to share equally the public good and its associated costs. In addition, it is assumed that the club does not discriminate against any of its members, i.e., all pay a uniform price and enjoy the identical level of services. The "Buchanan club" is a decentralized, voluntary organization. no centralized control is needed, because all members have the same goals.

Buchanan presents the utility function for an individual, including public goods and with the assumption of equal sharing as:

$$U^i = U^i \left[(X_1^i, N_1^i,) \ (X_2^i, N_2^i), \ldots, (X_{n+m}^i, N_{n+m}^i) \right] \quad [8]$$

where: U^i = the utility function for individual i

X = good x

N^j = number of people who are sharing good x_j;

where: $j = 1,...n+m$

$1,2,3,...,n+m$ = type of commodity

The cost of production function is:

$$F = F^i[(X_1^i, N_1^i), (X_2^i, N_2^i), ..., (X_{n+m}^i, N_{n+m}^i)]$$ [9]

The addition of members to a sharing group will affect the cost of the good to any one member. If students had to pay the full cost of operating a university, then increasing the number of students in the university would reduce the average cost and thus the cost borne by each student. In fact, all students pay just part of the costs and the rest is subsidized by the government. Moreover, tuition fees in the short-run are independent of the number of students attending the university. If fewer students enrolled in the university, then in the long run tuition fees would go up.

From the above two functions, Buchanan derives the necessary marginal conditions for Pareto optimality with respect to consumption of each good: $\frac{U_j^i}{U_r^i} = \frac{f_j^i}{f_r^i}$ [10]

For the i^{th} individual the marginal rate of substitution (MRS) between good x_j; and x_r in consumption must equal the marginal rate of substitution between the same goods in production. (x_r is a numeraire good).

Buchanan adds $\frac{U^i_{Nj}}{U^i_r} = \frac{f^i_{Nj}}{f^i_r}$ [11], which says that the "marginal rate of substitution in consumption" between the size of the group sharing in the use of good x_j and the numeraire good x_r, must be equal to the marginal rate of substitution "in production."[12] In other words, when an additional member joins the club, the previous member obtains full equilibrium in club size only when marginal benefits (with a negative sign) equal marginal costs (also with a negative sign).

We combine the last two conditions to get:

$$\frac{U^i_j}{f^i_j} = \frac{U^i_r}{f^i_r} = \frac{U^i_{Nj}}{f^i_{Nj}}$$ [13]

This is the necessary marginal condition with respect to the consumption of x_j.

By the use of geometry we clarify the argument. The following diagram (figure 1)[14] shows the optimal number of members in a club at N_i^* with all individuals assumed to be identical and the size of the club facility given. When marginal benefit equals marginal cost, and average benefit is maximized for each identical member of the club, the optimum size is achieved; i.e, at N_i^* in figure 1.

