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Potential Resource Recovery in Higher Education in the Developing Countries and the Parents' Expected Contribution

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Abstract

If the costs of higher education in the developing countries were shared using fees paid by higher income parents with the ability to pay, additional resources would be available for education. This requires computing a parents' expected contribution, the methods for which are developed here for developing countries for the first time. Increased resource recovery with some reallocation to primary levels where rates of return are higher would increase efficiency. Fees would also permit attainment of some economies of scale, and discourage college students from wasting time. Equity would increase since the higher income groups who benefit from higher education would be less heavily subsidized, and the poor who pay the most taxes would less frequently be excluded.

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The total economic cost of higher education includes the potential earnings of the student foregone by the family, which are represented approximately by the room and board costs often borne by the student and his parents. Viewed in this way, the contributions made by parents and students are the major source of financing total higher education costs, of which tuition is a part, in the United States, Japan, and some of the other industrialized countries. It is these total costs that determine whether the student can attend or not, and they are analyzed in many studies, including Johnstone's (1986) recent book and some of the papers in this volume.

The developing countries can afford to waste resources even less and are often inefficiently subsidizing the tuition and living costs of students from high income families who do not need the aid. Failure to be more selective in the award of aid is also inequitable in that the taxes are borne mainly by poor families who are largely excluded from these institutions. To select among the many academically qualified students in order to limit the large current aid as fees are raised to those that have true need, and thereby to increase the resources available for education without merely driving out the able students from poor families, requires developing a financial need analysis to determine the parents' expected contribution. Yet this appears to be the first article that has ever been published that

considers how the parents' expected contribution can be determined in the developing countries. This is remarkable in that there are increasing needs for more adequate and acceptable resource recovery as development occurs.

The need for more adequate financing of education in the developing countries, since it is a socially productive and relatively advantageous form of investment, has been developed by Psacharopoulos, Tan, and Jimenez (Financing Education in Developing Countries, 1986), McMahon, Millot, and Eng (1986, pp. 90-6), Psacharopoulos and Mingat (1985), Mingat and Tan (1986), and Jimenez (1986, 1987). The two key policy options they all recommend are 1) recovering more of the public cost of higher education to make it more self-sustaining, and reallocating some of the tax revenue thereby released to primary, junior secondary, and other areas of education with the highest social rates of return, and 2) developing a credit market for education together with selective scholarships, especially in higher education.

The student loan portion of this financing package as it applies in developing nations has been studied extensively previously by Woodhall (1983), and is developed further by her in this special issue of EER. But as fees rise, to prevent the exclusion of qualified students from poor families, subsidized student loans and other financial aids require greater selectivity among those who are academically qualified and able based on economic need. This is recognized as "an indispensible feature of all scholarship schemes" (Psacharopoulos, Tan, and Jimenez, 1986, p. 32). But except for some work on what would be required for a uniform system of means testing in Indonesia

by McMahon, Millot, and Eng (1986, pp. 94-6), there simply does not seem to be any literature on the subject of adapting the concepts and methods to the special conditions typical of developing countries.

After considering the financial problem and this available solution, this paper then will consider how use of an objective means test to make subsidies more selective has the potential of increasing both the efficiency with which education can contribute more to growth, and to equity. With respect to the potential for greater efficiency, overburdened tax systems limit the expansion of all of education and prevent the attainment of economies of scale in higher education, keeping unit costs higher than they need to be (e.g., Psacharopoulos 1980). Simultaneously the well to do parents of most of the college students at public institutions contribute remarkably little to tuition and even to living costs in many developing nations, especially in the poorest nations of Africa (e.g., Psacharopoulos, Tan, and Jimenez, 1986, p. 55). With rapidly increasing numbers of "qualified" students finishing high school, the capacity to meet the effective demand at the public universities is severely strained, and private sector institutions sometimes are hastily organized to fill the gap (e.g., McMahon, Millot, and Eng, 1986, pp. 186-96, 219-22, 164-67). Apart from the limits that high room and board subsidies and free tuition for higher education place on attainment of economies of scale and on the capacity to meet growing social demand, they also contribute to inefficiency in the use of time by college students. In Indonesia, for example, it takes 6.5 years to complete a 4 year university degree, which raises the cycle costs and limits quality (ibid., p. 307).

The external efficiency is also reduced as unnecessary financing limitations reduce the capacity of higher education to contribute significantly to the diffusion and adaptation of technical change and thereby to growth, albeit with a lag of 5 years or more in Africa at least (McMahon, 1987). But even this contribution is more limited when available resources from parents are not utilized, and scarce tax resources are partially wasted. Since the social returns to primary education are so high, and since human resources are normally the largest and most underdeveloped single type of economic resource in most developing countries, this inefficiency and failure to tap available resources is a real impediment to development.

To introduce briefly the problems with inequity, the benefits from subsidized higher education in the developing nations are enjoyed primarily by the highest income groups. It is estimated that 51 to 83% of the benefits of higher education in various countries go to the top 20 to 38%, respectively, according to Psacharopoulos, Tan, and Jimenez (1986, pp. 14, 56, and 61). Yet these benefits are financed with taxes, 60-85% of which are collected from families whose income is below this level (see Table 2 below). Furthermore their children, often from rural areas, are largely excluded from higher education (Psacharopoulos, Tan, and Jimenez (1986, p. 15).

Beyond this, the income distribution in lower income economies tends to be more unequal than it is in the United States and other industrialized nations (World Bank, 1986, pp. 226-7). Over 50% of the income, and <u>over</u> 50% of the capacity to finance higher education therefore, arises within this highest 20% income bracket whereas those

in lower income groups than this pay 75% of the costs. The evidence in the United States in McMahon (1984, 1974) and in Western Europe developed by Johnstone (1986) is that most parents tend to be both willing and able to contribute to the support of their children in college if asked.

In this paper Part I will consider the specific problems of inefficiency and inequity that would be addressed if a uniform methodology for the appraisal of financial need to determine the parents' expected contribution were implemented within each developing country. Part II develops the concepts and Part III presents sample forms and discusses the potential problems involved in assessing financial need in the LDC's. Part IV considers how financial need analysis and a more specific expected parents' contribution contributes to efficiency and to equity, and Part V tests the effects of some reallocation of education financing on productivity growth in Africa. The final section summarizes the conclusions.

