

Market and Non-Market Values in Cost-(Benefit) Analysis.*

Xavier Martinez-Giralt
Universitat Autònoma de Barcelona

October 1999

Abstract

This note overviews some aspects of the evaluation of costs in the economic evaluation of projects in the health care sector. Some particular implications of aging are also emphasized.

CORRESPONDENCE ADDRESSES:

Xavier Martinez-Giralt
CODE and Departament d'Economia
Universitat Autònoma de Barcelona
Edifici B
08193 Bellaterra
Spain
Fax: 34-93-581 20 12
Email: xavier.martinez.giralt@uab.es

*The author acknowledges the financial support of research projects SGR98-0062 and HP98-0057. The usual disclaimer applies.

1 Introduction.

In the recent past years we are witnessing an increasing pressure to keep control of the expenses generated in the health care systems of the European Union. A very good account of these efforts can be found in Mossialos and LeGrand (1999); a recent appraisal on the setting of targets in health cost control are Cohen (1999) and White (1999). Two of the main alleged factors behind the inflation in the cost of the health care system are the technological development and the aging of population. Also, the financial constraints imposed by the completion of the European Union implies an extra element of pressure. One consequence of the situation is that budgets are tighter and therefore the need for a proper economic evaluation of the use of the resources available is mandatory. One of the best known and most commonly use method of economic evaluation is the so-called *cost-benefit analysis*. It consists in comparing for every alternative program, the discounted future stream of benefits and costs, what is called the *net social benefit of the program*. For those projects yielding a positive net social benefit, a ranking is proposed in order to allocate a given budget. Accordingly, a proper evaluation of the alternative programs implies a proper study of the costs and consequences involved.

Here, we will address three questions focused mainly on the cost side of the problem:

- What is included in the estimation of costs: the costs at the hospital, the social costs, the costs to the individual?
- In the cost-benefit analysis, commodities are assigned the value that we assign to them through our choices on the (free) “market place”. But most markets are neither free, nor ideal. To consent in a market is not identical to consent to a market. Can these latter considerations be included in the

cost-benefit analysis? How?

- Can we put a price on everything? is everything a commodity that is for sale if only the price is right? life, honor, rights, embryos, human tissues...If not, there are certain things that will be difficult or impossible to include in the economic analysis.

The task of evaluating different projects has a long tradition in many sectors of the economy, such as transportation and environment. Nevertheless, the peculiarities of the health care sector does not allow a direct application of the analysis of those other sectors. Health care has many distinctive features although is not unique in any of them. Rather, it is the particular mix of features and the sheer number of them: uncertainty, insurance, information problems, non-profit firms, restrictions on competition, role of need, government intervention (subsidies and public provision) are a sample of them.

We will start with a description of the contents of economic evaluation. We will find different techniques of evaluation. All of them have in common the evaluation of costs. Next, we will focus on the cost analysis, and will see particular implications of aging in the evaluation of costs.

2 Basic Types of Economic Evaluation.

Any agent involved in the management or administration of health services make questions regarding,

- *who* should do *what* to *whom*;
- what resources are available;
- what spill overs within the health sector and to other sectors appear.

To answer these questions we need to compare the resources used by a programme (i.e. its costs) with the health improvement provided by the program (i.e. its consequences). In other words, we need to perform an evaluation of health services. Specifically, this means that we have to provide an answer to a series of questions (see Drummond et al. (1997) regarding the *efficacy*, *effectiveness* and *availability* of the program. First, efficacy refers to whether the program can work. When the answer is positive, then we proceed to the effectiveness which refers to whether the program does work. To answer the question often we will rely on the medical literature taking into account what adjustments should be made, the quality of the information available and its relevance for our problem. Again when we obtain a positive answer, the proceed to verify the availability, that is to check whether the program reaches the population targeted. When these three questions are satisfactorily answered, we still have to impose a second filter regarding more economically oriented questions. In particular, we have to ask ourselves whether the program worth doing compared with alternative uses of the same resources. This is what economists call the *opportunity costs* of the program. Finally, we will address the question of the *optimality* of the program, i.e. whether the resources are spent in the best possible way.

