

**ECONOMIC ANALYSIS OF HEALTH SECTOR PROJECTS—
A REVIEW OF ISSUES, METHODS, AND APPROACHES**

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Foreword

The Asian Development Bank *Economic Staff Paper Series* presents the results of selected preliminary research undertaken by the Economics and Development Resource Center. It is designed to stimulate discussion and critical comment on socioeconomic issues facing the developing countries of the Asian and Pacific region. It is hoped that in some small way the discussion generated by the series will increase our understanding of the development process in the region.

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Contents

Abstract	vii
I. Introduction	1
II. Key Issues	2
A. Setting Out Project Objectives	2
B. Macroeconomic and Sector Context	3
C. Justifying Public Sector Involvement	5
III. Methods and Approaches	11
A. Macroeconomic and Sector Context, and Project Economic Rationale	12
B. Demand Analysis	12
C. Analysis of Alternative Project Designs	14
D. Cost-Benefit and Cost-Effectiveness Analyses	15
E. Quantification and Valuation of Costs and Benefits	17
F. The Role of the Counterfactual in Measuring Net Benefits	21
G. Valuing Redistribution (Equity) Benefits	22
H. Project Sustainability Analysis	22
(1) Fiscal Impact	23
(2) Cost Recovery and Allocation of Subsidies	24
(3) Risk Assessment—Institutional Capacity, Stakeholder Analysis and Incentives	24
IV. Conclusions	26
References	28

List of Boxes

1	Key Steps in the Economic Analysis of Health Sector Projects	13
2	Analytical Tools for Economic Evaluation of Health Projects	17
3	Examples of Potential Benefits from Health Projects	19
4	Examples of Measures of Performance for Health Sector Projects	20

Abstract

The paper asserts that project designs and benefit valuation in the health sector are much more complex than in other sectors that traditionally apply economic cost-benefit analysis. Economic analysis should therefore begin at the early stage of project development. Improved project economic analysis provides a strong basis for choosing between project alternatives and program and project approaches. The selected option to meet the likely demand for project activities is further evaluated to examine their worth from the point of view of the national economy and long-term sustainability. Increased attention to the extent of cost recovery and the analysis of budgetary implication issues likewise enhance prospects for project impact and sustainability.

The paper discusses the key issues in the economic analysis of health sector projects and then presents possible approaches pertaining to demand analysis, analysis of alternative project designs, project framework analysis, cost-effectiveness analysis, cost-benefit analysis, and project sustainability analysis.

I. Introduction

Health sector planning poses a series of unique and difficult issues. Unlike other sectors, there is no tradeoff in health sector activities, as they are involved in addressing very delicate issues such as treatment of illness or avoidance of illness, both involving human lives and having implications for human resource development. Moreover, the trend towards liberalization, market orientation, and privatization is reshaping the way projects are identified, designed, and evaluated. In this changing environment, the rationale for public involvement, either in investment projects or in policy aspects such as regulation, incentive mechanisms, capacity building, and good governance, must be strong. Likewise, the alternative to public provision must be properly established.

The other complexity is the typology of health sector projects. Health sector projects are heterogeneous requiring different approaches to different types of projects. Such complexity may demand additional project preparation resources. In addition, until recently, economic benefits in health sector projects have been methodologically difficult to value and some of the basic input data have been unavailable. In view of these considerations, project designs and benefit valuation in the health sector are much more complex than in other sectors, especially those sectors that traditionally apply economic cost-benefit analysis such as infrastructure and utilities.

Economic analysis begins at the early stage of project development, for example, in the analysis of the health sector and in the identification of projects. Demand analysis and analysis of project alternatives and least-cost options are two key activities at the early stage of health sector project preparation. Improved project economic analysis thus provides a strong basis for choosing between project alternatives and program and project approaches. The selected option to meet the likely demand for project activities is further evaluated to examine their worth from the point of view of the national economy and long-term sustainability. Increased attention to the extent of cost recovery and the analysis of budgetary implication issues likewise enhance prospects for project impact and sustainability.

In general, the purpose of economic analysis of health sector projects is to ensure that: (i) resources are allocated efficiently; (ii) the project provides sufficient returns or benefits on investments; (iii) sufficient funds and institutional capabilities are available to make project operation sustainable; (iv) the distribution of project benefits and costs is consistent with project objectives; and (v) there is adequate consideration of social and environment concerns.

The paper¹ is based on the review of literature in health sector economic analysis in general and in particular methods and approaches applied by multilateral development banks like the Asian Development Bank (ADB), the World Bank, and bilateral development agencies such as the United Kingdom Department for International Development (UK-DFID) (see ADB 1987, Over 1991, Barnum 1996, Hammer 1996, Preker et al. 1996, and UK-ODA 1996).