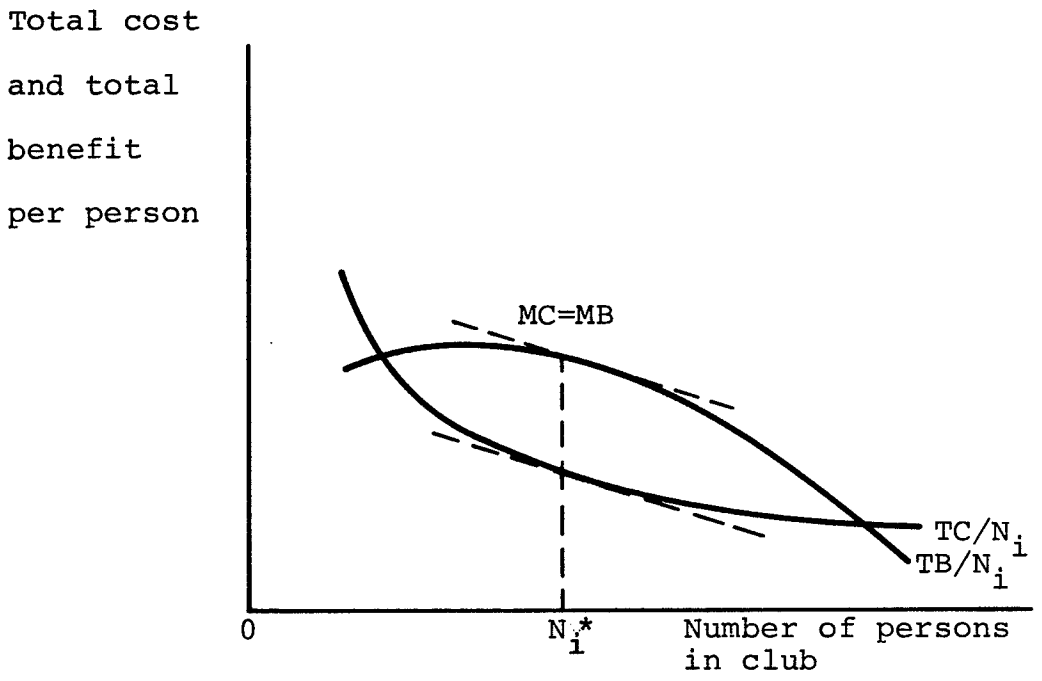

Figure 1

As more people are allowed to share the facility, the marginal benefit declines and the marginal cost declines as well. In our case, more students in a classroom will create more crowding conditions and each student will receive, on average, less attention by the professor. On the other hand, the presence of many students in university may be considered desirable from a social point of view.

The next diagram (Figure 2) depicts two cases. When one individual is considered, the costs are greater than the benefits; thus a one-person club is not desired.

However, when the number of members is a fixed number, k, marginal cost is assumed constant and marginal benefit is assumed to be falling. Q_k is the optimal club size for a club of membership size N = k.[15]

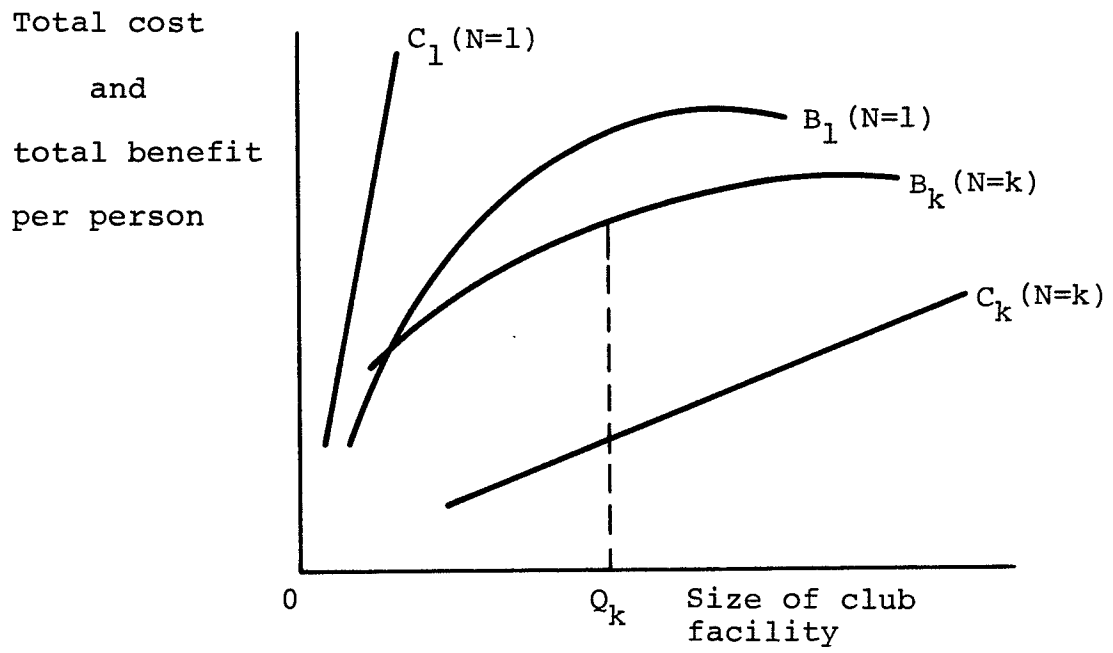

Figure 2

We combine the above two diagrams in order to get the equilibrium point, G.[16] in figure 3.