From these questions, it follows that to carry out an economic evaluation we need to

- clearly identify the relevant alternatives;
- clearly define the viewpoint to use in the analysis;
- clearly estimate the opportunity costs and compare with benefits of the program

We will come back to these points below. At this point we can propose a definition:

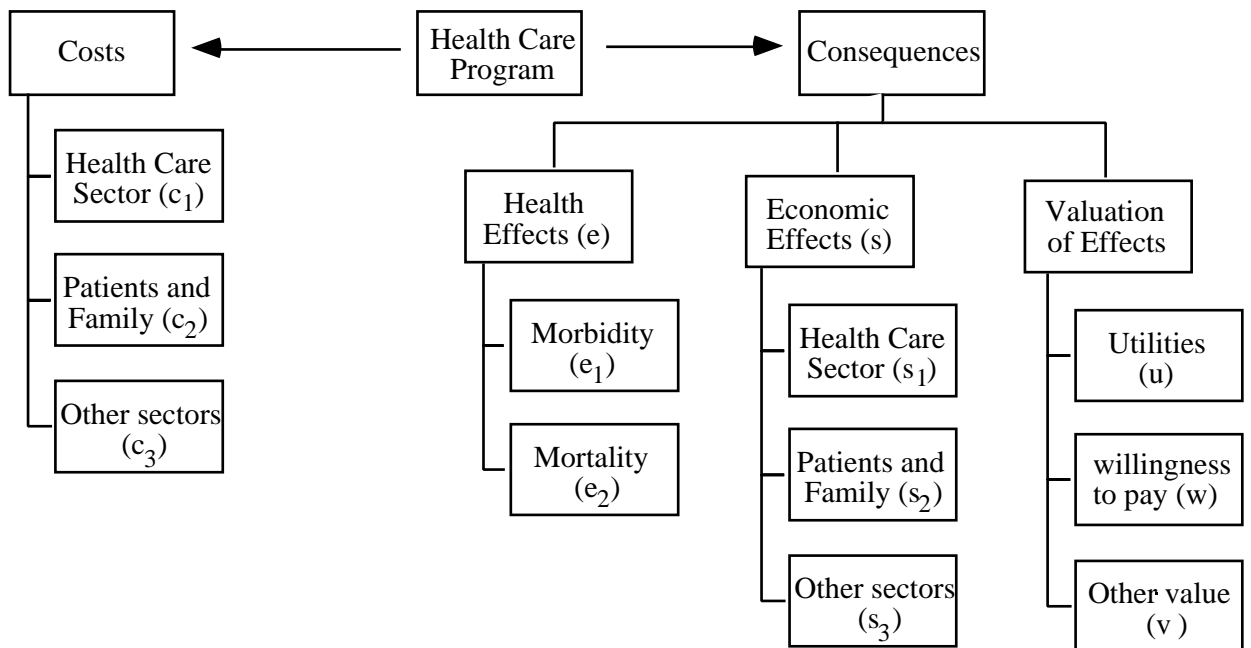


Figure 1: Components in Economic Evaluation of Health Care

Definition 1. *Economic evaluation is the comparative analysis of alternative courses of action in terms of both their costs and consequences.*

Accordingly, we can distinguish two fundamental components in the economic evaluation in health care: costs and consequences. Figure 1 (see Torrance (1986) and Drummond et al. (1997)) illustrates them.

Within the costs we should distinguish the costs associated to the health care sector containing, costs of physicians, hospitals, drugs, etc. (c_1), to the patient and family, including the cost of lost production and leisure (c_2) and to other sectors (c_3). We will describe these elements in detail below.

On the consequences side, we can distinguish three categories: identification, measurement and valuation.

First, the health status of the patient will change as a consequence of the program. This can be measured in terms of the effects, e (i.e. life-years gained,

COMPARISON OF COSTS AND CONSEQUENCES					
		NO		YES	
		ONLY COSTS	ONLY CONSEQUENCES		
C O M P A R I S O N	A L T E R N A T I V E S	NO	COST DESCRIPTION		OUTCOME DESCRIPTION
	YES	EFFICACY OR EFFECTIVENESS EVALUATION	COST ANALYSIS	COST-MINIMIZATION COST-EFFECTIVENESS COST-UTILITY COST-BENEFIT	

Figure 2: Techniques in Economic Evaluation.

disability days reduced) and we can value those effects either in terms of utility, u , (health state preferences) or in monetary terms, w , (willingness-to-pay).

Second, the health care program may spill over other value (v) such as information on one's health, alternative treatments, etc.

Finally, the health care program may allow to save resources to the health care sector (s_1), to the patient and family (s_2) and to other sectors (s_3).

Depending on the way alternatives, costs and consequences are combined, different economic evaluation techniques may be identified. Figure 2 shows them (see Drummond et al.(1997)).

