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ABSTRACT

This paper discusses the allocation of resources to retention efforts, and whether community college administrators should utilize a cost/benefit rationale. The author intends to provide a conceptual framework within which a broad range of choices regarding retention rates might be better understood. The author quotes Victor Fuchs in support of his arguments. According to Fuchs, the romantic view of reality assumes that resources are unlimited in relation to human wants. The monotechnic view presumes that most problems have a technological aspect, and those trained in that technology should be allowed to find solutions to the problem. In contrast with the romantic and monotechnic view, economic rationality is concerned with balancing societal costs and benefits of the many demands made upon scarce resources. Here, the social optimum is the point at which the benefit from an additional increment of education equals the cost of the resources used to attain that increment. The paper also presents the Equi-marginal Principle, which suggests that the consumer makes choices that allow "the greatest bang for the buck." This principle should and can be applied to choices within the educational sector, according to the article. (NB)

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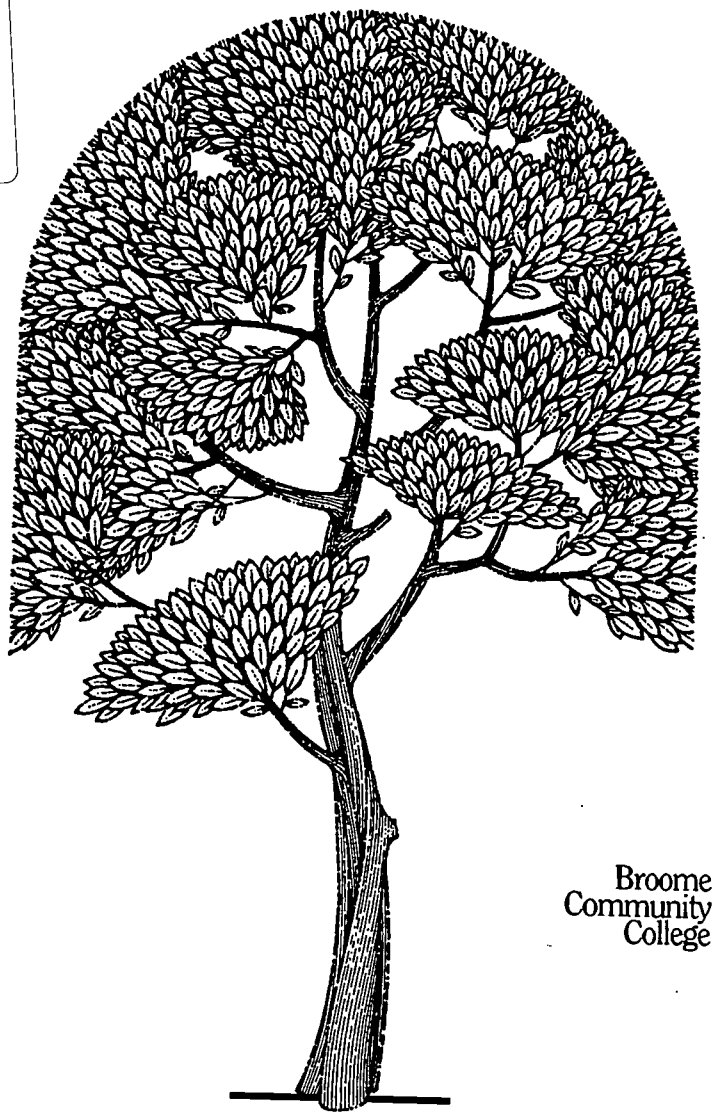

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COUNTING BEANS AT THE COMMUNITY COLLEGE:

AN EXERCISE IN ECONOMIC RATIONALITY

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COUNTING BEANS AT THE COMMUNITY COLLEGE: AN EXERCISE IN ECONOMIC RATIONALITY

Richard M. Romano

In an article published sometime ago, I reported on a retention study that I had conducted at my community college in up-state New York (Romano, 1995). As part of that study I made the general observation that, when faced with the question of whether to allocate more resources to retention efforts, one needed to utilize a cost/benefit rationality. In particular, I questioned whether the costs of additional retention efforts were worth the additional benefits at my own college which, my study had shown, had a fairly high retention rate.

When the editor of the journal sent my article out for review, one critic remarked that "there was still plenty that could be done to retain students at the community college level." After publication of the article, I received a few letters that followed the same train of thought. One letter stated that "my arguments would harm community college students and lend support to the Republican bean counters who wanted to cut funding for public education." Another letter contained the phrase, "I don't think we can ever spend too much... [to retain students]."

