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THE ECONOMICS OF EDUCATION SUBSIDIES AND THE EFFECT OF FEE INCREASES: A CASE STUDY

by

Sirilaksana Chutikul

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ABSTRACT

Higher education in Thailand, as in many other countries, is heavily subsidized by the government. Attendance fees are well below the marginal cost of producing a graduate, and because governments typically lack the resources to provide the required level of subsidy, a huge excess demand for placement is created. This study examines the economic justifications for such subsidy, and argues that the current low level of fees is undesirable on both efficiency and equity grounds. Equity considerations are explicitly incorporated into the familiar efficiency framework to determine the socially-optimal level of provision, subsidy, and fees, taking into account the limit on available government resources.

Furthermore, the study uses a sequential decision-making model to estimate the demand for enrollment in a particular institution of higher education in Thailand, and to explore the effect of fees increases on enrollment in that institution. The size of the effect was found to be small, indicating that an increase in tuition fees would not adversely affect the level of enrollment and in fact would allow the provision of education to be expanded. It is also maintained that greater efficiency in resource use would be accomplished by raising tuition fees, and that equity considerations need not be sacrificed in the process.

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INTRODUCTION

The higher-education system in Thailand has undergone rapid expansion in the last fifteen years. This has been precipitated largely by the demographic surge in the school-aged population, the huge increases in enrollment rates at the post-compulsory secondary-school level, and the strengthening of parental attitudes (especially among the rural population) in favor of higher education -- its intrinsic value and particularly its perceived contribution towards social and occupational mobility. In addition, job-market difficulties in recent years have lowered the opportunity cost of further study, and the increasing use of educational attainment as a screening device for job placements, with the concomitant tendency towards qualification escalation, has further increased the demand for higher levels of education.

Traditionally, higher education in Thailand is provided by universities financed and run by the government. However, in the face of fiscal constraints in recent years, private-sector initiative has been encouraged. In 1979, an Act was passed allowing private universities to be set up and currently there are four categories of institutions offering tertiary education. These are (i) public universities with restricted admission, (ii) public universities with unrestricted admission, alternatively known as open universities, (iii) private universities and colleges, and (iv) public colleges for specialized training, particularly in teacher training, nursing, and vocational and technical skills.

The combined number of students enrolled in these institutions increased by leaps and bounds from 55,000 in 1970 to over one million in 1986. However, the numbers seeking admission increased even more dramatically, and large numbers are siphoned off each year to the two open universities whose only requirement for admission is possession of a high-school certificate. Of the students enrolled in institutions of higher education in 1986, less than ten per cent were in the more prestigious public (restricted-admission) universities, acceptance into which is determined by ranking in a nationwide entrance examination. In 1970, there were nine such universities that admitted 9,400 new students or approximately 38 per cent of those who sat for the entrance examination. The proportions admitted have consistently dropped and in 1986, there were twelve universities that admitted 17,700 new students or only 18 per cent of the applicants. From 1980 to 1986, new admissions to these universities rose by a mere 20 per cent.

This situation of excess demand is typical where there is a large social desire (often misleadingly labelled "social demand") for higher education and insufficient resources to provide places for all the prospective applicants. The problem is also a consequence of, and/or is exacerbated by, controls on tuition fees. Government provision of higher education is therefore heavily subsidized.

Educational subsidies can be justified on the grounds of efficiency (in the social welfare sense) to counteract market imperfections caused by the presence of positive consumption externalities, inadequate consumer knowledge, imperfect loan markets,

and risk aversion in the face of uncertain returns.[1/] But governments typically lack the resources to provide the level of subsidy that would be required to bring about an efficient solution. With dwindling resources and further attempts by the government at budgetary discipline, there is a need to seriously examine alternative methods or mixes of financing that would nevertheless retain or enhance the dual objectives of efficiency and equity that is claimed by the present situation of government subsidy.

One main suggestion is that tuition fees should reflect the marginal cost of producing a graduate and function more as a price in the economic sense, supplemented possibly by a loan and/or scholarship scheme. However, there is a great deal of reluctance and occasionally overt opposition on the part of university administrators (and of course, students) to an increase in tuition fees. Apart from the political unpopularity of such a move for the administrators, there are genuine concerns that such increases may entail reductions in the current level of enrollment. If one believes that higher education produces benefits to society over and above the benefits accruing to the students themselves and that current provision is still inadequate, any resultant curtailment in enrollments would be undesirable, not only to the students, but from society's point of view.

In addition, the effect of tuition fee increases on

[1/] A qualification that needs to be made here concerns the question of whether or not the government, through its tax collection and subsidy disbursement activity, in fact has a comparative advantage in ensuring that the imperfections are corrected for.

enrollment in each institution may be uncertain, and administrators are understandably uncomfortable about this. Furthermore, given the absence of a perfect market for student loans such that poor students may be unable to secure loans, low-income families may be further penalized and even excluded from educational opportunities. If this occurs, then further questions regarding current and long-run equity would have to be contended with.

The objective of this paper is to demonstrate the rationale behind tuition fee increases taking both efficiency and equity issues into consideration, and to explore the effect of such increases on enrollment in a particular institution of higher education in Thailand. A model of sequential decision-making is used to portray student preferences regarding educational options, and the effect of fee increases is explored.

It is argued that an increase in tuition fees does not adversely affect the level of enrollment and in fact allows the provision of education to be expanded. It is also maintained that greater efficiency in resource use is accomplished by raising tuition fees, and that equity considerations need not be sacrificed in the process.

THE PRESENT POSITION

The situation of excess demand for higher education where resources are insufficient to provide the required subsidy is represented in Figure 1. It is assumed that there are positive external benefits arising from higher education, i.e. benefits

accruing to society over and above those accruing to the individual being educated, and that these external benefits are Pareto-relevant.[2/] Therefore, using the standard treatment in welfare economics, the social marginal benefit standard treatment in welfare economics, the social marginal benefit curve (SMB) in Figure 1 is shown to lie above the private marginal benefit curve (PMB) which measures private demand. For simplicity, the marginal cost of provision (MC) is assumed constant.

The optimal provision of educational services is therefore at OQ^*, where the social marginal benefit equates the marginal cost. Again for simplicity, it is assumed that production externalities are absent and that social marginal cost and private marginal cost coincide.

Without subsidy, the level of tuition fees that would allow marginal costs to be recouped would be OP^*. However, at OP^*, demand would be limited to OQ_1; private demand does not take account of external effects and would result in less education than is socially optimal. One way to achieve the socially optimal level of education, OQ^*, would be for the government to provide resources equal to rectangle PP^*AB in the form of subsidy. Tuition fees can be lowered to OP and provision is at the social optimum.

2/ If education generates external benefits that are Pareto-relevant, this implies that, ignoring the free-rider problem, people would be willing to pay for the marginal increase in the education of others if transactions costs were not prohibitive. In a general equilibrium context, the existence of external benefits per se is not sufficient for such benefits to be included in the social calculus -- there must also be a willingness to pay for it on the part of individuals, so that external benefits can be internalized.