Focussing on the measurement of costs and consequences figure 3 identify the main characteristics of each technique:

MEASUREMENT OF COSTS AND CONSEQUENCES			
TYPE OF STUDY	MEASUREMENT/ VAL. OF COSTS	IDENTIFICATION OF CONSEQUENCES	MEASUREMENT/ VAL. OF CONSEQUENCES
Min Cost	\$	IDENTICAL	NONE
CEA	\$	SINGLE EFFECT OF INTEREST COMMON TO ALL THE ALTERNATIVES	NATURAL UNITS/ NONE
CUA	\$	SINGLE OR MULTIPLE EFFECTS NOT NECESSARILY COMMON TO ALL THE ALTERNATIVES	QALYs/ COST PER QUALY
CBA	\$		\$

Figure 3: Characteristics of some techniques.

The *cost minimization analysis* deals only with costs without taking any consideration for the consequences. It is therefore a partial form of economic evaluation. In terms of the elements of economic evaluation defined above, it only compares the costs with the savings that the program may generate:

$$(c_1 + c_2 + c_3) - (s_1 + s_2 + s_3).$$

The *cost-effectiveness analysis* considers not only the costs but also the effects on the improvement of health obtained:

$$[(c_1 + c_2 + c_3) - (s_1 + s_2 + s_3)]/e.$$

Similarly, the *cost-utility analysis* relates costs to health state preference scores

$$[(c_1 + c_2 + c_3) - (s_1 + s_2 + s_3)]/u.$$

Finally, the *cost-benefit analysis* ascertain the total amount that individuals would be willing to pay for the program, and compares it directly with the costs to assess

whether the program is worthwhile.

$$(w + v + s_1 + s_2 + s_3) - (c_1 + c_2 + c_3).$$

To help clarifying these different techniques to approach the economic evaluation of alternative programs, let us make some considerations.

Cost-effectiveness analysis determines a cost-effectiveness ratio. Accordingly, as we have seen in the figure above, its results are expressed in terms of natural units such as euros per life-year gained. Accordingly CEA is useful only in comparing alternative programs measuring its effects in the same units, but it is not useful in assessing a single program because there is nothing to compare the cost-effectiveness ratio against.

Cost-utility analysis is a special form of CEA where the measure of effect is QALYs gained. The advantage of CUA over CEA is that it uses a common unit of measure, allowing thus, comparisons across programs. In particular, CUA is appropriate when the quality of life is a main issue of the program.

Cost-benefit analysis determines the social net benefit of the program. Its decision rule is very simple: all programs yielding a positive social net benefit qualify to be implemented. Also the actual value of social net benefit of each program serves to rank them and thus propose an order of implementation when the budget constraint does not allow to put forward all the programs. CBA is the most complete technique to evaluate programs, although is not free from serious criticisms (see Klarman (1982)).

A simple account on how to perform these three different techniques of analysis as well as the information requirements involved can be found in Jacobs (1997, chapter 15), while a more advanced approach is Zweifel and Breyer (1997).

3 Cost Analysis.

As we have just seen the analysis of the cost component is common to all techniques of economic evaluation. I will follow Drummond et al. (1997) for its account.

In looking at the evaluation of costs of one or several programs, there are four basic questions to be considered: (i) What costs should be considered?; (ii) What costs should be included?; (iii) How costs should be estimated?; (iv) How accurate does costing have to be? In this section we will answer these question in turn.

3.1 What costs should be considered?

As illustrated in figure 1, there are three categories of costs.

First, we have the costs directly related to the health sector. These are the hospital resources (i.e. treatment, bed days, out-patient attendance, overheads, etc) and the Community care resources (GP visits, nurse visits, ambulance, etc).

Second, we consider the costs borne directly by the patients and their relatives. Here we find the time taken in receiving treatment and off work, the time of the relatives nursing, accompanying the patient to the hospital, and the out-of-pocket expenses such as transport fares, meals in the hospital, etc.

Finally, we must include the resources in other sectors such as the social worker visits, nursing home help, volunteers time, etc.

3.2 What costs should be included?

Having identified the sources of costs in health care programs, now we have to define the particular range of costs to include in a given study. To do so, we should take into account several points.