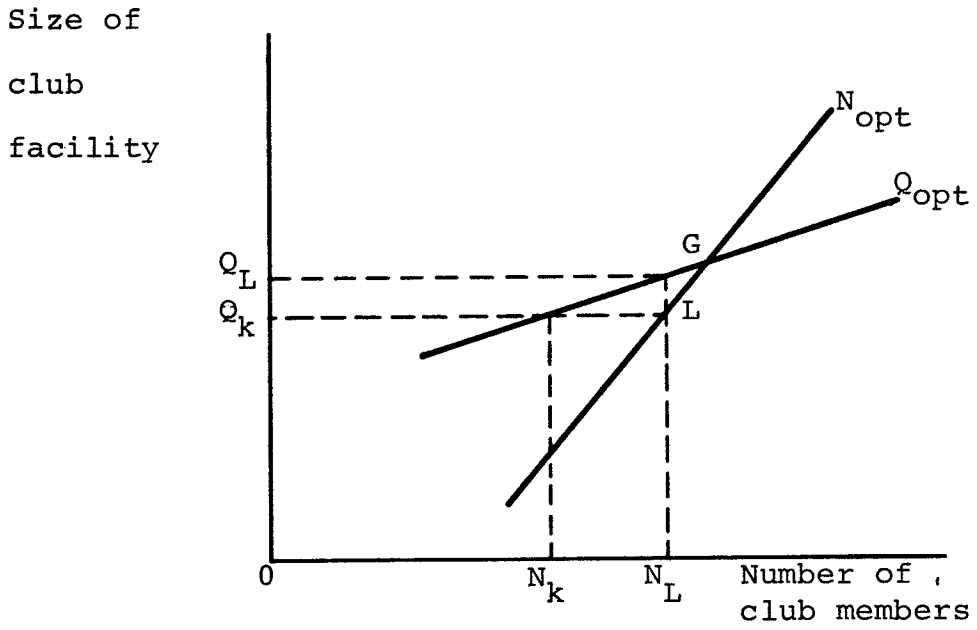

Figure 3

The point G is the full equilibrium. N_{opt} and Q_{opt} are lines of optima; N_{opt} depicts the locus of the optimal number of club members for each possible club size; Q_{opt} depicts the locus of the optimal club size for each possible fixed number of club members; and G is the top of the ordinal utility mountain. The relationship in this example is of complementarity between increasing the size of the club and increasing the size of the sharing group.

Suppose, for example, that the sharing group is limited to size N_k as is the case in many faculties, e.g., law, medicine, business administration. Then, the club size Q_k enables the sharing group N_k to maximize its average net

benefit. However, if the size of the club facility is Q_k, the number of sharing members which would maximize net benefits per member would be N_L. But for membership N_L, the optimal size of club facility to maximize net benefits per member would be Q_L. Thus it can be seen that full equilibrium would be attained uniquely at G.

Assume the size of the university is fixed (e.g., at Q_k). Now what is left to determine is the number of students in order to maximize average net benefits per student. If the decision is made on the basis of maximizing average net benefit per student, the number of students that would be admitted would be N_L in the diagram. In fact, the basis upon which admissions are set will depend as well on the market needs for these professions.

While Buchanan maximizes the utility function of a single individual in deriving the Pareto-optimality conditions, Y.K. Ng considers the aggregate marginal valuation rather than the individual marginal valuation. According to Ng, N_j enters into the utility function of the club members, where N_j = number of individuals consuming the j^{th} collective good, and they cannot vary N_j at will.

$$\sum_{i=1}^{N_j} \frac{U^i_{xj}}{U^i_{xN}} = \frac{f^i_{xj}}{f^i_{xN}} \quad 12$$

where: x_n is a numeraire.

x_j = the good consumed by the club members.

Ng maximizes <u>total net benefit</u> (in contrast to Buchanan's assumption of maximizing average net benefit per club member), as can be seen in the following diagram:[18] (figure 4)