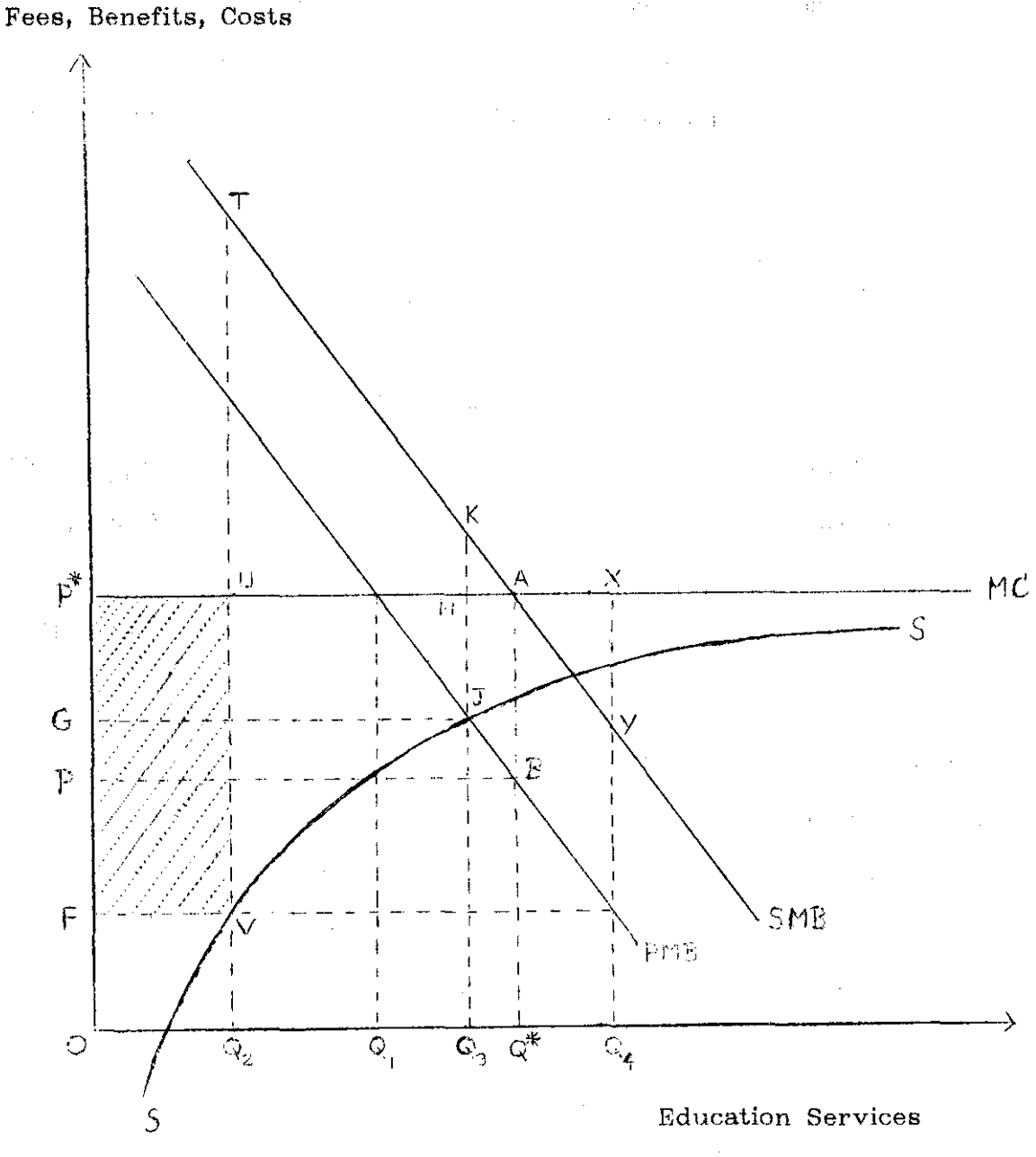

Figure 1: Tuition fees and subsidy in a situation of positive external benefits.

But what if the government does not have enough resources to provide the required subsidy? If resources are lacking so that there is a space constraint, and if tuition fees are kept low, a situation of excess demand plus suboptimal provision would be inevitable.

Assume that tuition fees are set at OF, and the government has available for subsidy, the amount FP*UV. The quantity of educational services provided would thus be OQ_2. It may also be noted that at the low level of tuition fees assumed here, the private demand for education, OQ_4, exceeds the social optimum, OQ*, even in the favorable situation where social marginal benefit exceeds private marginal benefit. Thus, even if resources were available for subsidy, catering for such demand would cause a net welfare loss to society, in this case equivalent to triangle AXY.

Now, if fees were raised to say, OG, and the level of subsidy were maintained, educational services can be expanded to OQ_3 which approaches the (unattainable) social optimum. The amount of subsidy required to provide educational services at the level of OQ_3 is the same as at OQ_2, since by construction of the rectangular hyperbola iso-subsidy curve SS, the new subsidy GP*HJ is equal to the original subsidy FP*UV. The net gain to society is given by the area UTKH.

Over the past twenty years, public spending on the education sector in Thailand has fluctuated between 16 to 19 per cent of total government expenditure. A large part of this spending has necessarily taken the form of teacher salaries, since teachers are civil servants whose salaries increase automatically each year, and whose employment

cannot be easily terminated.

Currently, the persistent shortfalls in tax collections and the increasingly alarming situation of public indebtedness at both the domestic and international level, make any increases in budgetary allocation for social expenditure highly improbable. In fact, it is unlikely that current levels of subsidy to education would even be maintained in real terms in the present situation of fiscal austerity.

Without increases in subsidy to higher education, it is claimed that the "high cost of this form of education (i.e. the public universities), ... (limits) its capabilities for expansion" (Colletta, 1985, p. 3). Figures normally cited to support this view are the cost estimates of 1982 that indicate that the cost per student in the restricted-admission public universities was 41,739 Baht in that year, and tuition fees accounted for only 4 per cent of this cost. However, even though the internal efficiency or the efficiency of resource use in these institutions is admittedly in need of improvement, these same figures can be used to argue that the constraint on expansion is not only high cost but also low revenues. Fee increases appear to be a logical option, and the effect of such increases need to be explored.

The figure of 4 per cent cost recovery through fees is low by international comparisons. Added to this, is the apparent inequality of access to university education on the basis of economic status, so that the fee subsidy is effectively a subsidy to the rich.

It can be seen from Table 1 that students from professional and commercial backgrounds are substantially over-represented in the student population. A value of one for the Selectivity Index

Table 1

Distribution of Students in Tertiary Institutions
by Father's Occupation, with Selectivity Index, 1983

OCCUPATION	POPULATION DISTRIBUTION	STUDENTS' DISTRIBUTION	SELECTIVITY INDEX
Professional	3.05	27.35	8.97
Commerce	8.99	45.36	5.05
Farming	68.52	11.15	0.16
Production workers	10.41	1.29	0.12
Others	9.03	14.85	1.64

Source: National Statistical Office (1984)
National Education Council (1985)

(alternatively called the Ratio of Advantage) would roughly indicate equality of access -- that the proportion of the student population from a particular background corresponds to the proportion of that occupational category in the total population. (The Index is rough in the sense that it ignores possible deviations due to factors such as differences in family size and age structure). An Index value above one indicates over-representation, and below one under-representation. It is clear that students from farming and working class backgrounds are under-represented in the student population, with indices of 0.16 and 0.12 respectively.

Inequality of access is further evident in Table 2. This table compares the average family incomes of students and other population groups. It shows that the average family income of university students exceeds that of the population at large by 5-7 times. And compared with farming and working-class families, the student population has considerably higher family incomes, i.e. up to 10-20 times higher.

Looking at the affordability of university education, it can be seen from Table 3 that on average, tuition fees amount to only 2.5 per cent of the annual family income of the student population.

It is clear that the main beneficiaries of the present situation of higher education in Thailand are not the low-income families. However, one main concern is whether fee increases would further limit the chances of the poor. Because of the sequential nature of formal education, it would be necessary, in order to answer this question satisfactorily, to conduct a comprehensive study that

Table 2

Average Family Income Per Month of Students and Other Population Groups, 1983

POPULATION	AVERAGE FAMILY INCOME (Baht)
Students in Public Universities	11,197
Students in Private Universities	15,477
Total Population	2,380
Farmers	578
Manual/Production Workers	1,362

Source: National Education Council (1985)
National Statistical Office.