¹This paper draws on an "Issues Paper on Economic Analysis of Health Sector Projects", of the Economics and Development Resource Center. Many ADB staff contributed to the paper by way of providing comments and suggestions. However, the core team was led by Ramesh Adhikari, senior economist; the staff consultant was Professor Paul Gertler, University of California at Berkeley, and Anneli Lagman, economics analyst, provided research support.

Economic evaluation of projects is one of the most important aspects of project processing in all multilateral development banks and most bilateral donors, and considerable attention has been paid to developing guidelines or handbooks (see, for example, Asian Development Bank 1987, 1997; Devarajan et al. 1996; Inter-American Development Bank 1996; Squire 1988; UK-ODA 1996; and World Bank 1991, 1994, 1995, 1996 and 1998). The major objectives of the guidelines are to ensure that (i) project design yields high rates of return as possible to the project investments; (ii) projects are justified in terms of correcting market failures and are consistent with government objectives; and (iii) projects do not underperform because of nonmarket failure, i.e., they are not implemented correctly and managed efficiently, and benefits are not captured by nontargeted groups (e.g., the nonpoor).

II. Key Issues

A. Setting Out Project Objectives

The first task is to define the objectives of the proposed project or program. Without clear objectives, it is difficult to identify alternative project designs, apply appropriate quantitative and qualitative analytic tools, and design performance criteria. Objectives should identify and quantify the goals of the project, the beneficiary group, the intervention mechanisms by which the project will pursue the goals, and the time frame.

Project goals should be couched in terms of improving welfare and may or may not be focused on general health outcome issues such as improving children's nutritional status, reducing mortality, and reducing the overall burden of disease. Examples of nonhealth outcome goals include lowering the risk of uncertain economic costs of illness, i.e., improving insurance; and improving equity in access to medical care by the poor, ethnic minorities, and women. Projects could also be designed to improve "sector efficiency." However, these projects really intend to improve performance so that programs become more efficient in pursuing their intended goals. This is an example of correcting a nonmarket failure that limits public activities ameliorating market failures.

Intervention mechanisms are policy levers and programs by which the project will try to meet its goals. Examples include expanding immunization programs, improving human waste disposal, building public health clinics in rural areas, training medical personnel, and strengthening social insurance programs. Interventions should have clear linkages to project goals. For example, expanding child immunization rates is clearly linked to reducing infant and child mortality rates, or expanding mandated social insurance programs is clearly linked to improved insurance coverage.

The targeted beneficiary groups should be clearly identified and linked to the specific interventions. For example, if the goal is to improve child health outcomes, then projects designed to improve in-patient hospital services may not be the most appropriate. Or, if the project is focused on improving the poor's access to medical care, then the project should be investing in services used by the poor or expanding services to areas where the poor live.

The objectives should be placed in a realistic time frame. A realistic time frame is necessary to construct performance monitoring criteria and build realistic expectations especially in long-term projects that do not have immediate payoff. Many projects try to

institute long-term changes, which will continue after the loan project is over. In addition, the goals of many projects may not be feasible with a three to five-year project life (e.g., dramatically improving life expectancy and chronic morbidity rates). Also, projects aimed at improving program efficiency may not have immediate payoffs in terms of health outcomes for a long time.

Clear benchmarks should be laid out for what to expect at the end of the project in terms of successfully implementing the intervention and attaining the welfare goals of the project. These benchmarks should be discussed in terms of what to expect with the project and without the project. For example, projects designed to improve health outcomes by making health centers more efficient should state the efficiency improvements to be completed by the end of the project. Projects designed to lower certain types of illness rates through expanded immunization should identify the time frame for expanded coverage and lowered illness rates.

B. Macroeconomic and Sector Context

In many cases, the true effect of project funds may have little to do with the specifics of the project being proposed. Governments may have intended to carry out the projects anyway and the additional money from the loan simply allows them to finance another project, which they consider of marginal importance. Regardless of the project being appraised, the project actually being funded is the one that would not have been done if the project funds were unavailable. This is because funds are fungible across purposes so that their actual use is different from their formal accounting.

The most rigorous way to assess the use of funds is to look at how the additional project funds affect total budget allocations. If the project being appraised would not have been funded without the loan, then that is the project being funded. The most obvious concern is where project funds simply reduce government allocations to the health sector and fund instead education or energy or other budget demands. More subtle cases concern the effect of project funds on allocations within the health sector. For example, since the 1977 Alma Alta conference, the international public health community has stressed the need to shift resources to basic primary care, and this has been the focus of much of the donor assistance to developing countries since then. However, when government allocations across programs are examined in total (local funds plus donor assistance), we find that only small portions of their budgets go toward primary care activities and that these proportions have been stable over time (Peabody et al. 1997).