I. Basic Problems

Inequity

The highest income groups benefit most from the tuition and living expense subsidies to higher education as can be seen in Table 1. The

Table 1

The Share of Higher Income Subsidies Received by Different Income Groups

	Poorest 30%	Poorest 40%	Highest 30%	Highest 20%
Columbia		6%		60%
Malaysia		10		51
Indonesia		7	83%	
Chile	15%		≈55	

Source: Psacharopoulos, Tan, and Jimenez (1986, p. 61).

20% to 30% receiving the highest income also receive 51% to 83% of the benefits of public higher education subsidies. This is true in spite of long queues of academically qualified students who seek admission. At the same time, the poorest 30-40% of the population receive only 6-10% of the benefits, as illustrated for the countries shown in Table 1. Yet this lowest income group pays up to 40% of the direct and indirect taxes used to support higher education as illustrated for these and other countries shown in Table 2.

Table 2

The Incidence of Taxation by Income Group

	Lowest Income	Highest Income
Chile	18.5%	26.7%
Colombia	17.1	29.9
Malaysia	17.7	42.1
Mexico	40.2	14.9
Pakistan	15.0	25.3
Philippines	23.0	33.5

Source: Jimenez (1986, p. 116).

This income redistribution from the poor to the rich is all the more (vertically) inequitable in view of the fact that the income distribution in the developing countries is more unequal at the outset than it is in the United States or other Western market economies. This is shown in Table 3.

Table 3

Percent of Income Received by Lowest and Highest Quintiles of Households

	Lowest 20%	Next to Highest	Highest 20%
Developing Nations	4.8%	20.7%	52.0%
Industrial Economics	6.9	23.4	40.2
Exhibit: United States	5.5	25.0	39.9

Source: World Bank (1986, pp. 226-7).

In industrial economies including the United States, only 40% of so of the income is received by the highest income group. A larger share than in the developing countries goes to the next highest 20% of the households. In contrast, 52% of the income in developing countries goes to the highest income group.

The problem is that this highest income group has most of the ability to pay for higher education and also receives most of the highly subsidized benefits. Yet they pay very little of the costs. Taxes on the poor limit expansion of education. It is this higher income group that needs to be asked to contribute to its costs if higher education in the developing countries is to be financed more adequately.

Inefficiency

Misallocation Due to Underinvestment in Primary. The returns in developing countries to investment in primary education tend to be about twice as high as the returns to investment in higher education.

This is shown by the social rates of return to each of these forms of investment which are the best available measure of the growth payoff in Table 4 below. If higher education could become more self-financing, especially in Africa, Latin America, and South East Asia, tax funds could be used to expand access to primary and secondary education more rapidly, and to improve its quality. This should contribute to economic growth, especially in the very poor African countries where per capita income is currently falling. The per capita growth rates in Zaire are -1.3%, Zambia -1.3%, Ghana -2.1%, and Madagascar -1.2% according to the World Bank (1986, p. 67). There is the further positive effect of primary and secondary education of women in lowering fertility rates (e.g., Schultz, 1974, pp. 3-80), thereby indirectly contributing to the per capita growth that is so desparately needed in these places.

Table 4

Returns to Education in Developing Countries

	Social Rate of Return			Private Rate of Return		
	Primary	Secondary	Higher	Primary	Secondary	Higher
Africa	26	17	13	45	26	32
Asia	27	15	13	31	15	18
Latin America	26	18	16	17	13	13

High Unit Costs. Relatively low percentages of higher education costs are covered by fees in developing countries, which hold costs high, and prevent more efficient attainment of economies of scale. The extraordinarily small portion of costs borne by parents can be seen in Table 5. In many of the poorest countries public higher

Table 5

Cost Recovery in Higher Education, 1980

User Fees as Percent of Public Unit Costs

Africa		Latin America	
Botswana	0%	Bolivia	1%
Somalia	0	Brazil	5
Kenya	0	Chile	25
Lesotho	5	Colombia	3.4
Malawi	1	Costa Rica	8
Mauritius	0	Dominican Republic	1
Sudan	0	Ecuador	2
Tanzania	0	Guatemala	10
Uganda	0	Honduras	10
Guinea	0	Paraguay	0.7
Nigeria	12.4	Uruguay	5
Burundi	14.8		
Burkina Faso	0	Asia	
Mauritania	0		
		Malaysia	5.8
Asia		Pakistan	2.1
		Philippines	3.7
India	29.1%	Thailand	6.9
Indonesia*	13.0	Solomon Islands	0.9
Korea	23.4	Turkey	15.0

Source: Psacharopoulos, Tan, and Jimenez (1986, p. 55).