Table 3: Tuition Fees as a Percentage of Annual Family Income

INSTITUTION	AVERAGE ANNUAL FAMILY INCOME (Baht)	TUITION FEES	%
All Universities	137,364	3,328	2.5
Lowest tuition* (Thammasat)	155,505	2,455	1.6
Highest tuition* (King Mongkut)	97,774	6,103	6.2

* The level of tuition fees mainly reflects the nature of the courses offered (for example, humanities as opposed to the sciences.

Source: National Education Council (1985)

would involve an analysis of the pattern of enrollment and participation among different population groups at the lower levels of education to determine whether poor students are in fact excluded from the educational system even before they have a chance to qualify for admission to higher education. However, this lies beyond the scope of the present study.

EQUITY CONSIDERATIONS

Economic analysis, powerful when applied to efficiency issues, is less comfortable when equity considerations arise. The literature is replete with references to "other" social objectives, to non-economic considerations, to "merit goods", value judgements and impossibility theorems, and lacks the strength of formal economic analysis. Musgrave and Musgrave (1980) state in their authoritative book (even in its revised version) that:

> "merit-good situations ... do not fit the traditional framework. In part this reflects elitist domination, but in part it also reflects the prevalence of communal interests. The fact that such interests are inconvenient to conventional analysis ... does not disprove their existence." (p. 86).

This section attempts to deal with redistribution issues in the traditional "efficiency" framework, through extension of Samuelson's classic analysis of pure public goods (1954, 1955). Such treatment is by no means a panacea, and many important questions will be left unanswered, but it is believed that the formal treatment of "merit goods" in the same framework as efficiency provides a powerful means of dealing with the issue.

Access to education by the poor can be considered a "merit good", desired by society to the point of overriding free individual choice. It reflects "the prevalence of communal interests", in the terminology of Musgrave and Musgrave. But what do we mean by "communal interests"? Who are the people that comprise the "community"? Is it possible to identify such people? For example, would it be safe to assume that the education of the poor serves to satisfy the "communal interests" of the non-poor? If so, then these interests can be treated as external benefits. Samuelson's public-good analysis can be evoked, and no separate "equity" criterion need be concocted. The situation is depicted in Figure 2.

Let DP denote the private demand of poor students for their own education. If there is reason to believe that education of all students, whether poor or non-poor, confers external benefits on society, then, disregarding equity issues for the moment, the benefit to society of the education of poor students again exceeds the private benefit, and DP" is drawn to reflect this. DP" corresponds to the SMB curve in Figure 1.

Both the DP and DP" curves are drawn to depict a situation in which a large amount of educational services is demanded by poor students at low fee levels, whereas at high levels, demand is non-existent. This is presumably the cause of concern for the non-poor. In essence, there exists a demand of the non-poor for the education of the poor purely for the sake of redistribution. Therefore, let DNP represent such demand, reflecting the "communal interests" of those people in the community whose welfare is raised if poor students are

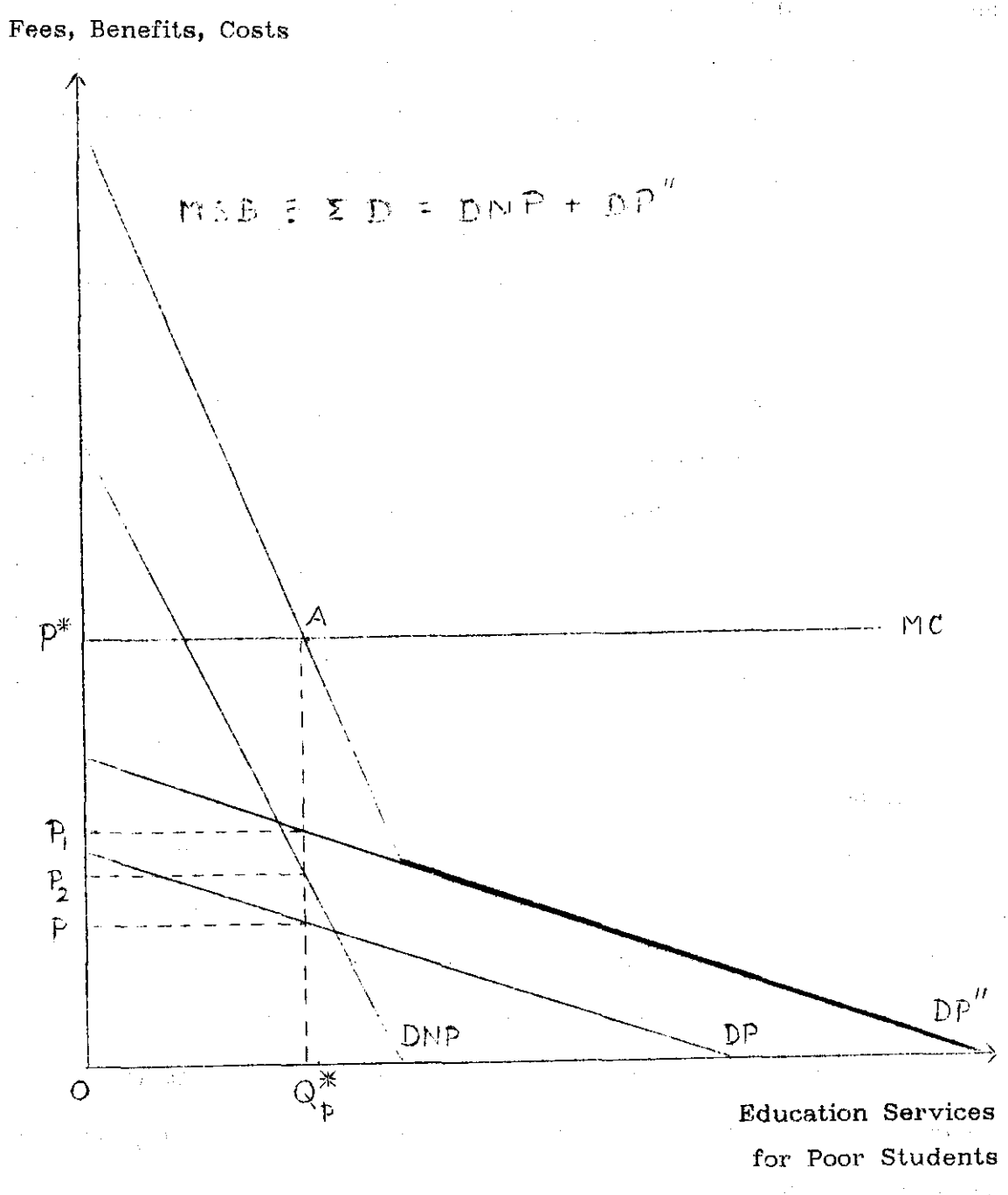

Figure 2: Educational Services to the Poor in the Efficiency Framework

educated. DNP is drawn to approximate the probable willingness to pay and is based solely on equity considerations.

Now, because every unit of educational services "consumed" by the poor, is also "consumed" by the non-poor whose communal interests are (simultaneously) served, total demand by society or the social marginal benefit (SMB) then becomes the vertical summation of the demand curves, DP" and DNP. The marginal benefit to society in this case, would therefore be the SMB curve in Figure 2. It coincides with DP" at lower levels of fees. In effect, the education of the poor is seen as a non-rival public good when fee levels are so high that education is not affordable by the poor.

The socially optimal amount of education to the poor is therefore given by OQ*(P). If fees were set to cover marginal cost at OP*, the poor students would demand no educational services. (Positive demand can also be depicted here by making appropriate adjustments to the diagram.)