Whether the primary care paradigm is the right one or not, the fact that actual allocations differ indicates that government priorities differ from those of donors. It is quite likely that governments felt that project funding could be used to fund basic primary care services, leaving Ministry of Health (MOH) funds to satisfy other pressures from their political constituencies or stakeholders for the provision and subsidy of urban tertiary services. Indeed, a recent review of the effect of foreign aid on public expenditure patterns found that aid earmarked for the health sector reduced infant mortality, while the government's own health expenditures did not (Feyzioglu et al. 1996). This is consistent with the fungibility argument in that donor funding for the international community's priority, primary care that affects infant mortality, freed up government funds to be used for other kinds of services, such as hospital care, which have less impact on infant health.

These problems arise when donor priorities differ from government objectives and when MOH objectives are not shared by the government as a whole. Appraisals must document that project objectives are government priorities. Project objectives should be derived from, and placed in the context of broader development and government objectives. Good project evaluation should document that the project's objectives are encompassed in government plans, but that implementation is constrained by funding. These objectives may be explicitly stated in a government plan or implicitly through a public investment program. If possible, appraisals should conduct an analysis of disaggregated health sector budgetary and expenditure trends to assess how the project's objective fits into overall government objectives. Finally, the appraisal should quantitatively document that there is demand for project activities, including consideration of the case where there is substantial user charge financing.

The key to a sector analysis is having conducted thorough sector reviews. Typically, good projects are developed in the context of an analysis of the country's health sector frequently conducted as part of technical assistance projects. Good sector analyses help government sort through priorities, identify projects in the context of priorities, and provide the basic data to appraise projects and assess the risks. Indeed, in a statistical analysis of the success of World Bank projects, Schneider (1995) shows that the number of sector reports contributed significantly to project success. Controlling for other factors, he concludes that one study in a sector increases the probability of the project's success by 9 percent and two studies by 16 percent.

In the health sector, Preker et al. (1996) cites a number of key studies that have been found to be useful including: (i) prescriptions of utilization patterns by income, age, and geographical location; (ii) estimates of price and income elasticities of demand and willingness to pay for improved care; (iii) epidemiological studies of specific illnesses and burden of disease studies; (iv) studies of the financial and organizational structure of delivery and pharmaceutical systems; (v) evaluation of manpower supply and demand; (vi) evaluations of quality of care; (vii) estimates of public and private provider costs and efficiency; (viii) the nature of competition between public and private providers; (ix) an assessment of institutional issues related to the provision and financing of services; and (x) assessments of health information and management systems.

It is also important to point out that much of the work in developing a project is to help governments in sorting out their objectives and plans. In many cases, governments do not have plans or have seriously flawed plans and, therefore, have not been able to sort out a set of realistic and achievable set of goals and priorities. Projects are much riskier in these environments. Not only does the real use of project funds become muddled, but the basic information necessary to do an appraisal is not present. Good sector work identifies these situations and leads technical assistance projects to help strengthen government's capacity to develop plans and priorities.

The analysis should also identify whether there are any major macro and micro distortions that could affect the outcome of the proposed project. For example, in countries with low participation rates in formal labor markets, improving the income tax system or the introduction of a national health insurance system may be an essential prerequisite. The extent to which individuals are able to use new facilities depends on the transportation system. Investments in improving drug supplies will only affect health outcomes if individuals have the education to use the drugs properly.

In some cases, the analysis should also consider the impact of the project on the macro-economy. For example, expanding national health insurance through increased payroll taxes may push marginal income taxes very high. This may impede economic growth strategies and policies. On the positive side, control of infectious diseases that affect adults may improve worker productivity and reduce absenteeism. Improving sector efficiency and control over expenditures may reduce the burden on the government.

Some projects require a multisectoral approach to ensure a significant impact on outcomes. Synergies exist between activities in health, education, social protection, nutrition, population and reproductive health, such that investment in one area can have positive benefits in others. For instance, investment in girls' education is associated with delayed childbearing, which will have an overall effect on fertility and women's health. Investment in water and sanitation also reduces water-borne disease. Social protection plans that increase income are associated with increases in nutritional status among children in poor families. Investments in early childhood development have positive health benefits later in life. In the limit, investments in health projects may not be sufficient to improve health status without parallel activities in other sectors.

C. Justifying Public Sector Involvement

The recent reviews and revisions of the economic analysis of projects have focused on the importance of strengthening public justifications (see ADB 1996b, 1997; Devarajan et al. 1996; World Bank 1995). In addition, public sector rationale has a major focus of re-examination of the economic analysis of health sector projects at the World Bank (see de Ferranti 1985, Hammer 1996, Hammer and Berman 1996, Preker et al. 1996, and Musgrove 1996).

The lack of consideration of the distortionary cost of funds can lead to a public delivery bias. When the public sector is just as good at delivering a service as the private sector and there are no market failures, then the distortionary cost of funds implies that it is more efficient to use the private sector or at least recover the full costs of providing the service. This implies that only projects that ameliorate market failures should be funded so that the increase in social value is greater than the distortionary cost. The lack of consideration of the distortionary cost of funds has led to the gross overstatement of project and program returns.