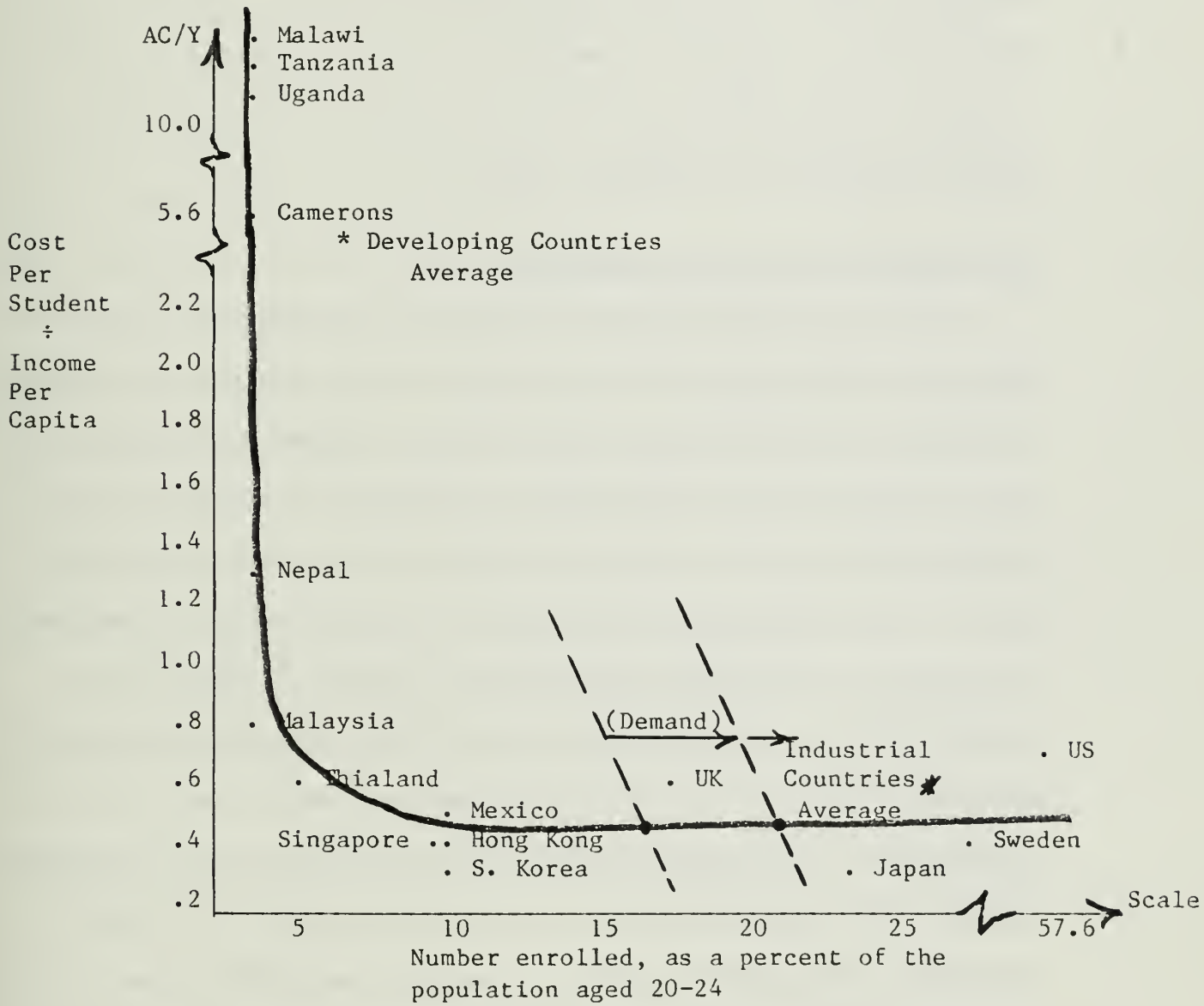
*Indonesia doubled the tuition charged at public institutions during 1986. This would raise the percent shown here, but by less than 13% given that all prices have risen during this period.

education for the relatively well to do is totally free. In the country that has expanded higher education the farthest of any in the list, South Korea, and where economic growth also is the highest in the world, a much higher 23.4% of public higher education institutional costs (not including foregone earnings) are borne by the family. This percentage approaches the pattern found in the United States.

Where fees are low, the public cost per student are high. These costs which must be borne by taxpayers limit expansion, and thereby prevent still further cost reductions by limiting the attainment of economies of scale. This problem is illustrated in Figure 1. For purposes of international comparisons, the average cost per student (AC) on the vertical axis is "deflated" by dividing by income per capita, thereby expressing it in relation to local standards of living. The scale of the higher education establishment on the horizontal axis is expressed as a percentage of the relevant age cohort that is enrolled in higher educational institutions. If as effective demand increases, the scarcity of tax revenue in non-profit production forces public expenditure per student to approximate costs, then the result is not a demand curve but instead a long run cost curve as demand shifts outward, although the data points do of course represent a joint solution. In fact, on this basis a very pronounced L-shaped curve like a long run average cost curve for higher educational expansion in Figure 1 emerges. It is clear that if more students could be enrolled by using fees to lower the public cost per student, then greater efficiencies at large scale in the institutional costs per student (and in the use of public funds) could be achieved.

Figure 1

Long Run Average Costs for Higher Education
(Cost per student on the vertical axis, "deflated" by national per capita income to permit international comparisons)



Source: Calculated from Psacharopoulos (1980, pp. 23 and 73) and Y from World Bank (1981, pp. 134-5). Indonesia AC are from McMahon, Millot and Eng (1986, p. 300), with ER and Y from World Bank (1985, p. 222; 1983, p. 148). Data for many countries other than those shown for illustrative purposes are given by Psacharopoulos (1980, p. 73).

II. Potential Solutions: Uniform Determination of a Parents' Expected Contribution

To address both the problems of inefficiency and inequity, there are basically four problems that must be addressed in determining financial need, and thereby determining the parents' expected contribution based on this needs assessment. Some are conceptual, others statistical-political, and still others relate to the practical administration of an efficient system.

The Concept of a Uniform Methodology

The first problem that must be faced in determining the parents' expected contribution is the conceptual one of developing a national standard of "ability to pay" that applies a uniform methodology free of favoritism. This involves measuring parents' income and wealth, allowing deductions for their own support now and after retirement, and for other dependents, to determine "available income." The problems unique to developing countries are a greater role for the extended family, a smaller market economy, fewer written records, and more favoritism fostered by a rule of persons rather than of law accompanied by objective reporting. These problems must be addressed. But with some experimentation, they would not appear to be insurmountable. Some function of the estimate of available income obtained by methods discussed below then can be viewed as "taxed" as a rate is applied to determine the parents' expected contribution. The beauty is that this tax does not have to be collected by the government, but instead is contributed voluntarily later by the parents to the son or daughter to help cover his or her tuition and living costs.

Room and board costs are covered by costly public maintenance grants in many of the developing countries, a practice that even extends to secondary boarding schools in several African countries. These living costs are an essential part of the analysis, and are a major portion of the costs of the higher education to the society. They represent, approximately the foregone earnings costs of the investment which are usually borne by the parents, at least in the U.S. as they refrain from consumption and send the resources saved to the children in college as part of the family's total investment in education. The high dropout rates after primary school in most developing countries as well as low enrollments in higher education are due in large part to the burden of these costs. Low income parents cannot continue to forego indefinitely the help of the child in agriculture, or alternatively to forego getting the child employed and thereby independent of the family budget constraint.

Determining the amount of family income available to cover not only tuition, therefore, but also foregone earnings (room and board costs) is in principle the same problem as that faced by each nation's income tax system (if any) in establishing exemption levels and deductions for other dependents. It is only after this that a "tax" rate can be applied to determine the parents expected contribution. It is suggested, therefore, that if the developing country in question has an income tax, the literature about it and the experience in establishing deductions and exemptions it has established is a good place to look for local experience when developing criteria for a uniform methodology measuring the ability to pay.

The Data

The second problem is one of collecting verifiable and accurate data. The specifics will be considered below. But again, this is the same problem faced by any income tax.