Because the interests of the non-poor are served by the educational services provided to the poor, society's demand (or marginal benefit) at that price requires that provision up to OQ*(P) is made. Again, one way to achieve this is by means of subsidy equal to PP*AB, with fees set at OP. The charge to poor students themselves is OP; the amount paid by "society" through tax levies is PP_1, and the amount paid by the non-poor is OP_2 through appropriate foundations, charities and scholarships. By construction, $OP^* = OP + PP_1 + OP_2$. Each group is charged its marginal benefit, and marginal cost is recouped.

Figure 3 combines the analysis of Figures 1 and 2 and allows the optimal allocation of resources to be determined. The right-hand side of Figure 3 duplicates Figure 1, except that the quantity of educational services now refers to educational services to the non-poor. The left-hand-side extension of the horizontal axis now represents the quantity of educational services to the poor.

If sufficient resources existed for subsidy, then the optimal amount of education OQ*(P) would be provided to the poor, and OQ*(NP) would be provided to the non-poor. The social marginal benefit of education to the poor, the social marginal benefit of education to the non-poor, as well as the marginal cost are all equated. Fees equal to OA and OB would be charged to the poor and non-poor, respectively. In practice, this can be achieved through such means as partial fee exemptions or equivalently, scholarships for the poor. The total required subsidy would therefore equal AFGC + BCHJ. (Part of AFGC will come from the private sector). The marginal benefits of education to the poor and the non-poor are equated at the level OC. Any allocation that departs from this would bring a welfare loss to society. For example, one more unit provided to the poor gives gross benefits to society equal to the shaded trapezoid on the left-hand-side of Figure 3 (falling short of marginal cost), minus the larger trapezoid on the right-hand-side. This would result in negative benefits to society. Similarly, any further increase in provision to the non-poor beyond OQ*(NP) would also be undesirable.

This analysis allows the conceptual allocation problem to be solved on the sole basis of well-established efficiency criteria.

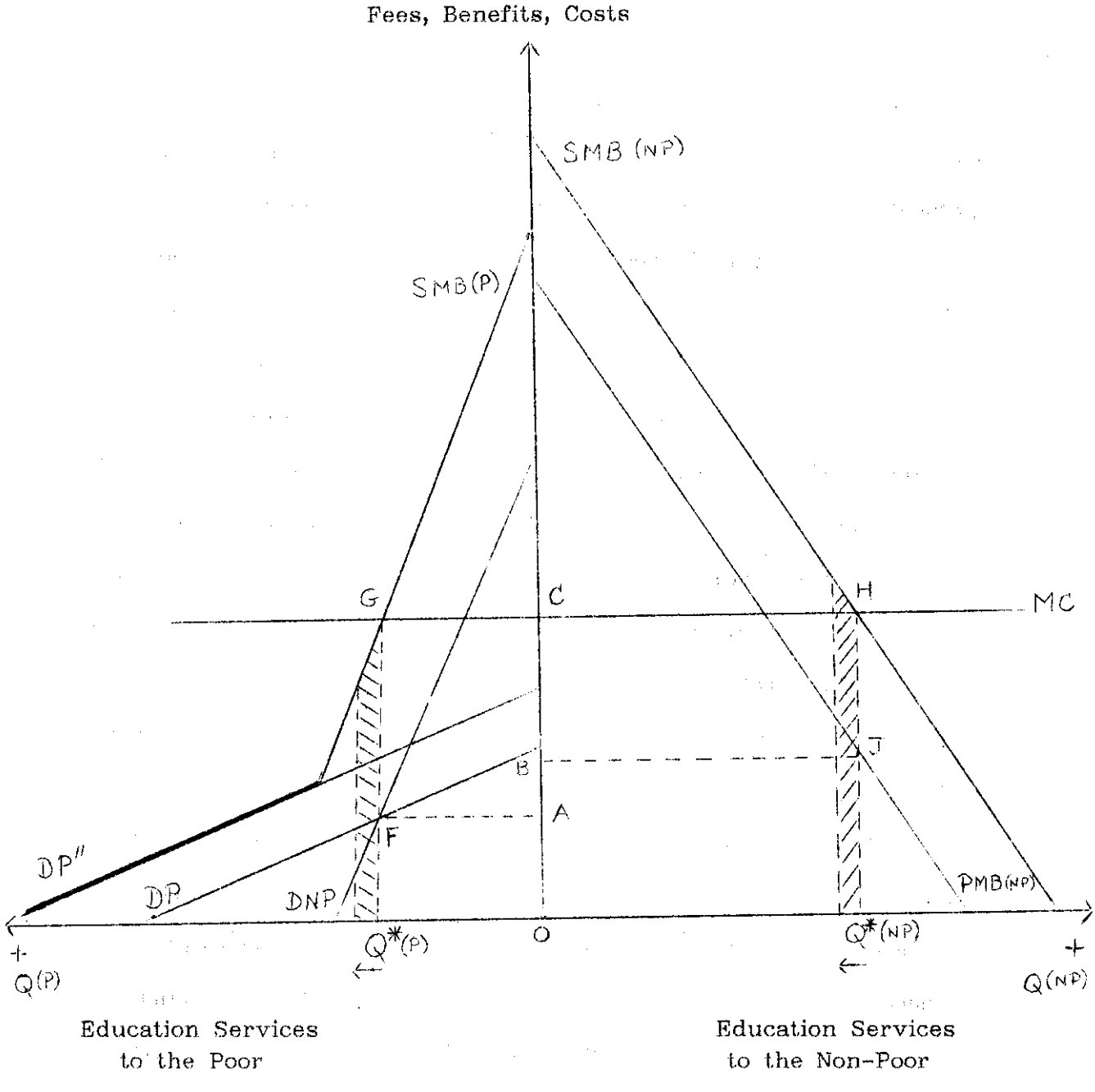

Figure 3: Optimal Allocation of Educational Services

Greater provision to the poor in excess of OQ*(P), or to the non-poor in excess of OQ*(NP), can be seen to be at the expense of the other group, and would be socially non-optimal. In addition, different scenarios which change the shape and position of the marginal benefit curves can be envisaged, and the same allocative criteria used.

Many who hold the view that merit goods should be accorded separate treatment would argue that the above analysis is irrelevant. Pazner (1972) summarizes the line of argument by maintaining that there are two categories of merit goods, namely, merit goods that arise because:

> "the individual has imperfect information of the consequences of <u>his own</u> action on his welfare, and second, ... because he has imperfect information of the consequences of actions taken by other individuals on his own welfare (or, if he "cares" about other members of the society, actions taken by him on the welfare of others)." (p. 461; emphasis and parenthesis in original)

Those adhering to this line of thought would maintain that the first category should be considered to be "pure merit goods" that cannot be treated as an externality. Pazner (p. 462) illustrates the point with a useful example:

> "Consider the problem of drug addiction. The issues involved seem to be of essentially two kinds, those arising from concern for the well-being of the addict himself and those arising from concern about the possible reverberations his intake of drugs may have on other members of the community. If the addict does not realize the possible harmful effects on his own health and/or if other members of the community are unaware of the possible correlation between his consumption of drugs and antisocial behavior on his part, intervention by the omniscient elite will occur on grounds of merit wants." (p. 462)

The present paper does not disagree with the categorization

of merit goods into two types for the sake of clarity, but argues that both can be treated in the same efficiency framework. Does it matter whether the concern is for an individual harming himself or for the harm he inflicts on others? If concern exists for the individual's plight, then his release from addiction would increase the welfare of those who are concerned. The addict's behavior, or the consequences thereof, enters the utility function of other members of society.