Viewpoint of analysis. Possible viewpoints include that of the patient and family, the hospital, the health care sector, the entire health and social services

sector including education, and the global (societal) viewpoint (see Torrance (1986)). Depending on the viewpoint adopted in the study a particular item may or not be regarded as a cost. For instance, the expenses of the relatives of the patient will be a cost if we adopt a societal point of view. But they will not if we look at the problem from the perspective of the Ministry of Health instead. The off work compensation payments represent a transfer from the government to the patients (in a public health system). Therefore, from the point of view of the society is neither a cost nor a gain, while it is a cost for the government and a gain for the patient.

Short run vs long run. It is also relevant to take into consideration whether the program being evaluated (as well as its alternatives) are of immediate application, in which case common costs need not be considered, or the different programs start their operations at different moments. We will elaborate on this point below.

Justify exclusion of “irrelevant costs”. If we have reasons to think that considerations of some costs will not add any significance to the results of the analysis, it may be worth ignoring them, thus saving some time, effort and resources. Nevertheless, it is equally important not only mentioning these ignored costs but provide a sound justification as well.

Order of magnitude. Similarly as in the previous item, it is not worth devoting time effort and resources considering costs whose weight in the overall evaluation is not going to be relevant for the result of the study. Again though some justification should be provided.

Opportunity costs. Any decision to spend resources in a particular activity implies (under a budget constraint) that other activities will not be performed. It is therefore crucial to consider also the “opportunity costs” of the given

program (and its alternatives) in the evaluation of the costs of a particular program.

Non-market goods. Finally, Volunteer time, donations and other types of contributions for which there is no well-defined market should also be taken into account.

3.3 How costs should be estimated?

Once we have identified the costs relevant for the study, we have to measure them. We can distinguish two possible situations, according to whether there is a market or not for the particular component of cost we are trying to estimate.

The health care market, like most real markets, is not perfect. Some hospital may enjoy a local monopoly situation; Prices of drugs sold in the market are far from competitive due to the market power exert by pharmaceutical laboratories, etc. Consequently, prices do not reflect opportunity costs. Ideally, we would like to estimate opportunity costs, and if we have enough information we will want to do it. Nevertheless, very seldomly this will be the case and we will have no alternative left than using market prices and quantities as proxy values for the real ones.

The situation is fairly different when markets do not operate. This may be due to the fact that the agents involved take their decisions in a different institutional framework or to the pure non existence of an institution where to take decisions.

In the first case we find all the negotiation procedures between e.g. a pharmaceutical laboratory and a hospital to set the price of drugs. Also, some wages are negotiated between the unions and the government, etc.

In the second case, where there is no market (or any other institutional arrangement) to coordinate the actions of the agents involved, we have to distinguish between say “marketable” goods and “non-marketable” goods. For instance, vol-

unteer time and leisure time of the patients and their relatives are difficult to assess. We may appeal for instance to the market price of overtime work. Alternatively, we could try to compute shadow prices for these goods and services (see below).

We may also think of situations where people sell kidneys, blood, and other organs as well as embryos, human tissues, etc. A recent example of this is a posted kidney in the web page of e-Bay (until it was retired by the organizers) reaching an amazingly high price. These situations involve non-marketable goods and their inclusion in the analysis can be rejected on two grounds. First, from an ethical point of view, the values supporting our (western) society do not accept such trade.

Another more problematic aspect of the problem is the evaluation of costs in projects giving rise to new developments in biotechnology such as cloning of species, applications of the knowledge of the DNA chain, etc. The problem here is that the society is still debating the values of these developments on different grounds, philosophical, scientific, moral, and their applications (at least those that we are able to imagine so far). In this sense, I do not think we can include them in the analysis so far.

Second, from an (more cynical) economic point of view, we should expect sellers of organs to be individuals in the lower segments of income, with on average (and neglecting the debate on the direction of the causality) a worse health status. This is a segment of population often targeted by the health care programs. The allowance of such trade would imply a further worsening of the average health status and thus a supplementary source of increase of expenses in the health sector.

In any case, even if we do not include these elements in the analysis, it may be useful to report them. The time span of the project has to be carefully identified, because two alternative treatments may yield very different costs at hospital discharge time, but there is the possibility that the treatment with the lower cost

requires patients receiving additional treatment subsequently. See below on the discounting of future costs to present values.

Capital costs represent an investment usually at the beginning of the program (i.e. is a stock not a flow of resources). Two elements have to be taken into account. The opportunity costs, that is, the lost opportunity of using the funds in an alternative investment plan, and the depreciation over time of the capital. Also, the possibility of future use of the capital will affect the overall valuation of the cost of capital.