The basic conflict is between simplicity and equity, or sensitivity to individual differences. In developing countries, especially at first, it is probably better to err in the direction of simplicity and verifiability.

In non-market economies it is important that much of the data be self-verifying in the sense that it is about objects or behavior that is obvious to others who know the family, and therefore very hard to distort. For example, the number of acres farmed (usually recorded in provincial offices), trips abroad, and the year and model of any cars or color TV owned might serve as a basis for estimating income and real estate assets. Other data such as specific lines from tax forms in those countries that do have an income tax are not self-verifying, but can be checked if the family financial statement deviates from the earnings of others in the same occupation as revealed by national labor force or census surveys, and therefore can be verified if necessary. This kind of tax form information is usually available for civil servants, and higher income business people, but often not for others in developing countries. Amounts reported can be cross checked for reasonableness by computer once the norms are stored in the memory from census and national labor force survey data.

Although the data problems must be addressed, they are unlikely to be the real obstacle. Experience suggests that those who are opposed to charging those who benefit from the current subsidies will frequently confuse the issue by exaggerating the difficulties involved in collecting accurate and verifiable data. There is also a lack of knowledge of how to do it that leads to reluctance. In developing countries where there frequently are not objective records (such as 1099 IRS form reports by employers to the IRS), and where there is a network of favoritism on which the government in power depends, there is likely to be quiet opposition to changing the status quo. This is a political problem, not a data problem. From a strict data collection perspective, efficient collection of simple and verifiable data after some experimentation is not likely to be an insurmountable problem.

Design of an Efficient System

The administrative problem of designing a relatively low cost nationwide collection and data processing system is the simplest to resolve, given the years of experience with this by the American College Testing Program and the College Entrance Examination Board in the U.S.

All developing nations have mail services, some of them cheaper and faster than the U.S. A centralized computerized processing of a simple mark-sensed form, filled out by the parent, and mailed to the central processing center enables objective criteria to be applied equally to all. Once the agreed upon criteria are programmed into the

computer and published, this uniform methodology avoids personal favoritism. The standardized criteria can be openly discussed, and printouts of the parents expected contribution mailed to the parents and to the university officers administering the student loan, tuition waiver, and work-study programs. Each financial aid officer then has the same measure of "unmet need" for the student before him, including guideline limits for the tuition waiver, work-study, and student loan amounts making up the financial aid package. The "parents' expected contribution" is self enforcing within the family, and the "unmet need" total (if any) sets the upper limit for the total financial aid package including access to student loans at subsidized rates. Once programmed into the computer, the uniform methodology with its published criteria openly discussed should significantly reduce the capriciousness, personal favoritism, and even sometimes dishonesty that is sometimes an impediment to incentives in developing countries.

As fees are raised to eliminate maintenance grants and cover larger fractions of higher education institution costs, the need becomes increasingly acute to be more selective in the dispersal of grants, loans, and work-study. If qualified students from poor families are merely excluded as less qualified students from wealthy families are admitted, this merely sacrifices social efficiency by losing relatively more able students than those who can stay and equity by excluding the poor again by this other means. Once students have been determined to have clear merit, and be qualified, by virtue of their being admissible, then an objective method of determining economic need as a basis for deciding upon the size of the financial

aid package to be awarded is, therefore, an indispensible feature for a socially efficient and equitable system.

III. A Suggested Solution to the Practical Problems of Calculating the Parents' Expected Contribution

A Family Information Form for collecting the necessary financial information for determining the parents' expected contribution to set limits for the more selective distribution of financial aid is shown on the next page. It is a prototype reflecting conditions found in most developing countries. Income taxes tend to be paid by only a few civil servants and wealthy persons, the extended family has a more important role, there is a larger non-market largely rural sector, and past traditions have used more of a personal assessment, personal favoritism system. This form is designed to address all four of these situations. The form is illustrated for Indonesia. But with minor deletions and adaptation of language, it should be ready for experimentation or pilot testing followed by refinements and use in almost any developing country.

Just as with any Family Financial Statement (FFS) in the United States or West Germany, the form must be filled in by the parent who has access to the records and knows his or her income, and countersigned by the students seeking aid. The form emphasizes that it is an application for financial aid, although of course without this aid, the point is that the parents and/or extended family must cover the students' tuition and living expenses. It is for this reason that it is important that the student by involved in signing the form. There is no tax collector involved, and the parents' contribution later will

be a matter between the parent and the student. It is not a mark-sensed form because most parents in developing countries are unlikely to be familiar with these. Also the cost of clerical labor to transform the data for use by a computer

Demographic Information as a Basis for Parental Living Allowance Deductions

No questions are asked on this form (or or should be asked), that are not either self-verifying in the sense that their answers are readily observable to the student or others who know the family, or else that could not be verified should the need arise. This simple principle encourages honesty.

The identifying information in questions 1-5 provide the family and college financial aid officer addresses to which the results containing the parents' expected contribution and suggested financial aid package (if any) can be mailed. The demographic information in questions 6-8 provide the basis for computer calculations described later of the parents' living and retirement allowances.

Income and Assets for Those Who File Tax Forms (Questions 9-13)

The tax number is very significant in Indonesia (Q. 9) and some other places. If a person has one, it means they are a civil servant above rank 3A, possessing at least a Sarjana degree, or are employed by a private firms with incomes in the top 10% or so of the population. Income information is requested from a specific line of the Isiian Wajib Pajak (tax form) that must be filed (Q. 10), which increases the accuracy with which it is reported and permits

APPLICATION FOR FINANCIAL AID
FAMILY INFORMATION FORM

To be filled in by the parent of a student seeking financial aid. Mail to Department of Education and Culture before May 1.*

Warning: All information is subject to verification. If you purposely give false or misleading information to establish eligibility for student aid, you can be fined Rp 16,000, receive a prison sentence, or both.*

1. What university does your son or daughter plan to attend, or attend now?
   _____
   College Name and City
2. Student son or daughter's name: _____
   Last First Middle
3. Parent's name filling out this form: _____
   Last First Middle
4. Parent's home mailing address: _____
   Number Street City Province
5. Student's next year in college: ___ Freshman ___ 2nd ___ 3rd ___ 4th ___ 5th
6. Parents' marital status: ___ Married ___ Divorced ___ Father Deceased
7. Age of the older parent is _____ years.
8. Number of family members that you support:
   a. Number of your children that will be receiving over one-half of their support from you next year (include the student): _____
   b. Number of other family members to be living at home and receiving one-half of their support from you. Include elderly parents, grandchildren, and other family members here: _____
   c. Number of children of those included in question 8a to be away at a boarding school or college next year: _____
9. Do you have a tax number? ___ Yes ___ No. If so, what is it? _____ (If you do not have a tax number, skip the next section, and go to the family financial information section beginning with question 14.)
   Tax Number

PARENTS' FINANCIAL STATEMENT

Please refer to your most recent Isiian Wajib Pajak* (Tax Form) to complete the next few questions:

10. What is the total income of your family for the year just ended reported on line ____ of your Isiian Wajib Pajak? Rp _____ (This includes the wife's income, and that of other family members living with you who work.)
11. What are your total assets reported on line ____ of your Isiian Wajib Pajak (Tax Form)? Rp _____
12. How much tax did you pay, based on this tax form? Rp _____

*For illustrative purposes only. This is the practice in the United States, not in Indonesia.