In allocating their limited budgets, government officials and program managers must use the resources wisely and get as close as possible to their goals within a fixed budget. Whether delivered through the public sector or private sector, most government programs involve subsidizing some particular activity so that the price paid by the consumer is below the cost of supplying that service. However, as indicated above, subsidies are not costless and this needs to be kept in mind when developing subsidy policy so that governments are sure the project's net benefits are larger than the distortionary cost of subsidies. This raises the question of when should governments subsidize services so as to lower prices below the cost of providing the service. Indeed, the role of subsidies in Bank projects has received substantial attention and is discussed at length in the Board Information Paper on Bank Criteria for Subsidies (ADB 1996a).

Projects financed through loans fit into a government portfolio of public programs. Projects and programs are financed through a combination of loan funds, allocations from

the government budget, and user fees. Loan funds and allocations from the general budget are (eventually) paid for through taxes, which may create distortionary costs somewhere in the economy. This marginal cost of funds, which is associated with raising revenues from the least-distortionary tax instrument, should be included in the costs of the project. Estimates in the literature put these costs at 30-50 percent of the tax in industrial countries and even higher in developing countries (Devarajan et al. 1996). Although the essence of such argument for including the opportunity cost of public funds in project economic evaluation is commended, it has not been fully operationalized in the practice of multilateral development banks, including the World Bank.

For most services and commodities, there is a certain “rightness” about the level of use (demand) when consumers face a price reflecting the true resource cost of producing it. People ask themselves “is it worth buying the commodity?” given all the other things they can do with their money. If the answer is yes, then they get more value out of it than it costs society to produce it. If not, then they decide to spend their money on something else that they think is more worthwhile for the price. Individuals don’t purchase goods or services whose prices exceed the value the person places on them. Similarly, if someone is in a position to provide a good or service, he or she will do so only if the price exceeds the cost of making it. So prices tell both producers and consumers how much something really costs to produce and how much people really value it.

What’s wrong with this picture? For any of several market failure reasons, the amount demanded or the value placed on goods may not be “right”. The value to society for seeking care or providing a service may be higher than that privately judged by the individual. If this is the case, then society benefits if more people use the service than they would based on individuals’ private benefits. This justifies public subsidies to lower the price.

Optimal policy needs to be based on what is best for furthering social objectives subject to the limits imposed by medical, behavioral, and economic constraints. There are three general groups of objectives often cited: (i) improving health status; (ii) improving equity in terms of access to medical care; (iii) and improving individuals’ insurance against the risk of large financial losses due to unexpected ill health (Hammer and Berman 1996). Using project funds to pursue these objectives, as with government intervention in any sector, needs to be justified in terms of the benefit the investment would have for society above and beyond what would have happened without public intervention. The way to assess the benefit of a proposed public intervention is to identify the failures of private markets and quantify the loss from these failures. Priorities should be based on the degree to which the subsidy ameliorates these losses, and the importance governments place on the types of losses and the individuals who incur the losses. Important market failures in the health sector that justify public subsidy are public goods, inequity in access to medical care, and insurance market failure due to asymmetric and uncertain information (de Ferranti 1985, Musgrove 1996).

It is not enough to say that there are market failure justifications for the project. The specific project activities need to be linked to the justifications and government objectives in the sector. For example, with improved health as the objective, there is scope for governments to provide, with or without subsidies, health services that the private sector is unlikely to provide. The most obvious candidates for government undertaking are public goods. A pure public good is one for which a private market cannot exist at all because beneficiaries cannot be made to pay for benefits (nonexcludable) and one person’s benefits

are not reduced by others benefiting as well (nonrivalrous). In the health sector, the best examples would be some forms of vector control (e.g., draining swamps), some forms of sanitation, especially in urban areas, and the provision of health information and education for activities such as washing hands which have no product associated with them for which advertising would promote. Research, epidemiological surveillance, and monitoring food and drug safety are other examples. A health service has a positive externality if its use generates benefits to society above and beyond the benefit to the private individual. The most common externality in the health sector comes from prevention and treatment of infectious diseases. For example, the use of pesticide-treated bednets can reduce the incidence of malaria even among those who do not use such bednets, suggesting that the societal benefit from bednets can be greater than the private benefits (Tropical Disease Research Program 1995, Lengeler et al. 1996).

Left to their devices, individuals will prevent and treat infectious diseases less than what is socially optimal. Many individuals are not willing to pay the full cost of immunization because they know that they will be protected if enough people get immunized. Individual immunization thereby confers a benefit to those who are not immunized. Even with worthwhile medical benefits to individuals, the cost may impede the early seeking of treatment to prevent the spread to other individuals, or the completion of the full course of treatment. The consequence of not completing drug therapies may not only lead to a resurgence of the disease, but also to an increase in transmission and the risk of promoting resistance. For example, tuberculosis is a virulent, communicable disease, and although the drug therapy is both available and effective, it is expensive. Individuals feel better after partial treatment and tend to want to stop treatment long before the course of drugs is completed. They remain a public hazard as they can still transmit the disease.