There are different definitions of costs addressing different aspects of how costs are considered. We find *total costs*, *variable costs*, *fixed costs*, *overhead costs*, *average costs* and *marginal costs* among the most important ones:

Fixed costs, FC are those elements of cost we have to incur even if no production takes place (e.g. the rent of the building where the Activity is supposed to take place)

Variable costs, VC(q) are the costs dependent on the level of production. The more output we produce the more inputs we need. Thus this is an increasing function in the level of production.

Total costs, TC(q) are the sum of the fixed and variable costs.

These three concepts are appraisals of costs on absolute terms. Although useful, the information they provide is incomplete. We also need some relative measures of costs:

Average cost, AC(q) is a measure of the cost per unit of production. It is computed as the ratio between the total cost and the total output, $TC(q)/q$. In the same fashion we can compute the “average variable cost” as the variable cost per unit of production.

Marginal cost, $MC(q)$ is an incremental measure of cost. It gives information of how cost evolves as production varies in small units, $\partial TC(q)/\partial q$.

Finally, whenever there are shared costs with other services, departments, etc. (think e.g. of the laundry costs in a hospital) we need to impute the part of those costs that are due to the particular activity of the department. These are the so-called **Overhead cost**.

Figure 4 shows a particular representation of those costs and some relationships among them. In particular, $\tan \alpha$, the slope of the ray going from the origin to the total cost function at the production level q_0 , represents the average cost at the output level q_0 ; $\tan \gamma$, the slope of the total cost function at the production level q_2 , represents the marginal cost at the output level q_2 ; $\tan \beta$ identifies a production level q_1 where both average and marginal costs coincide, and average cost is at its minimum; finally, the minimum of the marginal cost is reached at the output level q_0 .

An user-friendly presentation of all these concepts can be found in Folland et al. (1997) and Jacobs (1997)).

To make the difference between marginal and average cost sharp, think of an extreme case as follows. In a hospital both the emergency service and the pediatrics service are of the same dimension in number of beds and nurses assigned. For some reason, the emergency service is fully occupied while the pediatrics service is only at half capacity. The average cost of a patient in the emergency service is lower than in pediatrics. If a new patient arrives at the emergency service, the marginal cost is extremely high, while if a kid is admitted in the pediatrics service the marginal cost is zero.

Also of importance is not to forget to impute the part of the overhead costs to the program. Although this is not always easy, a good criterion consists in computing how much such costs would have changed shouldn't the program be

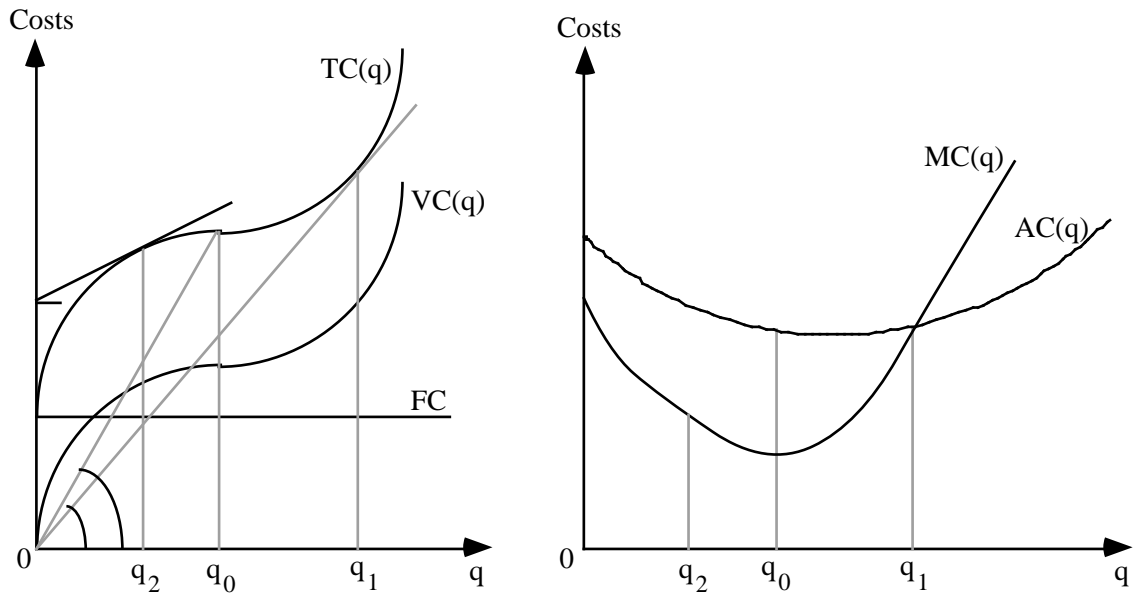


Figure 4: Different concepts of costs.

implemented (i.e. a marginal analysis).