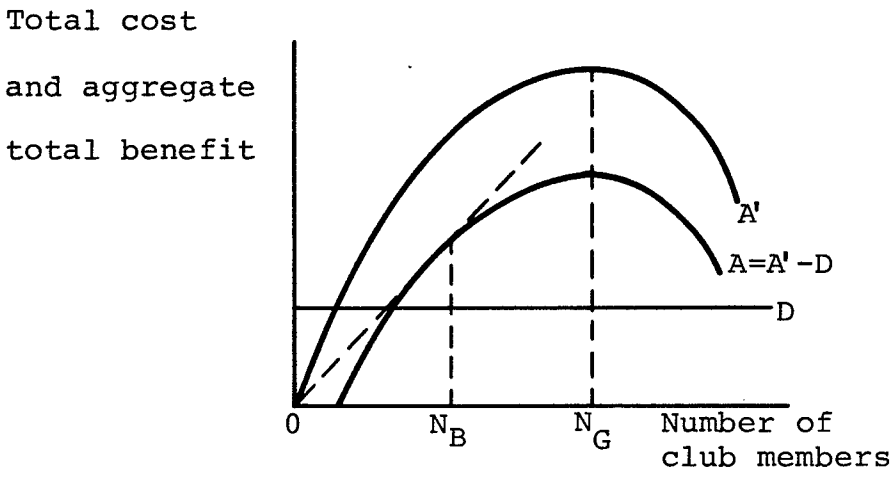

Figure 4

Where: A' = aggregate total benefit curve, i.e., the total benefit per person aggregated over all members in the club, for a given size Q' of the club facility.

where: D = total cost curve

A = A' - D = aggregate net benefit curve

N_G = Ng's optimal number of the club members, where both A' and A obtain their maxima.

N_B = Buchanan's optimal number of the club members for fixed size Q', maximizing <u>average</u> net benefit per club member.

The next diagram [19] (figure 5) depicts a number of "A" (i.e., net benefit) curves. Each curve A_i corresponds to a different fixed size Q_i of the club facility. The larger the size of the club facility, the higher the aggregate benefit, but also the higher the total cost. Therefore, the aggregate net benefit may increase or decrease.

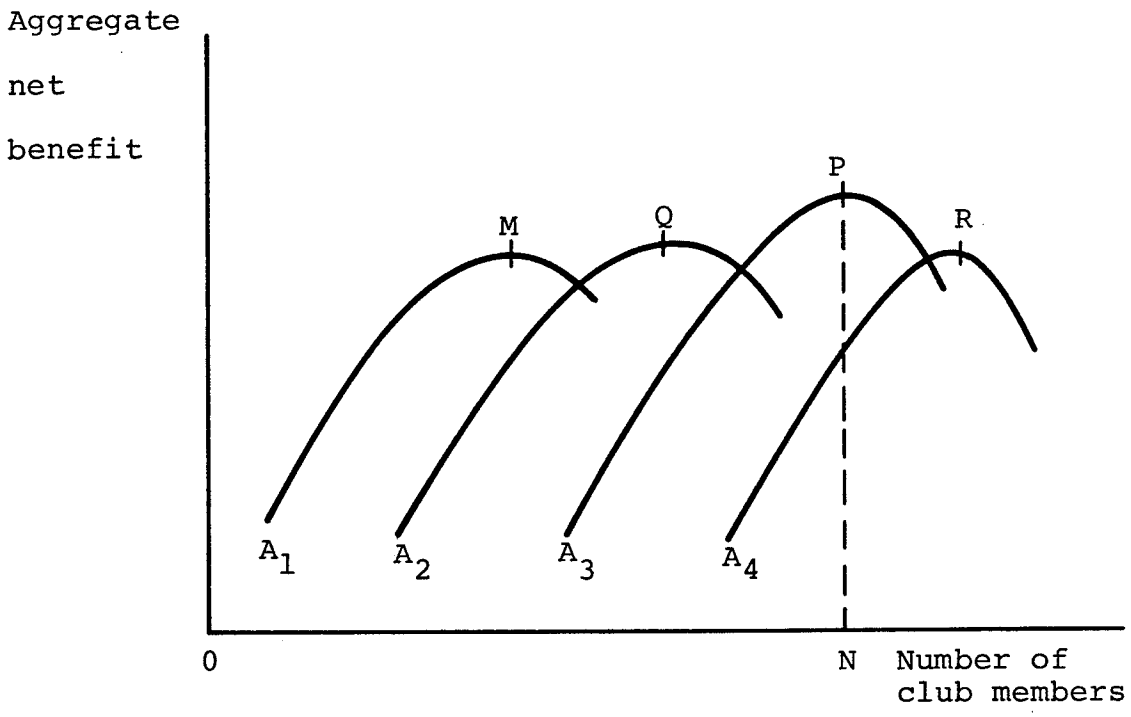

Figure 5

We choose the highest maximum amongst M, Q, P and R in the diagram, which is point P, determining both the optimal size of the club facility Q3 and the optimal number of members N, as shown by the curve A3.

The equilibrium point will occur when marginal benefit equals marginal cost, or when marginal net benefit equals zero.