Other public goods are applied and operational research and generation of information. Research on the adoption and use of new medical technologies in a country setting clearly benefits more than the researcher. In addition, there are few private markets that will generate the household-level epidemiological and socioeconomic information as well as the health provider information needed to design projects and manage health sectors.

Another implication is that governments should not invest in projects where a market exists and is functioning well. If the private sector provides an acceptable and affordable alternative to a public service, there is little justification for the public sector to be involved in subsidizing that specific service. This situation is most likely to exist in the market for outpatient services and drugs for treating noncommunicable diseases. In this case, the benefits of treatment accrue mostly to the individual and therefore there should be a private market for these services. Subsidies however may be justified only for vulnerable populations who have no access to private providers like in remote rural areas where private sector profits are too low.

Health sector projects can also be justified in terms of improving access to care for particularly vulnerable groups such as the poor, women, and children. Most countries recognize that poor individuals may not be able to afford health care and therefore subsidize their access to care. In countries where health care is delivered through public delivery systems, public subsidies are used to keep user charges low so that even the poorest families can afford medical care. Support for this use of public subsidies is often based on the idea that nobody, regardless of income, should be denied access to basic minimal health care. While these commitments are not boundless, they are pervasive throughout the world. This

has important implications in that redistribution policies are an inseparable part of health care policy. Unless private health care and insurance markets are able to guarantee universal access, governments will intervene and subsidize certain services and groups to varying extents.

However, health sector projects should not have general poverty as their primary objective as the health sector is not a good vehicle for general poverty alleviation programs. Studies of the demand for medical care show it to be an income elastic good (see Gertler and van der Gaag 1990, Baker and Van der Gaag 1993)². This means that the rich spend a higher fraction of their income on health care than do the poor. Therefore medical care subsidies accrue more to the rich than the poor. There are other goods that are more income-inelastic (e.g., food) and would be better vehicles for general poverty alleviation.

Projects whose major objective is to improve equity should subsidize services used more heavily by the poor. These are the services for which demand is income inelastic. One method is to subsidize the prevention and treatment of infectious diseases. Since the poor tend to suffer proportionally more from infectious diseases, subsidizing their treatment and prevention not only meets public health objectives but also improves the distribution of public subsidies across income groups (Murray et al. 1992). Basic principles of targeting (Besley and Kanbur 1993) suggest that if the costs of treatment are the same, then reallocating subsidies from noncommunicable diseases to the prevention and treatment of communicable diseases would better target public subsidies to the poor.

As a general rule, redistribution projects should subsidize services for which demand is income inelastic. Services for which demand is inelastic means that demand does not increase much with income and that these services are used more by the poor. For example, in Viet Nam the demand for commune health centers is highly income-inelastic, while the demand for hospital care is income-elastic (Gertler and Litvack 1996). This means keeping subsidies high at health centers, and low for hospital outpatient services will better target subsidies to the poor. The Viet Nam results are likely to be true in most countries, i.e., that the demand for health center care is the most inelastic with respect to income, especially in rural areas. This suggests that projects that use funds to improve quality of health centers in rural areas best target subsidies to the poor.

Projects motivated by equity concerns also need to focus on the structure of fees used for cost recovery. Redistribution projects need to consider price discrimination policies that charge lower fees to the poor.³ There are a number of ways to do this. The most common method is based on means testing at the time of treatment. However, administrative costs and past practical experience make it ineffective in most countries. The problem is how economic well-being can be measured in an economy where majority of the population pays no income tax and where a good portion of economic resources is home-produced. Without accurate, fast, and administratively simple methods of identifying poor individuals, an individual exemption mechanism may exempt too many people and consequently sacrifice substantial revenues. More importantly, identifying the poor when they come for treatment is costly and extremely difficult to do. The general consensus in the literature is

²The best candidates for redistribution via subsidies are goods and services that have low or negative income elasticities of demand, i.e., those goods and services whose use does not increase with income. These are the things that poor people tend to consume relatively more than other things.

³As discussed earlier, even if the government is not concerned with equity, there are still good reasons related to the desire to improve health to price discriminate in favor of the poor.

that facility-based individual exemption programs in the health sector are too costly, very difficult to administer, and typically are not good at identifying the poor across all regions of the developing world (see Booth et al. 1995, Chaulagai 1995, Ensor and San 1995, McPake et al. 1993, Mwabu et al. 1995, Nolan and Turbat 1995, Richardson et al. 1992, and Vogel 1988).