3.4 How accurate does costing should be?

The more accurate the estimation is the more time consuming and, thus, the more costly. Therefore, we usually face a trade-off between the quality of the data we want to collect and the resources we need to do it. A rule-of-thumb to solve it is: “Do not make the perfect enemy of the merely good”.

3.5 Different timing of costs.

As we have mentioned earlier, we have to take into account the fact that different programs may have different timings of costs and consequences. Thus, computing costs at a particular point in time may be misleading.

Also, as important, we envisage the different time preferences of the agents

involved in the decisions. That is to say, regardless of the presence or absence of inflation, different individuals may prefer to have access to programs or facilities the sooner the better just because “life is short”, “the future is uncertain” (a bird in the cage is worth hundred flying), people may expect to be wealthier in the future so an euro today would be more valuable than the same euro in the future, etc.

Let us consider an example where two projects span their effects through three years but with different profiles of costs. The costs en each period are reported in the following table:

Year	Cost of A	Cost of B
1	5	15
2	10	10
3	15	4
Total	30	29

If we sum up the costs of each program as such, we see that project A is more expensive than project B. We must note the different structure of cost of both programs. While program A requires little investment the first year, more than half of the cost of project B is spent the first year. To take these effects into account we can discount future costs to present values, that is to express the costs to be paid in future periods in terms of what we would have to pay should the activities involved would take place today. The general formula doing it is

$$P = \sum_{n=1}^N F_n (1 + r)^{-n},$$

where P stands for the present value, F_n represent the future cost in period n , and r is the interest (discount) rate.

Interestingly enough if we discount future cost to present values at a discount rate of 5% we obtain the opposite result, namely that the present value of the cost of project A ($P_A = 26.79$) is smaller than the present value of project B ($P_B = 26.81$).

Three comments are in order here. First, the fact that discounting cost varies the ranking of projects is not general, second the formula as has been used reflect the criterion that expenses are computed at the end of the periods. We could consider the alternative criterion of computing expenses at the beginning of the period in which case the formula would look,

$$P = \sum_{n=0}^{N-1} F_n(1+r)^{-n}.$$

In the particular example we have presented, the ranking is not affected by the use of either criterion. Finally, whenever a discounting is applied, there is the problem of choosing the discount rate r . In the literature there are different criteria to estimate the value of r . Following Pearce (1971) let us assume that all benefits and costs are discounted at the same rate, and such rate remains constant over time. Three different approaches have been proposed in the literature to derive a value for the rate of discount. (i) the *social rate of time preference*, r , which is a measure of society's willingness to forgo consumption today in order to have greater consumption tomorrow; (ii) when public projects are involved, we may consider the *social opportunity cost*, that is, the discount value for use in public projects should reflect the rate of return forgone in the displaced project (usually in the private sector so that the appropriate rate of discount is the rate of return on marginal projects in the private sector, denote it by k); (iii) finally, since in general we will have that $r < k$, and both rates are relevant to the public investment decision, we may want to compute a "synthetic" rate reflecting both influences.

To illustrate these arguments consider a project over two periods. Figure 5 measures in the axes the consumption possibilities (C_1, C_2) in every period, TT' represents the transformation frontier, i.e. the rate at which investment in period 1 can be transformed into consumption in period 2; SS' represents a (representative) social indifference curve between consumption in period 1 and in period 2.