13. What are the specific assets reported on line ____ of your tax form?

	Value Now	Amount Owed	
Parents' home	Rp _____	Home Mortgage	Rp _____
Financial assets and investments	Rp _____	Other bank debt	Rp _____
Other real estate, business, or farm	Rp _____		

14. What kind of a house do you have?
____ Rumah Tembok (brick house)
____ Rumah Setengah Tembok (half brick)
____ Rumah Bilik (bamboo)

15. How many hectares do you own, if any? (Insert here number recorded at the Province level for the Kabupatan.) _____ hectares

16. What is your occupation? _____

17. Do you have: _____ Water buffalo? How many? _____
____ Electricity at home? ____ A car?
____ A color TV? ____ A telephone at home?

18. How many years of education have you completed? _____ College? ____

STUDENT INFORMATION

19. With whom will you live next year while in college?
(a) At home with parents (if parents live near enough to the college). . . . . ____
(b) College dormitory or rented room. . . . . ____
(c) A brother, uncle, or other relative . . . . . ____

(If you answered 19(a) or 19(b), skip the next section and go to question 22.)

INFORMATION ABOUT RELATIVE WITH WHOM YOU WILL LIVE

20. What is the name and address of this brother or other relative with whom you will live? _____
Name Address

21. Does this member of your extended family have a tax number?
___ Yes ___ No If so, what is it? _____

22. Approximately how much tax did he pay?
___ None _____ Rp. ____ Don't Know

23. What is his occupation? _____
What is his rank (if in the military, or civil service)? _____

CERTIFICATION AND SIGNATURES

I certify that the information on this form is complete and correct. If necessary for verification, I permit an authorized official to make inquiries, and agree to send a xerox copy of my last Isiian Wajib Pajak Tax Form if asked. I do realize that if I don't respond to the request for proof when asked, the student will not receive financial aid.

At least one parent must sign: _____ _____
Parent's Signature Date

Student must also sign: _____ _____
Student's Signature Date

verification later. It includes the income from "second jobs," the wife's income, and the income of other family members. Assets are reported on another page (Q. 11-2), and also could be verified if the form is selected for auditing. This information therefore piggy-backs on the enforcement by the Ministry of Finance of the nation's tax laws. If the parents actually were assessed any tax based on this form by the tax authorities (Q. 13), they are probably in the top 1% or so of the income and wealth holders in the country.

Estimating Income and Wealth for Those Who Do Not File Tax Forms

Questions 14-18 that follow get away from using the favoritism-ridden subjective practice used in many developing countries of asking the neighborhood leader to report the parents' income or wealth. In Indonesia the neighborhood leader who is elected will report anything to please. These reports are then certified by the village head and seldom changed since he does not know the income of all of the people in the village. The Provincial official who receives it basically only wields a rubber stamp. The procedure suggested here gets away from this "rule by men," moving toward a "rule by law" and the more objective assessment it implies.

Questions 14-18 are for those who do not file tax forms, many of whom are in rural villages where non-market aspects of the economy loom more important. The value of real estate is assessed at the provincial level in Indonesia, which is common elsewhere as well, and is a verifiable basis for estimating wealth. Occupation and education can be used for estimating income. The national labor force surveys

(SUSENAS and SAKARNAS in Indonesia) collect detailed information on income from a sample of 367,000 persons in all provinces that can be used for imputing income and for checking returns for reasonableness. Other developing nations do usually have these labor force, social and economic, and/or census surveys that cover earnings or at least consumption, although many are not as well developed as those in Indonesia. Questions 14, 17, and 18 about the kind of home, electrification, cars, and TV are mostly intended as cross checks.

The Extended Family

The extended family is very important in developing countries, helping to support not only the elderly in the absence of social security, but also the unemployed, as well as helping in the finance of higher education. The extended family cannot be expected to accept the same degree of responsibility as the parents however. Brothers and other family members employed in the city and living near the college frequently help out by supplying room and board, which therefore is a portion of living costs that should not be subsidized a second time by loan or tax funds.

Questions 19 and 20 ask whether the student will live at home or with a relative. If so, living cost subsidies are not needed. Sometimes the student is essentially a servant in the relative's home, working a room and board job, since there are few of these at the colleges. This is more likely to be true if the supportive relative's income is low. So if the parents' income is also low a partial tuition waiver may be justified. But if the brother or uncle has high

income, such as that of an Army General, this will be revealed by questions 21-23 about his tax number, taxes paid, occupation, and rank. In this case, no aid or a student tuition loan without a tuition waiver would be more appropriate.

Criteria for Computing the Family's Expected Contribution

The parents' expected contribution now can be computed based on this information about the parents' income and net assets, and the income of any supportive member of the extended family. The computer must be programmed to deduct a maintenance allowance from income for the parents and their other dependents, as well as setting aside a retirement allowance from net assets for the parents.

The Standard Maintenance Allowance is based on national surveys of consumption resulting in a cost estimate for families with specific numbers of dependents. It must be adjusted annually by a consumer price index to reflect the inflation rate expected in the upcoming year. Most developing countries have consumer expenditure surveys and some have standard household budgets similar to those prepared in the United States by the Bureau of Labor Statistics, since they are needed for assigning weights to get a consumer price index. If the nation has no CPI, the average blue collar wage in manufacturing could substitute for the standard budget.