In general, the pricing structure should have lower fees (and higher subsidies) if the patient enters the system at the lowest level, and progressively higher the further up the system the patient enters. If an individual first goes to the health centers and requires a higher level of care at the hospital, then registration fees are waived (or at least lower) at the hospital. Thus, this pricing structure provides an affordable portal of entry into the health care system through health centers and allows those willing to pay to bypass the commune health center and go directly to higher levels of care. Since it is the nonpoor who are willing to pay to bypass the lower levels, they will be charged higher prices and receive lower subsidies. An alternative method of implementing a pricing policy that protects the poor is geographic targeting. This policy aims to tailor the fee structure to the socioeconomic composition of the population served by each facility.

Finally, the classic reason for most developed countries to intervene in health markets is the inherent uncertainty in health status (Arrow 1963). The uncertainty is compounded the longer one looks into the future and the less one knows about one's current health. While most families are able to finance routine care out of their own budgets, most are not able to finance the rare but expensive incidents. In fact, in all countries, expenditures on health care are extremely skewed in that a quite small proportion of the population accounts for a large fraction of total expenditures. Therefore, while most families have only small expenditures in a given year, a relatively small number have very large expenditures.

Given aversion to risk, individuals would prefer to have predictable health care expenditures. Predictable health care expenditures relieve the worry of how one will finance costly unexpected illnesses and allow families to better plan other consumption. Thus, individuals will seek to insure themselves against the financial loss associated with uncertain illness. Without formal health insurance, individuals would have to finance the losses out of accumulated savings, transfers from relatives and friends, credit markets, or help from charities.

Despite the demand, most individuals are unable to buy insurance from private sources due to market failure from adverse selection (Rothschild and Stiglitz 1978). Adverse selection arises from insurers not being able to observe heterogeneity in the population regarding health status. Individuals are born with different genetic make-ups, making them more or less predisposed toward certain illnesses, and with different life course experiences with respect to exposure to environmental contagion and hazards. For both reasons there is substantial variation in the propensity to become ill. Because insurers do not observe each individual's propensity to become ill, they cannot write individual-specific contracts, but rather are forced to offer the best community-rated insurance plans. The terms of these contracts can be quite unfavorable to relatively healthy individuals. The good risks tend to subsidize the bad risks, and the value of the insurance to the good risks, or healthy people, drops significantly. The incentive is for the good risks to drop out of the market, leaving the bad risks to insure among themselves, thereby substantially driving up the cost of insurance, making it a financially bad deal for both insurers and beneficiaries. Frequently, they are so bad that the market fails to exist at all.

The opposite problem is “risk-rating” or “cream-skimming” which occurs when individuals of poor health are observable. Competing on their ability to select good risks leads insurers to avoid insuring individuals with “pre-existing” conditions such as cancer or AIDS, who are “certain” bad risks and will have predictably high medical care expenditures. Insurers do not want to provide these individuals with coverage at the community rated (average) premiums. Instead they either explicitly deny coverage or effectively deny coverage by charging a premium approximately equal to the cost of care. In many high-risk cases, the actuarially fair cost of insurance (expected expenditures plus a loading factor to cover administrative costs) may be prohibitively expensive, leaving these individuals effectively uninsured.⁴

Insurance market failure due to adverse selection and cream skimming occurs when insurance is voluntary rather than compulsory. These problems do not occur when everyone is in the insurance pool. Most countries correct the insurance market failure either through a universal public system with subsidized low prices, or through compulsory social insurance in which the poor’s enrollment is subsidized, or a combination of the two.

Public intervention in insurance markets is justified because private markets are unlikely to supply adequate insurance because of adverse selection. While this might justify expanding mandatory social insurance programs, it also justifies projects that support hospitalization. Insurance principles suggest that subsidies should go to the services that provide care for the rare, high-cost illness that wreak the most havoc on family budgets. In public systems, this means that heavily subsidized public hospitals provide insurance against large financial loss associated with a catastrophic illness.

Given that the relatively wealthy are the ones disproportionately using hospital services under current systems, there is a distinct tradeoff between equity and efficiency in subsidized hospital care. This can be mitigated by enforcing strict referral rules requiring very high charges for those entering hospitals directly, but with generous exemptions for those who are properly referred.

As a result, insurance motivations for government intervention are at odds with other values such as improving health outcomes or ensuring equity. Services that improve health outcomes the most are grouped as public health expenditures and include immunization campaigns and preventive care. Finding services that benefit the poor entails looking at what services they use and the income elasticity of demand. Such services include the prevention and treatment of infectious disease and primary care delivered at health centers in rural areas. Protecting the poor from financial risk because of illness argues for subsidizing the network of public hospitals that already consume generous shares of the public sector’s health budget. In essence, subsidies to hospitals provide catastrophic health insurance.