I will not admit to being a Republican. However, I certainly am a bean counter; so are my critics. It is just a matter of which beans you are counting. My critics only want to count the benefit beans, while I argue for counting the costs as well as the benefits. Reverting to my role as a teacher, I offer here a brief primer on the economic rationality that underlies my thinking. As such, this paper provides a conceptual framework within which a broad range of choices can be better understood.

Economic Rationality

When economists look for criteria that can guide the allocation of resources, they turn to the principles of efficiency and equity. Efficiency does deal with producing a good or service at the lowest possible cost but is more generally concerned with how to use scarce resources to achieve a given objective. Improving efficiency depends not only on costs but also on what we get for our money. Resources in society are efficiently allocated when the total benefits from producing something exceeds, as much as possible, the total costs. Producing beyond this point means that the additional costs (usually referred to as marginal costs) exceed the additional benefits (usually referred to as marginal benefits), thus leading to lower efficiency. Equity concerns are less precise and have to do with issues of fairness and the distribution of income in society. Because income in every society is unevenly divided, tax monies, for instance, to support higher education might be justified on the grounds that not everyone has a fair opportunity to go to college. However, the exact amount of subsidy for this question cannot be calculated in any precise way, and ultimately its level becomes a political question related to how much the polity wants to redistribute income in the society.

The critics of my article mentioned above were no doubt motivated by concerns over equity but were nonetheless using the efficiency criteria in considering the benefits of an expanded retention program. The feeling that additional resources should be devoted to an activity as long as any benefits are generated suffers from two fallacious views of human nature. The first is that resources are unlimited and therefore costs do not matter. The second is that people, individually or collectively, all value education or health, or any other good or service, equally. In writing about the arguments that flow from these

two fallacies, Victor Fuchs, a well-known health economist at Stanford University, has labeled them as either romantic or monotechnic in nature (Fuchs, 1974, p.19). These viewpoints come out clearly when debating national health care policy but can also be related to policy decisions in education at the national, local, or campus level.

Romantic and Monotechnic Views

As Fuchs argues, "the romantic view [confuses] the real world with the Garden of Eden" (Fuchs, p. 5). It assumes that resources are unlimited in relation to human wants and, therefore, that tough choices do not have to be made with respect to the allocation of those resources. If not enough resources are devoted to education, for instance, it is not because we do not have the resources but because something structurally within the society is blocking their flow. Problems might thus be blamed on faculty unions or something grander, such as the class structure of society, or the way technology is used or controlled. This view of the world can be found among the more aloof critics of the community college. Pincus (1980) and Brent and Karabel (1989) seem to be good examples. (See Dougherty,1994, for a review of this literature).

The monotechnic viewpoint is more likely to be encountered within the structures of organizations themselves. It is the reasoning displayed by the critics of my paper on retention. According to this view, most problems have a technological aspect, and those trained in that technology should be allowed to find the solutions to those problems. Thus, the engineer wants to build the best road possible, the physician wants the best-equipped hospital, and the educator wants to have the highest quality education or the best retention program technically possible. This is not to say that every problem has a technological fix but only that the best (optimal) solution is "the highest level technically

attainable, regardless of the cost of reaching it" (Fuchs, p.19). The shortcoming of this view is that "it fails to recognize the multiplicity of human wants and the diversity of individual preferences" (Fuchs, p. 5). The optimal use of society's scarce resources, as seen by the physician, engineer, or educator, "may not be optimal for society as a whole because it requires resources that society would rather use for other purposes" (Fuchs, p.5).

In contrast to the romantic and monotechnic views, economic rationality is concerned with balancing the societal costs and benefits of the many demands made upon our scarce resources. Within this framework, the social optimum is not the highest level technically attainable but rather the point at which the benefit from an additional increment of education, for instance, equals the cost of the resources used to get that increment. Politicians are faced with such choices when they allocate public spending. Should we expand education, the prisons, or health care? In principle, in a rational world, these decisions would balance the costs and benefits of each choice in an effort to generate the largest total benefits from the multiple wants of the society. Even within organizations, the same sorts of choices apply. Given a spare million dollars to spend on the campus level, should it go into expanded maintenance, retention efforts, or faculty lines? "In principle the solution is to be found by... relating the incremental yields [benefits] of any particular program to the incremental cost of the program and then allocating resources so that the yield [benefits] per dollar spent ... is the same in all programs" (Fuchs, p. 20). It would help to flesh out this principle with a few hypothetical examples.

A Model of Consumer Choice: The Equi-marginal Principle.

The principal of equality at the margin, mentioned above, involves a simple form of cost/benefit analysis and can most easily be illustrated by the choices which we all make as consumers in the market place. Once illustrated, this principle can then be applied to the choices within other sectors, including education.

Let us assume that a hypothetical consumer has $10 to spend and is faced with a choice of purchasing three different goods: A, B, and C. Let us further assume that our consumer is equipped with a mental calculus which allows her to calculate precisely the additional benefits she would receive from consuming each additional unit of each good. A rich literature in economics has shown that such precision is not really necessary for the example to work but it does make the illustration easier to understand.