Table 6 below gives an example of a standard maintenance allowance computed for Indonesia based on the SUSENAS survey of consumption expenditure conducted by the Indonesian Census Bureau. The percentages in Col. 3 show the percent added by each additional dependent

Table 6

Standard Maintenance Allowance
for the Parents and Their Dependents
Illustrated for Indonesia

Family Size (Including Applicant)	Allowance (1987)	Percent Increment
2	500,000 Rupiah[a]	100 base
3	625,000	25%
4	768,000	23
5	907,000	18
6	1,061,000	17
7	1,178,000	11
8	1,296,000	10
each additional	1,412,000	9%

Sources: a) McMahon, Millot, and Eng (1986, pp. 285-6).
b) ACT (1986, p. 3).

in the U.S. in 1987 as computed by the BLS. This relationship may be useful with appropriate refinements in developing countries that have not estimated budgets for dependents. This allowance then must be reduced by 9% for each dependent child other than the applicant who is away at college. This recognizes that some savings occur if additional children live out of the home; if they live at home, this will be recognized in the student budget used for their need analysis.

Once the standard maintenance allowance in Table 6 is programmed into the computer, the appropriate deduction from the family's income is made automatically. Rather than making sophisticated additional deductions for local Kabupatan taxes paid, medical expenses, and secondary school BP3 and SPP fees paid, it is probably better to err here and in other developing countries in the direction of simplicity, and to assume that a standard allowance for these expenses is included

in the standard maintenance allowance for the parents and other dependent children as shown above. Available income is total family income less this allowance. It is the discretionary income available for raising the family's living standard as well as for financing the higher education of the children.

Wealth. The treatment of the parents' assets within the computer program must first subtract the debts reported on the form to obtain net worth. Then a fraction of the net value of the home and other assets are protected to provide for the parents' retirement. The fraction increases with the age of the eldest parent. The formula for the amount of assets set aside is based on the current cost of an annuity that would provide the parents a moderate level of living throughout their retirement years. Future inflation must be built into this formula using the inflation rate specific to each developing country. But no allowance normally need be made for social security since social security programs are rare in developing countries. Life expectancy data can be obtained from the World Bank's (1986) World Development Report statistical appendix for each country. The annuity formula used by the Uniform Methodology (ACT, 1986, p. 4) ignoring loading charges is:

$$(5) \qquad A = M(1+p)^{(L+n)/2} \left(\frac{[1-(1+r^*)^{n-L}]}{r^*}\right)(1+r^*)^{-n}$$

A = asset protection allowance,

M = moderate budget for a retired couple, from Table 6,

p = expected average annual rate of inflation (e.g., 6%),

L = life expectancy (50 in Indonesia), less current age (from form),

n = retirement age (48 in Indonesia), less current age (from form),

r* = rate of return on the annuity (e.g., 8%).

The resulting asset protection allowance can also be stored in the computer quite simply as illustrated in Table 7. This amount which depends on the parents' age is deducted from total assets to obtain "Discretionary Net Worth."

Table 7

Home and Retirement Asset Protection Allowance
Illustration from the U.S., 1987

Age of Older Parent	Allowance for 2 Parents	Allowance for Single Parent
25 or under	0	0
26	$ 1,900	$ 1,400
27	3,700	2,900
.	.	.
.	.	.
.	.	.
48	34,300	26,200
49	35,500	26,900
50	36,500	27,500
.	.	.
.	.	.
.	.	.
65 or over	61,400	42,300

This discretionary net worth is then converted into an "equivalent" amount of income by assuming it will be used up by the death of the parents. This is consistent with the life cycle theory of saving where the planned bequests of parents are treated as bequeathed before death through investment in their children's human capital. The net worth left after the asset protection allowance is deducted can therefore be converted into an equivalent income stream by treating it as the

present value of a stream lasting up to the parents' death. Since life expectancy averages 50 years in developing countries including Indonesia, and 42-43 years in Africa, the appropriate asset conversion rates using an 8% discount rate are 14% for Indonesia and 28% for Africa. The asset conversion rate would be larger if the rate of return available in the country is greater than 8%.

The Parents' Expected Contribution then can be printed out by the computer program after adding this net worth times the asset conversion rate to the parents' available income, and multiplying the resulting adjusted available income by an appropriate tax rate. The suggested tax rate schedule in Table 8 recognizes that the parents' maintenance and retirement allowances protect some income, taxing it in effect at a zero rate, so the rate at which fees are paid phases in above this level. This recognizes that the parents' maintenance allowance is close to base subsistence in developing countries. It also recognizes that net assets are not taxed very heavily in view of their illiquidity and the asset conversion rate used above. The schedule also recognizes that income and wealth are more unequally distributed in the lower income developing countries for which data is available than they are in the United States. Most important, the schedule is realistic in recognizing that there is no ability to pay in the lower income brackets, and that this investment by the parents in their child's further education is a saving and investment process. The parents refrain from consumption, and invest the resources in higher education (releasing some tax resources for reallocation to primary education). Any resources that they might have saved anyway

Table 8

Sample Tax Rate Schedule
For Determining the Parents' Expected Contribution

Adjusted Available Income Above the Parents' Maintenance and Retirement Allowances	Parents' Expected Contribution (as a percent of fees and net living costs)
0, or less	0
1st Quartile	25%
2nd Quartile	50%
3rd Quartile	100%
4th Quartile	100%

are invested productively for the society since the rates of return are high. But to the extent that upper income parents are encouraged to refrain from consumption and invest in the education of their children instead, the effect is to directly increase the developing nation's total investment in economic growth.

Unmet need is calculated as the final step. The parents' expected contribution as calculated above is deducted from the student's tuition plus the standard living cost budget of a student living on campus. If the student will be living with a member of his extended family, his costs would be calculated net of any room and board supplied by the supportive member of the extended family based on the answers to questions 19-23 above.

There would be no unmet need in the upper income groups, and families would pay full fees. The other income quartiles among the qualified applicants with academic merit would be eligible for much more selective financial aid than that now provided indiscriminately to those without need. Tuition waivers would be reserved for the

neediest among those who are academically qualified, with student loans for this group and the next neediest group, with part-time jobs for all that have any remaining unmet need. These "offers" (i.e., fee waiver and loan upper limits) then would be mailed directly to the parent, the student, and the campus financial aid officer.