Information about the efficacy value of preventive and curative medical care is complex and difficult to assess. Many times one only learns the value after having used medical care. In addition, there is imperfect information on the relationship between individual behavior and health outcomes (e.g., smoking, alcohol and drug use, and unprotected sex). When there is limited information about values and risks, individuals may engage in too

⁴This problem is exacerbated given that insurance contracts are written for limited terms (e.g., one year). Over time as more and more high-risk individuals contract serious illness, the number of high-risk individuals able to obtain insurance declines. With population aging increasing the number of individuals with long-term chronic illnesses, and improvements in genetic testing and long-range diagnosis, the number of individuals denied coverage can only grow.

few preventive actions and engage in too many riskier behaviors because they do not fully understand the risks and the value of prevention. With respect to curative care, patients must rely on the advice of providers, many of which face financial incentives that conflict with their agency relationship. In these cases, there is a role for government in providing information so that individuals can make informed decisions. However, it is important to note that individuals may still engage in risky behavior even when they fully understand the risks, because the expected return may still be higher than the expected costs.

The distortionary costs of public subsidies require that project activities generate social and private benefits greater than the marginal cost of funds. Project activities need to be justified in terms of the benefit the investment would have for society above and beyond what would have happened without public intervention. The benefit of a proposed public intervention is the degree to which the subsidy ameliorates the losses from market failures, and the importance governments place on the types of losses and the individuals who incur the losses.

III. Methods and Approaches

General scarcity of investible resources and the increased squeeze on public expenditure have provided extra impetus for economic analysis techniques to be more widely promoted in health sector projects. Economic analysis techniques are used in looking at priorities and alternatives in a more systematic manner and also in improving efficiency in the allocation and use of scarce resources within existing health sector activities. The parameters behind an economic analysis framework are those of scarcity of resources (i.e., the cost side); and competing needs (i.e., the benefit side). Economic analysis sets out a framework for comparing the resources (costs) used in a particular intervention with the expected outcome (benefits) resulting from it. It takes a view that generally those projects and programs with the highest outcome (or benefits) to costs ratio are the most appropriate to carry out. Essentially the process is analogous to any decision-making approach, which compares the advantages (benefits) and disadvantages (costs) of alternatives.

Project economic analysis as practiced by multilateral development banks goes beyond just the comparison of costs and benefits of a health care project to assess equity implications and project sustainability. The purpose of these additional analyses is to make sure that the project benefits reach the targeted population, and the project activities, including the delivery of quality health care services, are sustained throughout the project life so that the envisaged economic benefits are realized. ADB (1987)⁵ recommends three major considerations in health project economic analysis:

- (i) Macroeconomic considerations, or review of the health care system and national health plans, including justification of project in terms of needs or demand;
- (ii) Efficiency considerations, or identification of costs and benefits; cost-effectiveness analysis; disease impact assessment; and determination of internal rate

⁵The current ADB practice in the economic analysis of health projects is generally guided by the *Guidelines* (ADB 1997). A handbook for the economic analysis of health sector projects is under preparation.

of return on investment, acceptance and demand of users, providers of health care, and project sustainability; and

- (iii) Equity consideration, or accessibility, affordability, and cost recovery.

These basic considerations are found in the practice of other multilateral development banks and most bilateral donors (Over 1991, Barnum 1996, Hammer 1996, Prekker et al. 1996, UK-ODA 1996). Box 1 summarizes the major steps in the economic analysis of health projects following the option approach as discussed in Green (1994). The general approach depicted is similar to what has already been discussed above, but has some differences, namely: (i) it accommodates more than one option or project or activity under a health care program; (ii) it is also not clear about project justification in the sector context and as to economic rationale; and (iii) it does not address concerns regarding equity and project sustainability.