The question that is posed here is whether it is possible to identify those people who constitute the so-called "omniscient elite" and those ignorant masses, members of the community who are "unaware". Granted that the "elite" exists, and is indeed omniscient (and also benevolent), then it is typically a case of individual behavior (namely, that of the drug addict) affecting the utility of other individuals in the community (namely. the elite). This situation can then be usefully treated as an externality. The reason for the existence of the external effect seems less relevant than the size of the effect, and whether the affected individuals (elite or otherwise) would be willing to pay for it. The nature of the "concern", whether for the drug addict (or the poor student) or other members of the community harmed by the addict (or the uneducated) seems less pertinent than whether such concerns are Pareto-relevant, as previously discussed in footnote 2.

The present analysis does not pretend to overcome the free-rider problem, but does allow consistent conclusions to be made about resource allocation without recourse to a different set of criteria. In practice, non-revelation of demand would of course pose problems,

but that is not a conceptual issue.

Using the present analysis to incorporate constraints on government subsidy yields the same conclusion that an increase in tuition fees would lead to an increase in social welfare, even when the redistributive objective is included. Figure 4 illustrates this.

Assume as before that fee levels are kept at the low level of OF. Let fiscal constraints be such that the government is only able to afford the shaded area in Figure 4 for subsidy to higher education. Much of this subsidy is seen as going to the non-poor.

In a situation where subsidy is maintained at the initial inadequate level (along the respective iso-subsidy curves), it would be in the interest of both the poor and non-poor for fees to be increased, with scholarships given to the poor so that effectively a differential fee structure, as indicated in Figure 4, is created. Poor students would be charged OA and non-poor students OB.

With fee increases, provision would expand for both groups to OQ_3 and OQ_4, and social welfare is improved. Figure 4 is presented for illustrative purposes only; as constructed, the marginal social benefit from the education of each group is equated. In the event that this is not true, then shifts in resources should occur and the equi-subsidy levels (along the iso-subsidy curve) should be disregarded.

It is emphasized that the above result was obtained through appropriate construction of the diagram. However, such representation is believed to reflect the current situation that a positive excess demand exists at the current low level of fees. It can be verified

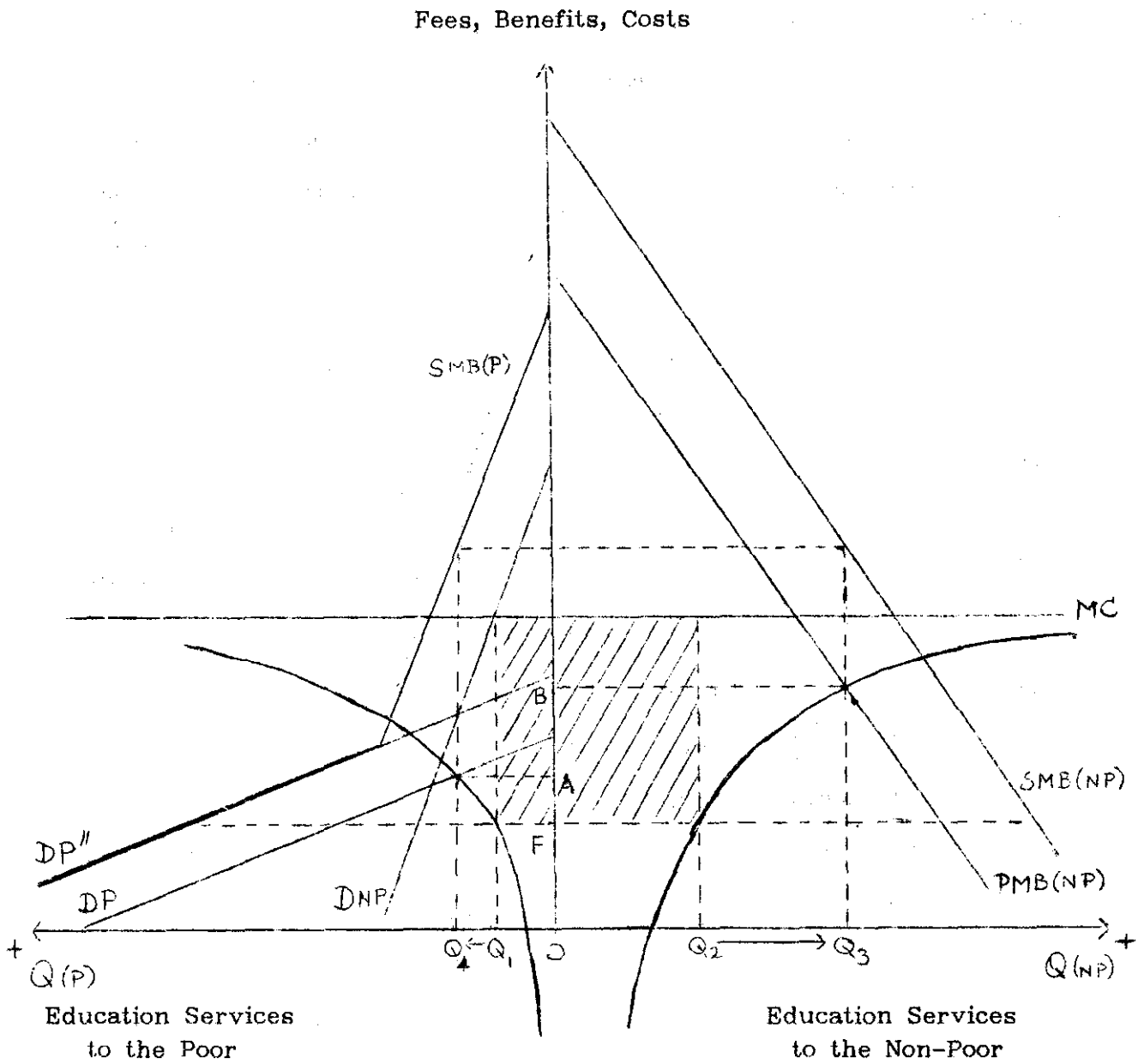

Figure 4: Efficiency and Redistribution with Subsidy Constraints

that an increase in fees would be inefficient only if, at the initial fee level, the private demand of the poor is non-existent. That is, if the DP curve lies below the level OF. In such a situation, an efficient solution (which also includes equity considerations) would require a lowering of fees to the poor. However, the DP curve as drawn in Figure 4 is believed to reflect more accurately the present situation of demand in Thailand, since casual empiricism indicates that at current fee levels, the demand of the poor is positive. If this is true, then at best (in the limiting case), fees should be maintained at the same level for the poor.

The extent to which fee increases can achieve its purpose depends on, among other things, the elasticities of demand, and this will be estimated in the following section.

THE MODEL

It is assumed the each high-school graduate, hereafter referred to as a "student", is faced with a set of mutually-exclusive options regarding his future education. He makes his decisions sequentially, discarding alternative choices as he moves along. His options are depicted as a decision tree in Figure 5.