Many further refinements to the unmet need concept are possible. But they seem to add unduly to the complexity in ways that would contribute to making the system unworkable in less developed countries. "Independent student" allowances for example that are discussed elsewhere in this volume are an unaffordable luxury in subsistence economies. Student budgets tailored to specific universities are irrelevant in the many developing countries where there is only one university. In countries where there are more, one nationwide standard student budget probably is politically more acceptable, more equitable, and certainly is less complex.

Finally it must be stressed that the entire context throughout is to aid students displaying academic merit, and who therefore are admissible, but whose parents do not have the financial resources and who are excluded as fees are raised. Although the achievement test scores and rank in the high school class used to measure potential are not distributed equally among all children, irrespective of their earlier schooling, nevertheless the parents' wealth is not a reasonable test of academic merit. Excluding those who cannot pay therefore is not an efficient method of selecting those who can benefit and contribute later. If financial aids are not to be provided to all indiscriminately, efficiency and equity therefore both require

some workable means of determining need and hence the parents' expected contribution.

IV. How Financial Need Analysis is a Necessary Element in Achieving Efficiency and Equity

The severe problems in financing higher education in the developing countries and the common recommendations that fees for higher education be increased often omit considering the implications if this is done without a careful determination of financial need as the basis for more selective financial aid. To prevent the clear result of excluding all but the children of the very well to do, usually student loans are suggested, similar to the pattern in Sweden (e.g., Psacharopoulos, Tan, and Jiminez, 1986). But this alone merely shifts the burden heavily to the students, and ignores the parents who are the main realistic source of significantly increased potential financing, as well as contributes to other inefficiencies as will be developed below. The reason for overlooking the parents' expected contribution does not seem to be any opposition to financial need analysis per se, or to expecting a contribution from the parents--the main reason instead seems to be merely a lack of available procedures.

Student Loans as Part of a Means-Tested Financial Aid Package

It is sometimes argued that access to student loans do not need to be means tested because the loans are to be repaid. There are several problems with this.

The first is that student loan interest rates are often subsidized, and as a result, scarce loan funds must be rationed. In

Germany, for example, student loans are more like grants, with a five year grace period, 20 year repayment period and zero interest. In the U.S. they are closer to real loans, with interest rates that fluctuate between 7 and 9 percent. Even if student loans are not subsidized directly to keep them below the economy-wide interest rate plus a reasonable risk premium left after the government guarantee reduces the risk to the lender, student loans are likely to be subsidized by tax coverage of some of the administrative costs. Educational loan funds in developing countries tend to be relatively small with considerable pent-up demand. In Indonesia, for example, no loans are available to students applying for admission, and only students who are enrolled and further along are eligible. Student loans are an important form of financial aid for students throughout Scandanavia, in Canada, in the United States, in Japan, have recently replaced grants in West Germany, and are widely used in Latin America. But the United Kingdom has virtually zero "self help" by students, and only a few countries in Africa and Asia have loan programs. Many developing counties have none. Failure to employ an objective means test enables those families who could otherwise support their children in college to borrow at a subsidized rate. These families then pre-empt the limited loan funds, excluding from college the child from the poor family where the first borrowing must be to support the child in college. The most selfish parents are the ones that benefit the most from this indiscriminate access to loans. Furthermore, on equity grounds, since loans are normally subsidized, again the poor wind up subsidizing the well to do.

Part-time Jobs as Part of a Student Financial Aid Package

Campus employment opportunities also are not unlimited. If these jobs, including research assistantships and part time library, food service, and computer jobs are given to full time employees, options for increasing the resources available for higher education are lost. If they are given to students, but indiscriminately so that some are not reserved for students whose parents cannot help to cover the costs, again additional resources are lost. The need for careful means testing for work study is less pronounced than it is for tuition waivers and for maintenance grants because the subsidy is smaller (as with loans) and there is more of a quid pro quo. But still a means test eliminates the displacement of those with greater need. A case can be made for a means test here also therefore on both efficiency and equity grounds.

The Parents' Contribution as a Key Element

Combining student "self help" through loans and jobs with a parental expected contribution determined by financial need analysis, the result is the possibility of a more comprehensive, coherent, financial aid package for each student. The first copy of the computer printout sets upper limits for the financial aid officer responsible for a few tuition waivers and room and board subsidies for the neediest cases. ~~The more indiscriminate provision of these subsidies currently run up the public cost of higher education~~ a great deal. More flexible guidelines would simultaneously be set for loans and work-study, with the second copy of the computer printout mailed to

each student (and/or his family) and clearly explaining how the total costs of financing his or her education can be covered. A uniform computerized methodology for calculating the parents expected contribution vastly simplifies construction of this financial aid package.

Other Inefficiencies. The 6.5 years it takes to complete a four year bachelors degree in Indonesia also is not very efficient (see McMahon, Millot, and Eng (1986)). This may be correlated there and in other developing countries with the large percent of college living expenses and tuition that are subsidized. To test this correlation for other developing countries would make a very interesting study. But it is a reasonable hypothesis that this cost-based subsidy together with the Scripsi requirement delays degree completion.

Most American students work 10-15 hours a week at board jobs and other campus library, grounds maintenance, stenographic, and food service jobs. However, in many developing countries any work is considered very low, and rather than viewing work experience as desirable the student and his or her family is unproductively ashamed. The availability of cheap labor is usually cited as the reason for this lack of student involvement with part-time jobs. But it is not a good one. What is more relevant is that this source for supporting some of the higher education costs in place of tax dollars is being lost. Tax dollars released in this way could produce other kinds of employment. But beyond this unused source of support, part-time work of 15 hours a week or less provides useful on the job work experience. It is a serious complaint of employers in Indonesia, for example, as well as in other developing countries, that college students who they

hire have never worked at anything and therefore are not good at supervising other workers. This is a serious source of external inefficiency in the higher education system.

V. A Test of the Effect on Productivity

Another perspective on the relative contribution of primary and secondary education to productivity growth, in this case for 30 African countries for five year periods from 1965 through 1985 can be seen in Table 9. Equation 1 explains growth in real output per person employed (y-n) by means of investment in primary and secondary education (IH/Y), in higher education (IHE/Y), and in physical capital (IK/Y). Each takes effect with a lag, so the relations are recursive. These components of total capital deepening then are influenced in turn by the growth of per capita income (y-n), again with a lag, and some other variables in equations (2), (3), and (4). Therefore total investment contributes to income growth, and the reverse effect as income growth in turn contributes to investment is taken into account. The theoretical framework and the data sources are the same as in McMahon (1987), but this particular regression is not shown there. This approach not only takes the two way flow of causation into account, but also the resulting returns to the different forms of investment (some of which are picked up in the lagged productivity-change term (y-n) do not depend on assumptions that workers are paid amounts equal to their true marginal products in the factor markets. Instead direct marginal productivity of the various investments is measured in the products market.