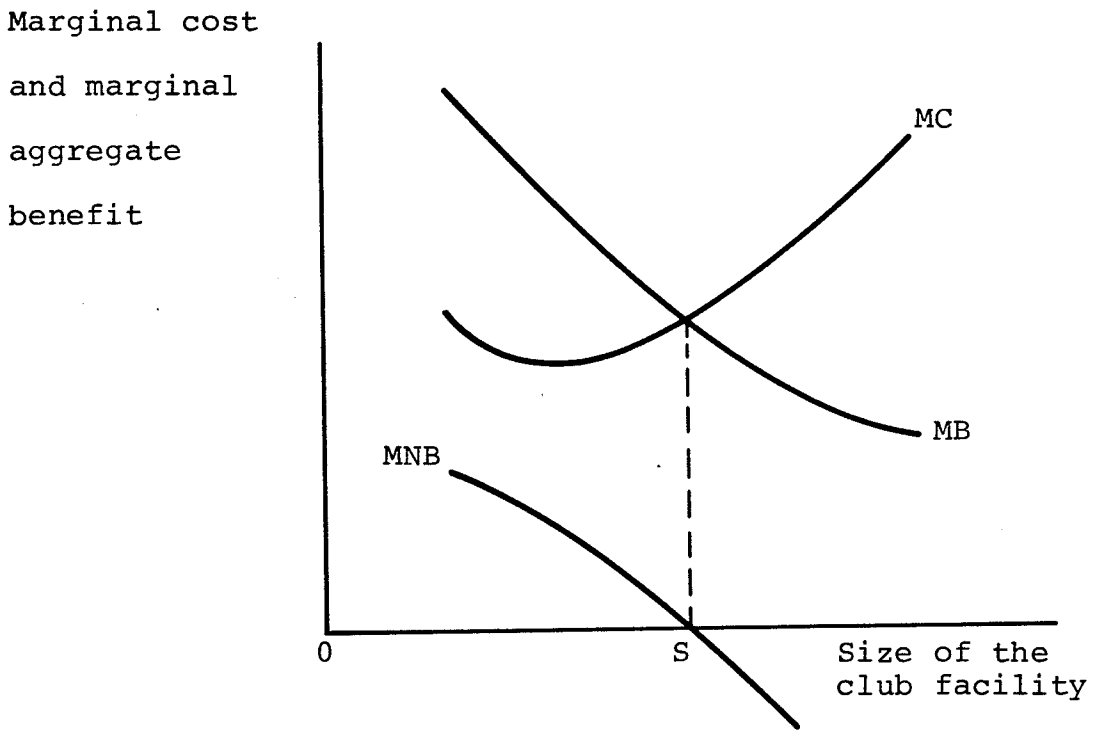

Figure 6

In the diagram above[20] (figure 6) the membership size is fixed. The optimal size of the club facility is where

marginal net benefit equals zero. When the size of the club facility is larger, marginal cost exceeds marginal benefit and Pareto optimality will not occur.

Ng's solution would appear to be more relevant to the setting of the university. From the view point of the central administration of the university, maximization of <u>total</u> net benefit seems plausible. From the view point of students currently in a professional faculty, the narrower goal of maximization of <u>average</u> net benefit would be a reasonable objective.

Buchanan and Ng's analysis can be summarized in the following diagram[21] (figure 7):