The student starts be deciding whether or not to undertake further study at all (at the current time), and thereafter makes the crucial decision of whether or not to sit for the nationwide public-university entrance examination if the path of further study is selected. Preferences regarding placement have to be stated when taking this examination, and the student is assumed to weigh the

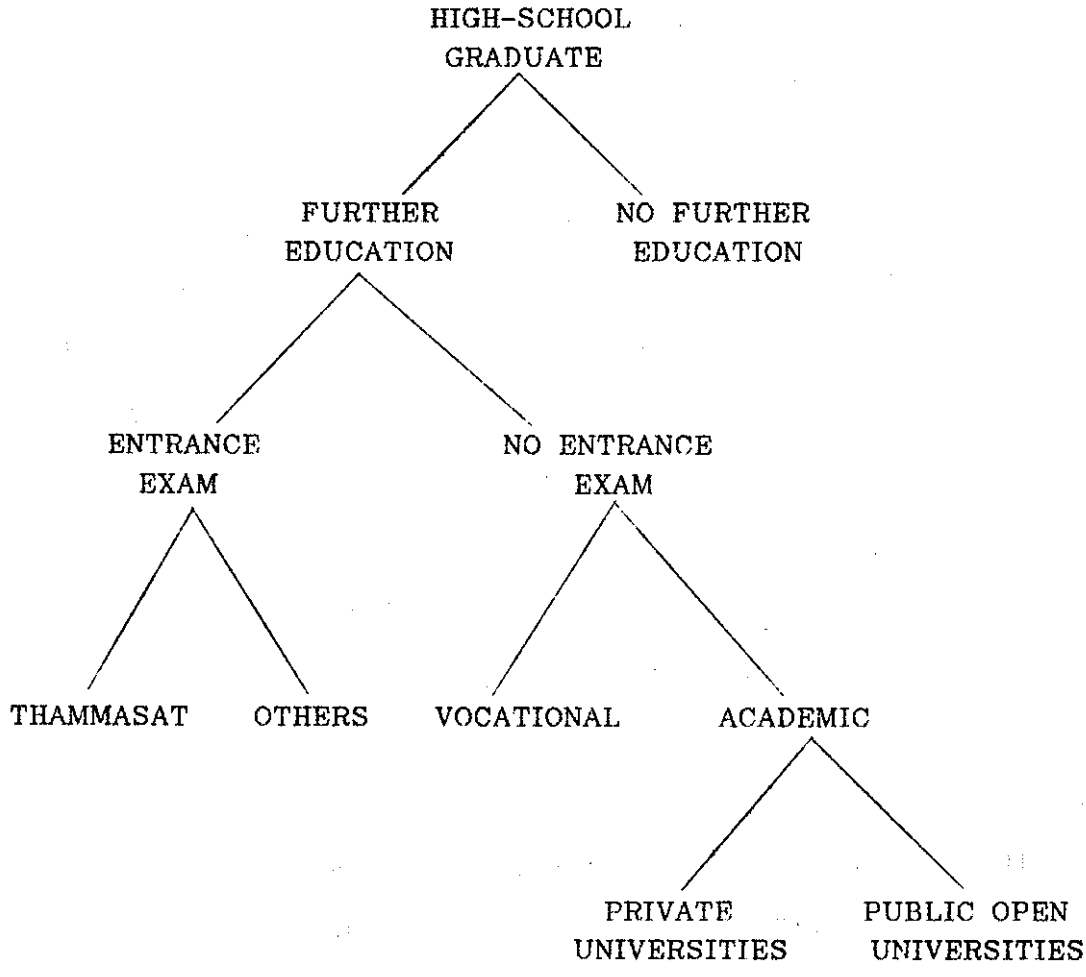

Figure 5: Education Options Facing the High-School Graduate

merits of each alternative by the utility that he would derive from that option.[3/] His utility is determined by a set of his own personal characteristics, Q_j, that reflect taste, scholastic ability, and financial readiness. These variables include family income, father's education, the student's ability and performance in high school, place of birth, type and location of high school, sex, and number of school-aged siblings. In addition, the attractiveness of each option is determined by a set of that option's attributes, Z_i, which include the costs (implicit and explicit) of attending that institution.

Thus, the higher-education system is viewed as an industry comprising many different establishments, each producing a variety of differentiated products: academic or vocational, with varying gradations of quality and duration, at various prices. The student makes his choice from the set of n options each having a set of characteristics or attributes represented by the vector, Z_i. It is assumed that the utility that student j would obtain from selecting option i, that is, U_{ij}, is a random function of the attributes of that option. Thus,

$$U_{ij} = F(Z_{ij}) + v(Z_{ij}) \qquad (1)$$

where $v(Z_{ij})$ is a stochastic term.

Let the probability that a student j drawn from the population of high-school graduates would choose institution i be denoted by p_{ij}.

3/ In practice, students also weigh the probability of being admitted to a particular field, but this will be ignored.

Each student is assumed to maximize his utility and will opt for a particular alternative, i, only if that alternative yields more utility than that derived from any of the other options. This implies that given the population of students at the decision-making stage, the probability that a person drawn from that population would choose option i, that is p_{ij}, is the same as the probability that the utility of option i would exceed the utility of each of the other alternatives, k. Thus, we have:

$$p_{ij} = \text{Prob}[U(Z_{ij}) > U(Z_{kj})] \quad (2)$$

for all alternatives $k \neq i$

Equation (2) can be rewritten as:

$$p_{ij} = \text{Prob}[F(Z_{ij}) - F(Z_{ij}) > v(Z_{kj}) - v(Z_{ij})] \quad (3)$$

for all alternatives $k \neq i$

The odds of choosing option i over option k can be estimated by the maximum likelihood logit model developed by Theil (1969), which makes certain assumptions about the stochastic terms such that the probabilities become a simple function of the attribute vectors, (Z_{ij}) and (Z_{kj}). The natural logarithm of the ratio of these probabilities can then be written as:

$$\ln \frac{(p_{ij})}{(p_{kj})} = (Z_{ij} - Z_{kj})\, B \quad (4)$$

where B is a vector of coefficients. Combining the set of personal characteristics and the set of attributes, the model then takes the following form:

$$\ln \frac{(p_{ij})}{(p_{kj})} = f(Z_{ij}, Z_{kj}, Q_j) \quad (5)$$

Radner, et. al. (1975) use a similar function to estimate the demand for higher education in the United States. The model is used here to estimate the demand for placement in Thammasat University. Estimation of the model is undertaken using a constructed set of data which may pose some problems with respect to the lack of randomness, and this is discussed in the following section.

THE DATA

The sample used for estimation purposes was constructed from two sets of data. One set consisted of students newly admitted into Thammasat University in the academic year 1985. These were used to represent the high-school graduates who sat for the entrance examination.[4/]

The other set of data was obtained by a survey which covered three groups of people, representing those whose first preference was not to sit for the entrance examination. It consisted of the following: first, students who entered the public open university, Ramkamhaeng, in 1985 with high-school qualifications obtained in 1984; second, those with the same qualifications that entered private universities or vocational institutions in 1985; and thirdly, those who decided not to further their education, represented by two groups of people, namely, those registered with the Department of Labor as looking for employment with high-school qualifications obtained in 1984, and those who entered the civil service in 1985 also with high-

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4/ For reasons of confidentiality, access was denied to the complete set of data for students sitting for the entrance exam. The degree and direction of bias introduced here is unknown.

school qualifications obtained in 1984.

The numbers included in each group are approximately proportional to the overall proportion of each group in the total population of high-school graduates, schematically presented in Figure 6. The data set is therefore an artificial construct based on revealed preferences instead of statements of intention as would have been the case in a direct survey of high-school graduates. In addition, because the supplementary data set was constructed on the basis of estimated percentages, the probabilities associated with choices in the no-entrance-examination sub-group are predetermined, being the direct result of the construction of the data. Therefore, the analysis of this sub-group will be confined to the determinants of the probabilities, rather than the probabilities themselves.

The total sample size was 750 persons, of which 600 were from Thammasat University (defined as those who sat for the entrance examination for the first time, enrolled in Thammasat University in the academic year 1985, and not necessarily selecting Thammasat University as their first option). Another 150 were obtained from the supplementary survey: 80 from the open university, 45 from vocational colleges, and 25 from the registered unemployed and new recruits into the civil service. Secondary demand arising from other groups of people, such as previously unsuccessful candidates re-applying for admission, is ignored.