Assume that in period 1 investment is given by TK . In turn, such investment

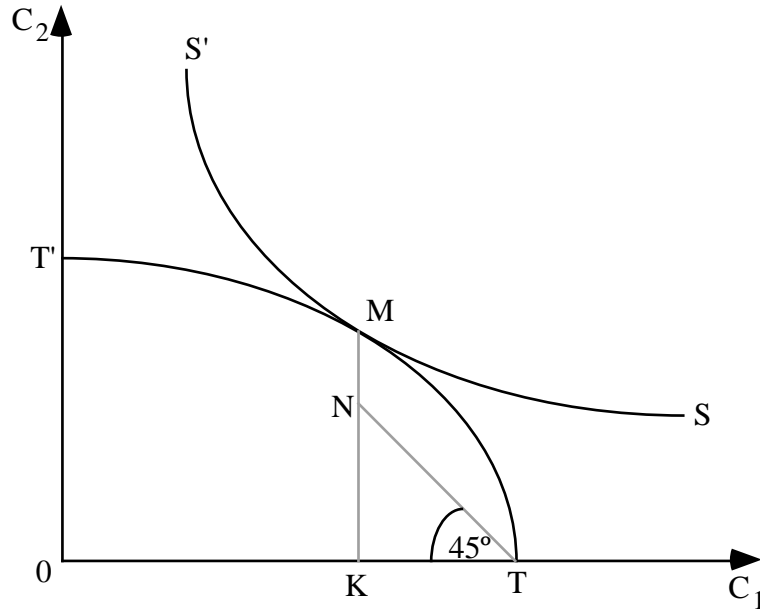


Figure 5: The choice of a discount rate.

yields a consumption possibility of MK in period 2. Also, assume that the level of consumption in period 1 is OK .

On the one hand, the slope of the TT' curve at the point M is approximated by the ratio MK/TK . Since $MK = MN + NK$ and $NK = TK$ it follows that MN represents the net productivity of capital (that is to say, its rate of return over cost). Therefore,

$$k = \frac{MN}{TK} = \frac{MK - NK}{TK} = \frac{MK - TK}{TK} = \frac{MK}{TK} - 1.$$

On the other hand, the slope of SS' at a given point is approximated by the ratio of marginal utilities $MU(C_1)/MU(C_2)$. Since by assumption society prefers present to future benefits, that ratio will be greater than one and we can write,

$$\frac{MU(C_1)}{MU(C_2)} = 1 + r,$$

where r represents the weight to today's consumption compared with tomorrow's

consumption. In other words, i is just the society's time-preference rate:

$$r = \frac{MU(C_1)}{MU(C_2)} - 1.$$

At the point M it turns out that $MK/TK = MU(C_1)/MU(C_2)$ so that $r = k$. Hence, in equilibrium the social time preference equals the opportunity cost rate, so that the three approaches mentioned above collapse into a single one. The problem is that the economy usually is not in equilibrium...

In practical terms there are also two alternatives. One is a convention to consider a rate of 5%. Given that it is a convention it has the advantage of making different studies easier to compare. The alternative is to consider the shadow price of capital, estimated around 3%.

3.6 On shadow prices.

The notion of shadow prices is linked to the problem of maximization of an objective function under constraints,

$$\max_{x,y} f(x, y) \text{ s.t. } g(x, y) \leq k \text{ and } h(x, y) \leq q$$

that we can express through an auxiliary lagrangian function as

$$\max_{x,y} L(x, y) = f(x, y) + \lambda(k - g(x, y)) + \mu(q - h(x, y))$$

To illustrate, think of $f(x, y)$ as the number of patients treated. This depends on the equipment available (x) and the labor used (y). In turn, we face two restrictions, a budget constraint k and the time available q .

Figure 6 illustrates the point, (where, for simplicity, constraints are drawn as linear functions and the objective function is assumed quasi-concave).

Graphically, the two restrictions defines the set of points that are feasible for the objective function. Analytically, for each restriction we introduce a so called "lagrange multiplier" that represent the rate of change of the objective function

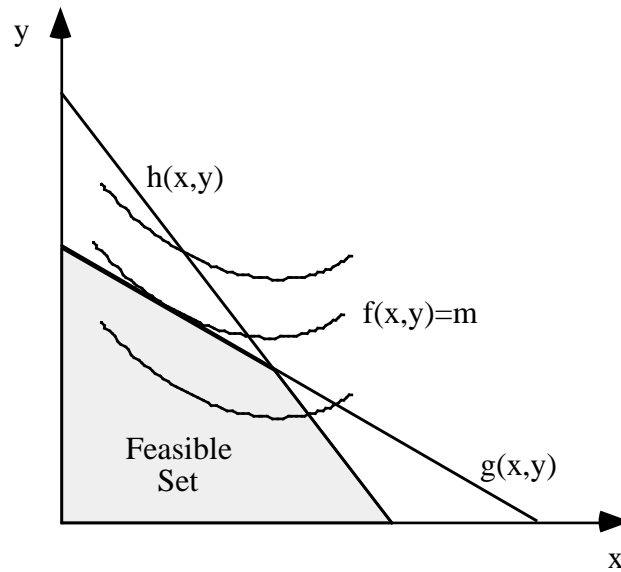


Figure 6: Shadow prices.

with respect a change in the restriction. That is to say, they represent how many more resources would be necessary if we want to achieve a value of the objective function beyond m . In other words, λ and μ evaluate this cost. This is what economists call shadow prices. When the constraint is binding, the shadow price will be positive; if, on the contrary, the resource requirement does not exceed availability, then the restriction will not be binding and the associate lagrange multiplier will be zero.