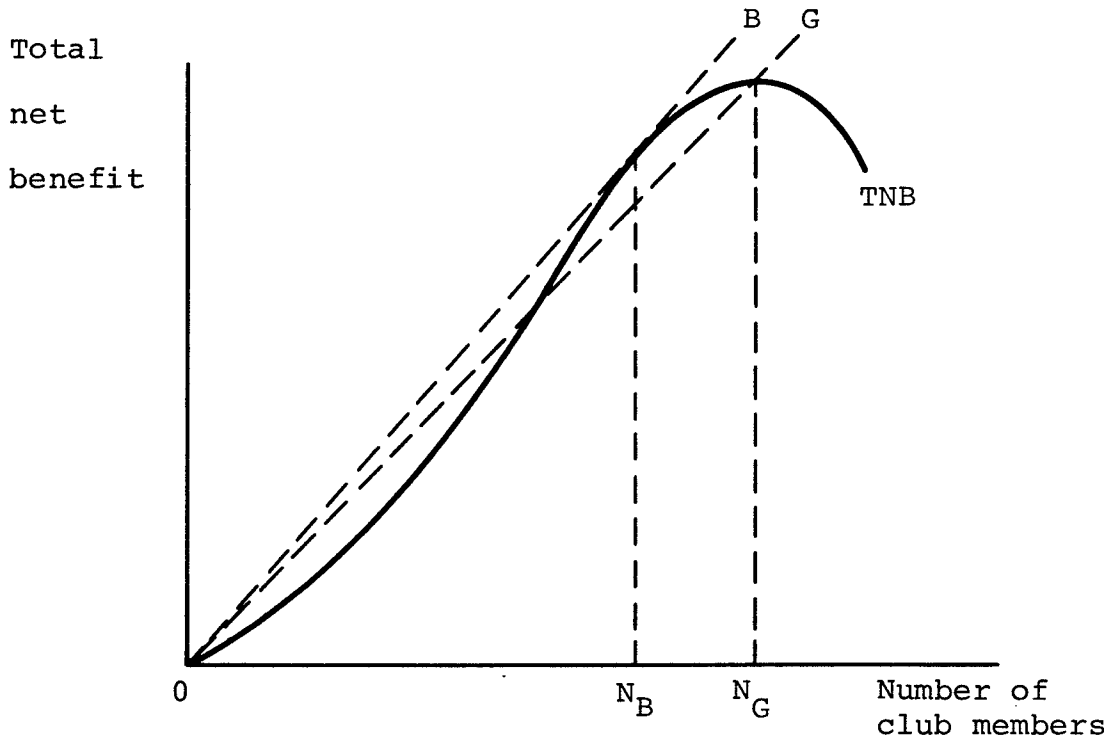

Figure 7

where: N_B = the number of club members which maximize average net benefit, i.e., Buchanan's optimum; and,

N_g = the number of club members which maximize total net benefit so that marginal net benefit equals zero, i.e., Ng's optimum.

The slope of a ray from the origin to the total net benefit (TNB) curve equals the average net benefit. OB has a steeper slope than OG, therefore average net benefit at N_B is greater than average net benefit at N_G, whereas total net benefit is at a maximum at N_G club members.

According to Ng the equilibrium size of a club occurs where average net benefit is maximized, i.e, at N_B in the above diagram. Buchanan's equilibrium number of members is smaller than the socially optimal size where total net benefit is maximized, i.e., at N_G in the above diagram. There arises the welfare question of whether to increase the Buchanan equilibrium number of members. Ng argues that an appropriate subsidy will cause an increase in the number of members until total net benefit to the members is maximized.[22]

In the diagram: (figure 8 below)

N = number of members

S = subsidy

T = total net benefit

S/N = average subsidy per member

MNB = marginal net benefit

$\frac{T + X}{N}$ = average net benefit <u>after</u> subsidization

ANB = T/N = average net benefit <u>prior</u> to subsidization.

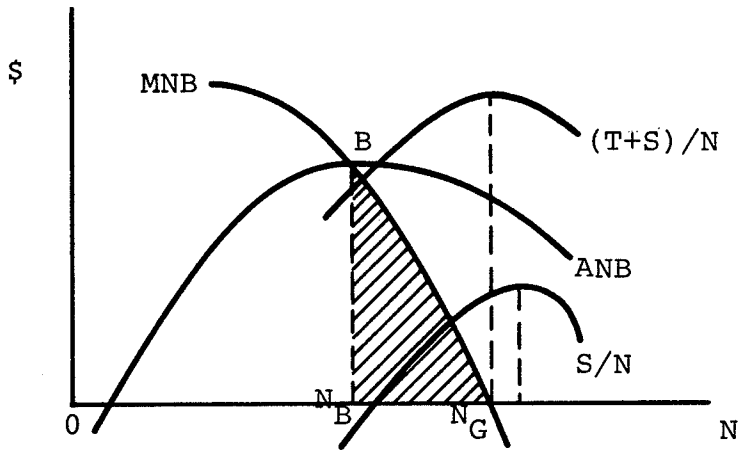

Figure 8

The potental welfare gain of increasing the club membership from N_B to N_G is the area of N_BBN_G (it can be seen also as a consumer surplus). Ng suggests, therefore, that subsidy will increase the number of members until

total net benefit to the members is maximized at N_G. In other words, with the assumption of equal cost sharing, the number of members will increase until marginal benefit of the last member equals average cost per person.