Due to difficulties in data collection (involving cooperation and confidentiality), the survey of private institutions and vocational schools was limited to those located in Bangkok. Thus,

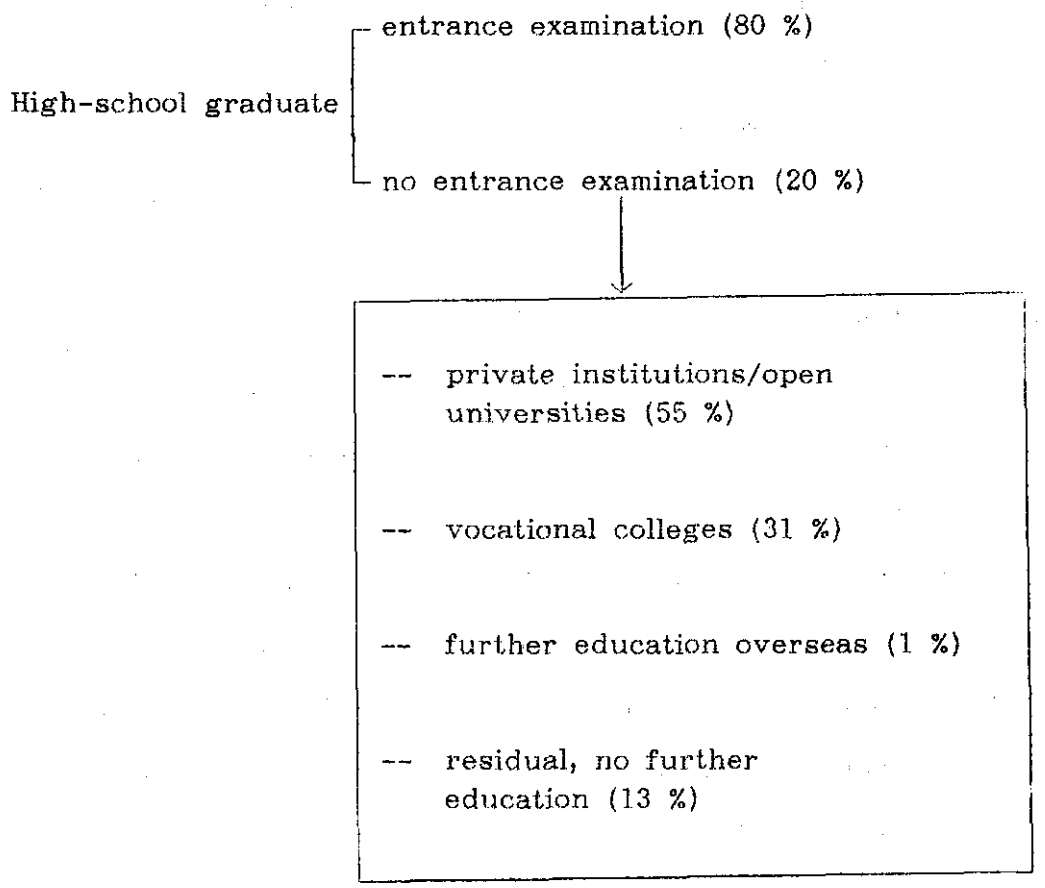


Figure 6: Approximation of Percentages of First Preferences in the Choice of Higher Education

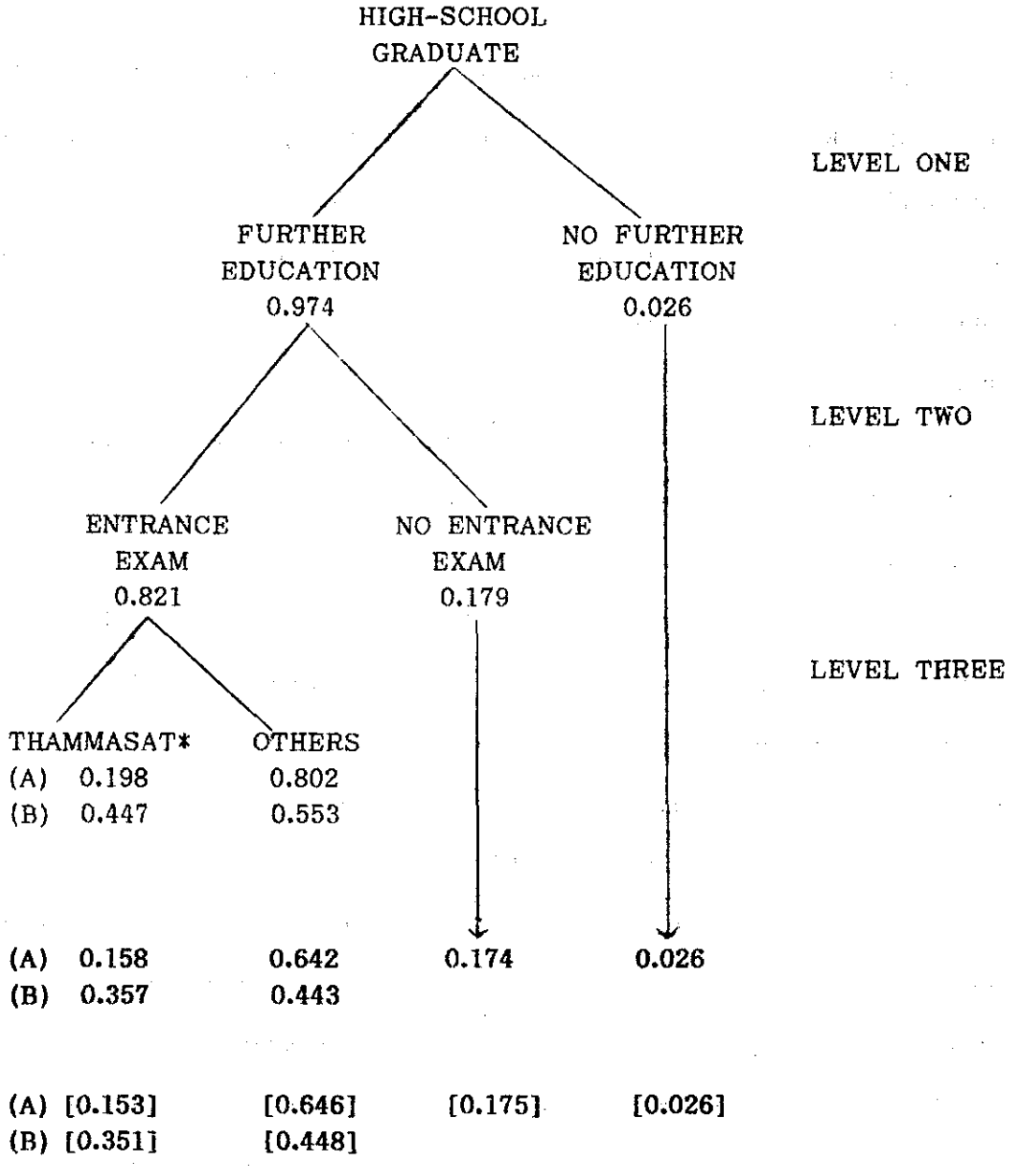
Bangkok students may be over-represented by construction of the data set, but the degree of distortion is believed to be minimal.

THE RESULTS

Figure 7 presents the estimated probabilities of choosing each of the educational options and Tables 4.1 and 4.2 report estimates of the determinants of those probabilities.

Candidates sitting for the entrance examination are asked to specify up to six possible preferences. Thus, two alternative estimations of Level Three (choice of university) are presented: Level Three (A) assigns a value of one to those whose first preference is Thammasat University and Level Three (B) assigns a value of one to those whose first and second preferences are for Thammasat University. The second alternative (B) is included to bring out more distinctly the demand for entrance into this university. Of all the students admitted to Thammasat University in 1985, 19 per cent and 44 per cent specified Thammasat University out of the possible twelve institutions, as their first and second choices, respectively.