In the table below, we call the additional satisfaction (benefit) gained from consuming each additional unit of the good the marginal utility of that unit. Marginal means extra or additional and utility refers to satisfaction. Thus, the consumer would get 10 units (utils) of satisfaction from consuming the first unit of A (MUa= 10) and an additional 8 utils from the second unit of A (MUa= 8), etc. If she consumed both units of A (say, two apples), her total satisfaction would be 18, so we can see that total utility is different than marginal utility. In principle, what the consumer wants is to obtain the highest total utility (satisfaction) possible from the $10 that she has to spend. This kind of analysis does not require much of a stretch in our thinking, since we can all agree that in our consumer choices we are simply trying to get the most satisfaction out of what we have to spend. In fact, all of our choices do not have to relate to the consumption of goods but could easily apply to other uses of our $10. Thus, good C in our example might represent

saving, or good B might be the satisfaction we get out of giving a dollar to our church. But let us stick with our goods example for now.

Table 1 The Utility Maximizing Combination of Goods A, B, and C

Price of A =$1			Price of B= $3			Price of C= $1		
Units of A	MUa	MUa / Pa	Units of B	MUb	MUb / Pb	Units of C	MUc	MUc / Pc
✔ 1	10	10	✔ 1	24	8	✔ 1	7	7
✔ 2	8	8	✔ 2	21	7	2	5	5
✔ 3	7	7	3	18	6	3	4	4
4	6	6	4	15	5	4	2	2
5	5	5	5	12	4	5	1	1

If we look at the MU column for each of the three goods, we notice that MU declines with each additional unit. That is, for the first unit of good A it is 10, for the second 8, etc. This is what economists call the law of eventually diminishing marginal utility. Empirically it has been shown that, after a certain point, the additional satisfaction one gets out of consuming each additional unit of a good decreases (total utility increases but at a decreasing rate). Faced with the above set of choices, it is rational for our consumer to buy 3 units of A, 2 units of B and 1 unit of C (see check marks). Allocating her money in this way would give her the highest total satisfaction possible (77 utils).

How did we arrive at this conclusion? For purposes of illustration, let us say that in the beginning the consumer is faced with buying the first unit of either A, or B, or C. The first unit of B really looks good because it will deliver 24 utils of satisfaction, but notice that B costs three times as much as either A or C. Price or cost really does matter. Given the difference in price, the relevant measure becomes, not the MU per se, but the

marginal utility per dollar (MU/P). If we calculate this, we get the figures in the third column for all three goods.

Looking at the MU/P, we can see that the first unit of A gives the "greatest bang for the buck" (10), so she will choose to buy it first. The next choice will be either the first unit of B or the second unit of A. Since both give her 8 utils of satisfaction per dollar, she would buy them both. By choosing in this manner, her ten dollars will yield 77 utils of total satisfaction when she buys 3 units of A, 2 of B and 1 of C. No other combination of A, B, and C will yield a higher level of satisfaction. We can show this mathematically. At the start of our experiment we had the following condition:

MUa/Pa> MUb/Pb> MUc/Pc, for the first units of A, B, and C

As she selects each unit, she brings the MU/P for each good into equilibrium, because of the law of eventually diminishing marginal utility. The end result is that:

MUa/Pa = MUb/Pb = MUc/Pc; once 3 of A, 2 of B and 1 of C are consumed; MU/P = 7

Thus, by following her own rational desire to maximize her satisfaction the consumer obtains the "optimum" use of her money with her given income. She gets the "greatest bang for her buck," by making choices so that the marginal utility per dollar spent is equal for all choices. This is the equi-marginal principle. Economists like to play with this example. By changing the price (P) and perceived benefits (MU) of the choices we can show how the mix of A, B, and C will change.

Now, one might think that all of this talk about utils of satisfaction is nonsense. People do not stop to calculate marginal utilities when they go into a store to buy products or when they decide to save a few dollars for future consumption. While it is certainly true that no one is capable of placing exact values on the amount of satisfaction they receive from consuming various units of certain products, the theory presented here does, in a general way, describe the basic rationale behind consumer behavior. It is not unreasonable to assume that consumers attempt to use their limited incomes to maximize their happiness, nor that they make crude marginal comparisons of costs and benefits in deciding how to allocate that income. In fact, most decisions involve cost/benefit comparisons such as this and are made quickly and unconsciously based on our experience. The validity of the theory does not depend on the precision that we have used in our example but only requires that we are able to predict the way in which consumers, or other decision makers, tend to behave, and this it does. We can now expand this principle to questions of social choice using education as an example.