In order to actually compute these shadow prices, we can use questionnaires, survey data etc. to assess would have been willing to pay for the good or service should a marked have existed.

4 Some additional remarks.

Along the arguments that have been presented, there is an implicit assumption fairly fundamental. This is that any economic evaluation assumes that resources

that are freed from a program are *efficiently* relocated in other programs. Given that some of the difficulties to evaluate costs (and benefits) arise because of the imperfection of the markets, it is certainly short sighted to assume that what even though we are not certain to be able to allocate the resources in the best possible way, we have no problem to reallocate those resources efficiently.

One aspect of the problem we have not introduced is related with the incentives of the patients and the way they can distort the allocation of resources. For instance, there seem to be some evidence among patients with kidney problems, that those following the treatments properly are the last to be transplanted¹. This is so because those others that do not follow the treatment become more severe and thus are push forward in the waiting list. In turn this misbehavior may have a positive aspect if the aim of a program for patients with kidney problems is to maximize the life years of the population of patients. Those patients following the treatments properly will on average live longer, while the only way to lengthen the life of the others is by transplantating a new kidney as soon as possible.

5 Final remark.

To finish in a similar way as we started, I would like to come back to the financial problems of the westerns countries to maintain the expenditure levels both in social security and health care. One standard blame for this is the aging of the population in our countries.

I think this argument so popular nowadays in the media requires a strong qualification. First of all, it is true that as population ages, the demand for social security and health care funds increases. It is also true that as population ages, the productive possibilities of the economy are lower. But it is also true that ag-

¹I am grateful to Ines Macho-Stadler for her comments on these issues in a private communication.

ing means that the proportion of young population gets lower and lower, which in turn imply that there is also lower demand for education and health care. A careful survey of the economic consequences of the population aging is Denton and Spencer (1998, 1999).

Whether how much one type of effects offsets the other is a matter of estimation in each country, but in any case what it is clear is that there is a *shift* in demand, not just an increase in demand. This is precisely the big problem that governments should face: how to shift effects within budgets to accommodate rising demands of some kinds and falling demands of others?

Incidentally, it is important to mention that aging is a slow process, and therefore it is not fair to blame it as THE cause of the present financial problems. Also, there are already suggestions of delaying the retirement age from, say 65 to 70. Is anybody trying to solve the problem by revising the concept of aging?

References

- Cohen, A.B., 1999, Hitting the 'Target' in Health Care Cost Control, *Journal of Health Politics, Policy and Law*, **25**(4), pp. 697-704.
- Denton, F.T. and B.G. Spencer, 1998, Economic Costs of Population Aging, QSEP report No 339, McMaster University.
- Denton, F.T. and B.G. Spencer, 1999, Population Aging and Its Economic Costs: A Survey of the Issues and Evidence, QSEP report No 340, McMaster University.
- Drummond, M.F., B.J. O'Brien, G.L. Stoddart and G.W. Torrance, 1997, *Methods for Economic Evaluation of Health Care Programmes*, Oxford, Oxford University Press.
- Folland, S., A.C. Goodman and M. Stano, 1997, *The Economics of Health and Health Care*, Upper Saddle River, NJ., Prentice Hall.
- Jacobs, Ph., 1997, *The Economics of Health and Health Care*, Gaithersburg, Maryland, Aspen Publishers.
- Klarman, H.E., 1982, The Road to Cost-Effectiveness Analysis, *Milbank Memorial Fund Quarterly/Health and Society*, **60**(4), 585-603
- Mossialos, E. and J. LeGrand (eds.), 1999, *Health Care and Cost Containment in the European Union* Aldershot, Ashgate Publishing Ltd.
- Pearce, D.W., 1971, *Cost-Benefit Analysis*, London, MacMillan Press
- Torrance, G.W., 1986, Measurement of Health State Utilities for Economic Appraisal. A Review, *Journal of Health Economics*, **5**, 1-30.
- White, J., 1999, Targets and Systems of Health Care Cost Control, *Journal of Health Politics, Policy and Law*, **25**(4), pp. 653-696.
- Zweifel, P. and F. Breyer, 1997, *Health Economics*, New York, Oxford University Press.