Sources of Productivity Growth in 30 African Countries
1965-70, 1970-75, 1975-80, and 1980-85, (90 observations since 1965-70 observation of (y-n) lost due to lag; t statistics in parentheses)

Raw Labor's Share $(\frac{MPP_N \cdot N}{Y} - 1)$ or	Five Years Rates of Return (No Lags) r_K^*	r_H^*	r_{HE}^*	Controlling For: Initial Level of Productivity	Delayed Effects $(y-n)_{-1}$	Anglophone (+1) or 0 = Francophone (D76)	Oil Price Shock	Constant Terms	R^2
-.90n	$+.70(\frac{\bar{I_K}}{Y})$	$+1.75(\frac{\bar{I_H}}{Y})$	$-5.07(\frac{\bar{I_{HE}}}{Y})$	$+.045\frac{(Y/N)_{70}}{Y}$	$+.433(y-n)_{-1}$	+.008	-.037	+.011	.42
(-2.71)	(3.35)	(2.37)	(-1.59)	(+9.52)	(4.17)	(.231)	(-.901)	(.171)	

fects as Per Capita Income Growth Facilitates Increased Total Investment

Income Growth	Lagged Income Growth	Interest Rate (r), or Anglophone (D76)	Oil Exporting Nation	Oil Price Shock	Lagged Investment	Constant	R^2
$.129(y-n)$	$+.083(y-n)_{-1}$	+.003r	+.037	+.027	$.443(\frac{\bar{I_K}}{Y})$	+0.74	.53
(2.88)	(1.75)	(.952)	(1.11)	(1.52)	(4.62)	(3.75)	
$.035(y-n)$	$-.019(y-n)_{-1}$	+.002(D76)	+.004	-.002		+.035	.18
(2.45)	(-1.18)	(.462)	(.433)	(-.481)		(6.60)	
$.002(y-n)$	$+.001(y-n)_{-1}$	-.003(D76)	.005	.004		.009	.19
(.44)	(.032)	(-2.15)	(2.22)	(3.06)		(6.69)	

The 16 Francophone countries in the regressions tend not only to subsidize each college student heavily, but also as shown by Table 10 to expend a high 40% of their educational resources on the 2% of the population who pursue higher education. In contrast, the Anglophone countries spend only 26% of their educational resources on higher education, and 39% of their educational resources on primary education which is significantly larger than the 16% spent on primary education in the Francophone countries.

Table 10

Distribution of Educational Resources and Population by Level, 1980

Africa	Primary Education		Higher Education	
	Population	Expenditure	Population	Expenditure
Francophone	86%	16%	2%	40%
Anglophone	83	39	1	26

Source: Mingat and Tan (1985a).

To test for the potential effects of some reallocation of education expenditure on productivity growth, a dummy variable was inserted in the regressions for the 14 Anglophone (+1) and 16 Francophone countries. As can be seen in Eq. (1) the net relation to productivity growth of the strategy in the Anglophone countries is positive, although not terribly significant. A major portion of the positive effect is picked up in the highly significant investment in primary and secondary education term (IH/Y). Investment in higher education has a negative relation to per capita growth in the following five

years in Eq. (1). But this turns into a significant positive effect when IHE/Y is lagged an additional five years (see McMahon, 1987, Table 3, Eq. 10). The implication is that there are some positive effects as new technology is embodied through higher education and transferred (IHE/Y includes investment in students studying abroad), an interesting discovery that merits further study.

In Eqs. (2-4) per capita income growth is associated in turn with higher investment in physical and human capital as expected. But it also can be seen that there is a relatively larger investment in primary and secondary education in the Anglophone countries, and a significantly smaller investment in higher education there as revealed by the dummy variable for Anglophone (+1) and for Francophone (0) in Eqs. (3) and (4). The low levels of adult literacy (18%) in the Francophone countries, the three-fold higher-than-elsewhere per student costs due to subsidization of study living expense, and some other aspects of this misallocation are developed further by Mingat and Psacharopoulos (1988, pp. 36-7). But tests of the relation of this financing pattern to productivity growth have not been tried previously.

VI. Summary and Conclusions

There is a relatively untapped potential for greater resource recovery in higher education in the developing countries but it requires more selectivity in financial aids based on need among qualified students than the indiscriminate subsidies provided at present. The methods for computing the parents' expected contribution developed

above has the potential for both sharing the costs in a more balanced way among students, parents, and taxpayers as well as for increasing both efficiency and equity. A prototype form for collecting the necessary financial information is developed for experimentation, adaptation, and use in each country that is currently without such a system.

The problems that are likely to arise are discussed throughout the paper, together with possible solutions. To encourage honesty, the forms have stressed using only objective information that is direct (no hear-say), self-verifying or easily verifiable. The argument that students should not work 10-15 hours a week because it is "below" them is answered in terms of their employability later; the argument that they would displace only cheap labor that would otherwise be unemployed is answered in terms of the potential alternative uses of tax funds that create jobs. The political opposition to asking parents and students from high income families who now are the primary beneficiaries to pay more is likely to be the main real obstacle, even though many other reasons are likely to be given. To circumvent this it is probably necessary to "grandfather" the current student body, and propose withdrawal of living allowances, (but tuition schedules and financial aid packages for those with need) that apply to each succeeding freshman class as they apply for admission.

The increased resource recovery that this would permit would allow some reallocation to primary levels where rates of return are higher, as well as further attainment of economies of scale in higher education, both increasing social efficiency and contributing more than at

present to economic growth. Efficiency also would be advanced by helping students to relate to the labor force later by giving more students part-time work experience, by providing an economic incentive through fewer subsidies to limit wastefully long times spent in BA programs, and by developing the skills of academically able children from poor families who otherwise would be excluded from higher education.

Equity also would be advanced by reforming a system where the highest income groups receive most of the benefit but pay little of the costs that are borne by taxes paid by lower income groups who are excluded.

Finally, there are no panaceas, but it is harder to defend the more polarized alternatives as either more efficient or more equitable--either no fees and extensive subsidies for everybody irrespective of need, or fees that cover full costs and student loans available for all.

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