The estimated probability of choosing each option is shown in unbracketed, bold print in the lower part of Figure 7. Each probability is obtained by multiplying the probabilities at each successive Level along the branches leading to that option. For example, the probability that a person graduating from high-school would choose to apply for admission to Thammasat University, given the current level of tuition fees, is 0.158 (using definition (A) at the Third Level) or 0.357 (if definition (B) is assumed). These



* THAMMASAT (A): if first preferences for Thammasat University are taken to indicate demand for admission to this university;

THAMMASAT (B): if first and second preferences for Thammasat University are taken as demand.

Figure 7: Estimated Probabilities of First Preferences in the Choice of Higher Education at Each Decision Level

probabilities are obtained by multiplying the probability (at Level One) of choosing further education (0.974), with the conditional probability (at Level Two) of taking the entrance exam (0.821), and finally with the conditional probability (at Level Three) of choosing Thammasat University rather than the other public universities (0.198 and 0.447 for estimation (A) and estimation (B) respectively).

What are the factors that determine the above probabilities? Tables 4.1 and 4.2 report the result of the estimated model for each level of decision-making.

The cost of further education is defined as the sum of tuition fees, incremental housing costs associated with attendance and forgone earnings, less any financial assistance received. For estimation purposes, it is deflated by family income.[5/]

It can be seen from Table 4.1 that the cost/income variable is a significant deterrent only at Level One -- in deciding whether or not higher education would be pursued. Cost does not appear to matter when the decision to sit for the entrance examination is made. If anything, cost and demand tend to move in the same direction; the higher the cost, the greater the demand. But when the first and second preferences are combined in Table 4.2 to represent the demand for entrance into Thammasat University (Level Three B), the cost figure becomes significant. The lower the cost, the higher the calculated probability of choosing Thammasat University. However,

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5/ The use of income as a deflator was necessitated by the small variation in the cost figure. This introduces a problem regarding interpretation, since the coefficient could measure responsiveness to either price or income.

Table 4.1

Results of Multi-Level Logit Model:
Determinants at Level One and Level Two

INDEPENDENT VARIABLE	LEVEL ONE (Further education = 1)		LEVEL TWO (Entrance exam = 1)	
	b	Chi-squared	b	Chi-squared
Cost/Family Income	- 0.049	16.32*	0.231	1.77
Number of school-aged siblings	- 0.751	2.88	- 0.561	1.52
Ability (GPA)	2.013	55.21*	4.967	65.00*
Father's education	1.365	1.35	0.352	1.23
Sex (M = 1)	0.443	0.76	- 0.350	1.05
School location (BKK = 1)	1.062	19.11*	1.957	26.03*
Birthplace (BKK = 1)	- 0.016	1.25	0.187	1.04
Overall Chi-squared		125.71*		112.83*
Sample		750		725

* significant at the 1 % level.

Table 4.2

Results of Multi-Level Logit Model:
Determinants at Levels Three (A) and (B)

INDEPENDENT VARIABLE	LEVEL THREE (A) (TU1 = 1)		LEVEL THREE (B) (TU1 & TU2 = 1)	
	b	Chi-squared	b	Chi-squared
Cost/Family Income	0.609	1.34	- 1.108	21.07*
Number of school-aged siblings	0.043	0.39	- 0.251	0.92
Ability (GPA)	1.622	2.01	3.645	59.73*
Father's education	0.921	1.55	0.223	1.89
Sex (M = 1)	- 0.534	0.62	- 0.734	1.22
School location (BKK = 1)	0.018	1.43	1.053	28.23*
Birthplace (BKK = 1)	- 0.278	0.98	1.247	1.76
Overall Chi-squared		5.34		178.95*
Sample		600		600

* significant at the 1 % level.

this result may be confounded by the fact that the average tuition/income figure for Thammasat students is the lowest of all the universities, and that the desire to enter may be based on the other attributes of the university.

It would seem from Tables 4.1 and 4.2 that the most important factor determining whether or not further education is pursued, and whether or not the entrance examination is taken, is the student's own ability as measured by his/her high-school grade-point average (GPA). The probability of choosing further education, and of choosing to enter public universities is considerably increased, the higher the GPA score.

Schools located in Bangkok also appear to instil a greater preference for further education in general, and for entrance into public universities in particular. School location is significant at all levels (except Level Three A where none of the explanatory variables perform satisfactorily). The influence exhibited by school location may be the result of conscious drilling and competition evident among Bangkok schools. The chances of success may also be enhanced by their proximity to the centers of information. In fact, school location probably overrides any negative influence that rural birthplace is postulated to have, and confirms the faith in Bangkok schools common amongst rural families. Sex, father's education, and birthplace are insignificant at all levels. Any effect that birthplace may have on the student would probably be swamped by school location.

The economic factors, as represented, are clearly

significant at Level One. Higher cost (or lower income) plus a larger number of school-aged siblings (over whom family resources presumably have to be spread), significantly reduce the probability of choosing the path of higher education.

Assume now that Thammasat University raises its tuition fees by 100 per cent. This changes the probabilities of choosing the different options, and the new probability estimates are shown in brackets below the original probabilities at the bottom of Figure 7.

Let the elasticity of demand be defined as the percentage change in intended enrollment, dE/E, with respect to the percentage change in tuition fees, dT/T. (Tuition fees are of course only one component of the total cost of attendance). Intended enrollment is the probability, p, of selecting that option multiplied by the number of eligible candidates, C. This gives dpC/pC divided by dT/T which can be reduced to dp/p divided by dT/T. Thus the elasticity of demand can be measured as the percentage change in the probability of choosing the option divided by the percentage change in tuition fees.

The new probabilities in brackets at the bottom of Figure 7 are again presented under Heading (2) of Table 5. Heading (1) of the Table also reproduces the original probabilities from Figure 7, and the change in the probability of choosing each option is shown in Heading (3) in the same table. The assumed fee increase reduces the probability of choosing Thammasat University by 0.005-0.006 percentage points.

It can be seen that the changes in all the probabilities are small even for a doubling in tuition fees. Smaller changes in tuition

Table 5

Changes in Probabilities and Elasticity Estimates

		THAMMASAT UNIVERSITY	OTHER PUBLIC UNIVERSITIES	NO ENTRANCE EXAMINATION	NO FURTHER EDUCATION
(1)	Original Probability	(A) 0.158 (B) 0.357	0.642 0.443	0.174	0.026
(2)	Probability after fee increase	(A) 0.153 (B) 0.351	0.646 0.448	0.175	0.026
(3)	Change in probability	(A) -0.005 (B) -0.006	0.004 0.005	0.001	0.000
(4)	Elasticity	(A) -3.16 % (B) -1.68 %	0.62 % 1.12 %	0.57 %	0.00 %

fees would in fact have no perceptible effect on the probabilities.

The results indicate that the demand for enrollment at Thammasat University is quite inelastic with respect to changes in the university's tuition fees. That is, the demand is quite insensitive to tuition fee increases even if a doubling of fees occurs. The cross-elasticities of demand for the other options with respect to the university's fees are also very low, ranging between 0.62 and 1.12 per cent for the other public universities. As for the other options, no perceptible impact of Thammasat University's fee increases can be discerned.

CONCLUSIONS

It has been argued in this paper that given the current low level of tuition fees in Thailand and the growing fiscal constraint that would make increased subsidy for higher education unlikely, there are both theoretical grounds as well as some empirical evidence to support an increase in tuition fees.

The paper has presented an excess demand situation where subsidy is justified in an analysis that combines efficiency and equity considerations in the same framework. It has suggested that an increase in fees is efficient and equitable in such a situation provided that scholarship schemes are available so that a differential fee structure can be achieved. The analysis can also be extended to the case of differential fees for different fields of study whose contribution to society may differ.

It has been argued that fee increases allow an expansion of

services to occur, and with the very small effect it has on at least for one institution chosen for the study, an increase in fees also proves to be a viable option for individual institutions.

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