All the diagrams above are two dimensional. They all illustrate the relationship between two variables: for example between the size of a club facility and the number of persons in the club, or between total net benefit to club members and the number of members in a club and so on. The relationship between all three variables can be shown by means of a single three-dimensional diagram, illustrated in Figure 9 on page 26.

In the horizontal plane we depict the size of the club facility, S, and the number of members in a particular club, N, while on the vertical axis we depict the total net benefit to the club members, Z.

The optimum occurs where total net benefit, Z, is maximized. In our diagram, this occurs at point M where S = S' and N = N' and total net benefit attains its maximum value Z'. The three-dimensional graph depicts Z = Z (S,N), i.e., the total net benefit is shown as a function of S and N. At its maximum point M' = (S', N', Z')

$\frac{\partial Z}{\partial S} = \frac{\partial Z}{\partial N} = 0$, the first order condition for a maximum.

The second order condition for a maximum value of Z is also satisfied at M'. M' occurs in the diagram at the top of the hill; any movement away from M' will result in a decrease in Z.

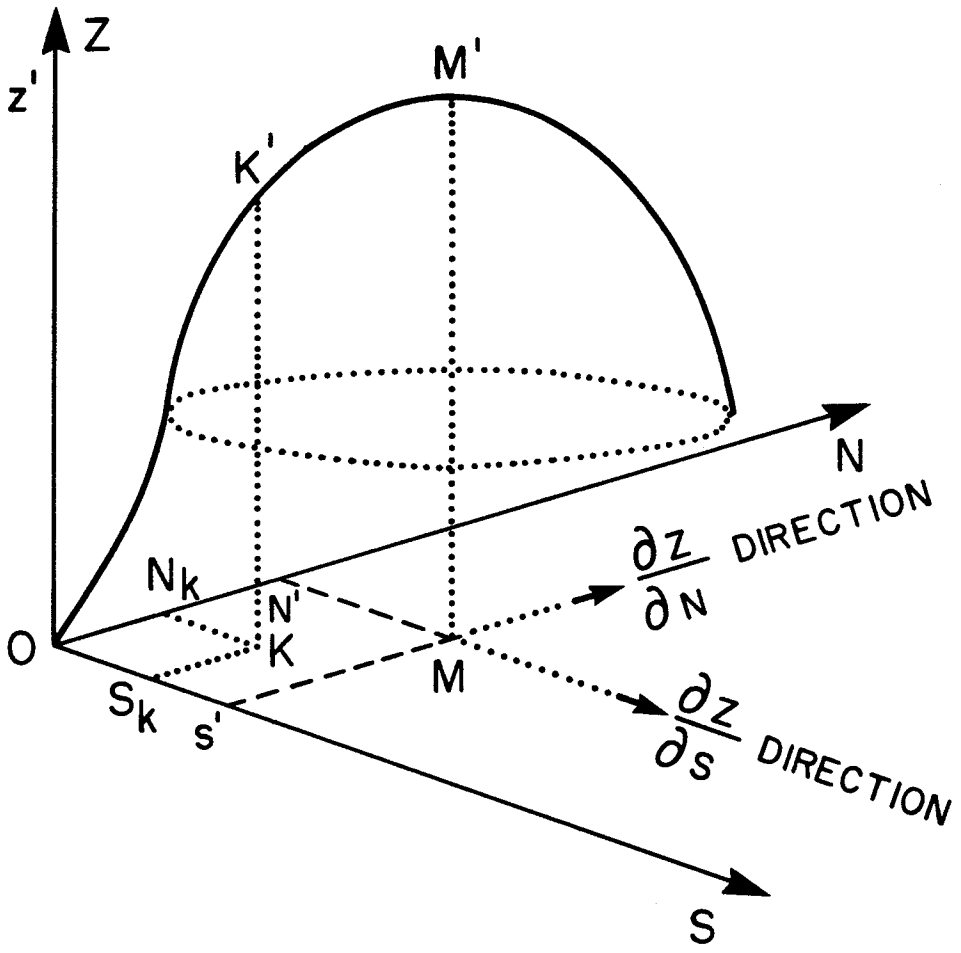
Z
z'
M'
K'
N
N_k
$\frac{\partial z}{\partial N}$ DIRECTION
N'
K
O
M
S_k
s'
$\frac{\partial z}{\partial s}$ DIRECTION
S

Figure 9