Educational Examples

A college faced with budget decisions is not concerned with marginal utility per dollar spent but rather with marginal benefits per dollar spent. Converting the concept of MU into marginal benefit (MB) is an easy task for economists (see Byrns & Stone 1987, pp. 186-87) and yields the same mathematical relationships shown in the consumer model above. In this conversion, MU is replaced by MB and price is replaced by marginal cost (MC). From this point we can move to examples of social choice, which draw on the

principles explained in the consumer choice model. Consider the following examination style question:

> Assume that you are the director of admissions charged with recruiting more students to your college. The administration has given you an additional $50,000 to spend during the current year for this purpose. Discuss how you (the economist) would go about deciding how to allocate this money in an optimal way. Your alternatives might include 1) an advertising campaign on local television, 2) increased visits to regional high schools, 3) publication and distribution of new printed materials to all graduating high school seniors, 4) etc. In principle, how would you go about allocating the $50,000 budget so as to maximize the number of students recruited to your campus?
>
> Note: Don't tell me which one you think will work best, but rather assume that you know the MB of each choice. (Hint: The answer is shorter than the question).

The answer is: In an ideal world, you cost out each option and, assuming you can calculate the additional benefits in terms of student enrollments, you allocate the budget so that the last dollar spent on each option yields the same marginal benefit, or as close to this optimum as you can get. If you do that, you will get the greatest "bang for your buck" possible. This is quite different from saying that because all of these methods work, we should allocate money to each of them. In the latter case, the recommendation

violates the equi-marginal principle and would result in a less than an optimal outcome. Students of choice theory will see that we could have designed a hypothetical example in which an equal amount spent on each option would have been optimal. However, such an outcome would be highly unlikely in practice.

Expanding this example from the departmental level to the issues faced by the college president we can envision a broader range of decisions. As an example, let us say that the biology department wants more money to buy microscopes, the admissions department wants more money to recruit students, and the maintenance department wants money to buy a new truck. How should these allocation decisions be made? Again, in principle, a rational administrator needs to consider the costs and benefits of each choice and then allocate the money so that the college gets the greatest benefit out of the money it has to spend. Any activity should be expanded as long as the MB>MC, or in other words, the expected marginal (additional) benefit is greater than the expected marginal (additional) cost. We may not have enough money to get to this exact point, but we can say that we should certainly not undertake projects if we are convinced that MC>MB.

From a practical standpoint, we can say that the choices we make as consumers, or in the workplace, involve this kind of informal cost/benefit thinking even though we seldom reach the level of precision displayed here.

What about the retention question that I opened this paper with? Again, reverting to my role as a teacher, with the examples I have given, you should be able to construct a table of hypothetical choices. When you construct your table, remember the law of diminishing marginal benefits. Extrapolating from our example of consumer behavior, the law states that the more money we put into a given program the lower the yield. That is, the first

$1000 spent on student retention yields the greatest marginal benefit and subsequent chunks of money spent on retention yield smaller marginal benefits per dollar spent. Looking at this from a cost perspective, the cost of saving the first 10 students is low but the next 10 cost more, etc. The marginal costs per student retained rise the further and further you dip into the pool of attriters because they are the more difficult ones to help. At some point spending more money on retention, admission recruiting, etc., generates very little benefit per dollar spent. Quoting from my original article on retention "in a world of limited resources, the relevant question is not whether additional intervention strategies will generate any benefits, but whether these benefits will justify the additional costs" (Romano, p. 175).

Decisions, Decisions

Should the federal budget use the nation's scarce resources to expand the navy or health care; should the state government spend more money on prisons or schools; should the college allocate more funds to the retention effort or building maintenance? We can not have everything we want so we are forced to make choices. Rational choices involve the balancing of benefits and costs at the margin.

We hope that community college administrators are predisposed to this type of mental calculation. This does not mean that money or FTE's are the only things that count. All benefits and costs need to be considered and we must accept that they can not all be monetized in the simple way that we have illustrated. Neither does this analysis imply that efficiency always wins out or necessarily should. The economics of a competitive market economy and its attendant mentality drive us in the direction of efficient

solutions; but other values wrapped up in political, moral or ethical issues often should, and do intervene. Sometimes we give up a little efficiency for the sake of equity.

Economists, nevertheless, often feel that too many decisions are made which reflect only short-run emotional considerations or political expediency and which use evidence selectively to support positions that are favored by one group or another. This approach is unacceptable to us since it does not reflect a more rational decision process based on a cost/benefit rationality. This paper has tried to specify in precise terms what underlies this economic rationality and to place educational choices within the general framework of choice theory. For, as the most famous economist of the twentieth century once said, "... soon or late, it is ideas, not vested interests, which are dangerous for good or evil." (Keynes, p. 384).

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