A. Macroeconomic and Sector Context, and Project Economic Rationale

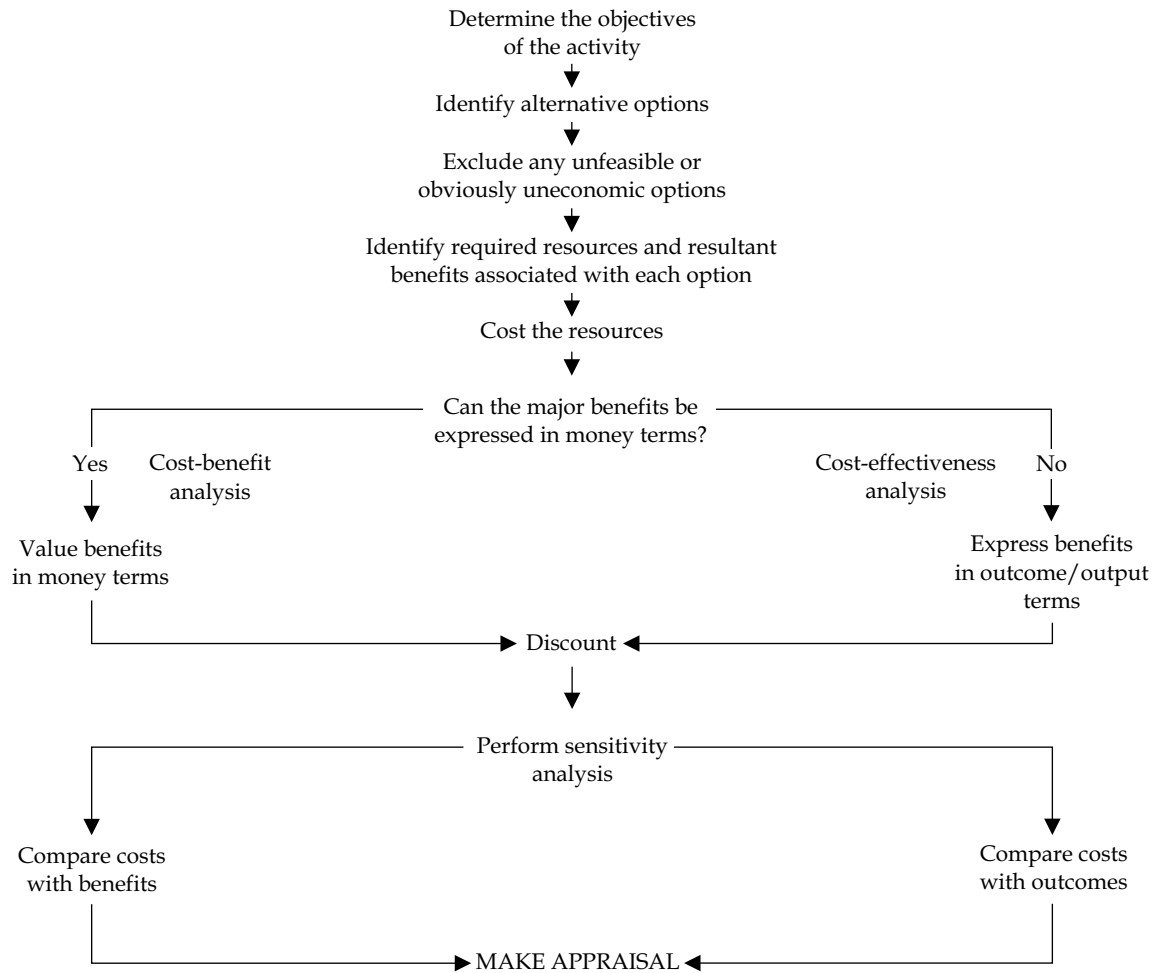
The key to a good project economic analysis is conducting a thorough sector review. Typically, good projects are developed in the context of an analysis of the country's health sector. These analyses are frequently conducted as part of technical assistance projects. Good sector analysis helps government sort through priorities, identify projects in the context of priorities, and provide basic data to appraise projects and assess risks. Sector reviews are completed before project preparation begins to help identify key areas for policy reform, capacity building, and improving health services leading to efficient and sustainable health sector development, and to provide inputs into project evaluation. A sector analysis should cover the following: (i) epidemiological profile; (ii) utilization patterns; (iii) public expenditures; (iv) system of financing; (v) supply of medical care; (vi) demand analysis; (vii) health sector personnel; (viii) quality of care; (ix) health information and management systems; and (x) implications for sector development strategy. Against this background, the economic rationale of health sector projects is evaluated.

B. Demand Analysis

The quality of project design and economic evaluation can be improved if demand analysis is made integral to project preparation. Demand analysis answers the following questions: (i) who should receive the benefits of the program; (ii) how should the program be targeted to the designated beneficiary group, i.e., utilization patterns, geographic location, self-selection through willingness-to-pay, means testing, age, gender, or identification of afflicted groups; and (iii) what is the demand for the services, taking into account the fact that users may be charged a fee for the service.

The project must forecast demand to determine the right level of project services to provide and to see if the project can be built on a scale large enough to exploit potential economies. The former is to insure, for example, that hospitals are not built so big that they will have low occupancy rates. The latter will affect the unit (marginal) cost of delivering the service and greatly affect benefit-cost calculations. In both cases, demand will differ depending on the degree to which user financing will be used to fund the project. Demand

Box 1: Key Steps in the Economic Analysis of Health Sector Projects



Source: For further reference see also Green (1994).

analysis also provides information on the willingness-to-pay for better access and quality, on the extent to which different methods of targeting benefits are feasible, and on how cost recovery will affect utilization.

Demand analyses are best conducted using household surveys combined with institutional information, including data on market structure, degree of substitutability of different types of care, and differences in the quality of care between public and private sectors, and relevant characteristics of the private sector. As part of these surveys, information can be collected to forecast the effect of project activities on health status.

In any demand study it will be necessary to consider the impact of cost to households from using health services. For visits to clinics or hospitals there will normally be costs even where user fees are not involved, since patients will have to bear the cost of travelling and waiting. However, where a project reduces these costs, for example, due to a more convenient location for the patients, this will stimulate health service use and must

be allowed for in planning the scale of the project. Most studies of demand for health and medical care in developing countries find price elasticities to be less than 1.0 in absolute value (implying that demand changes less than proportionately to price), although the results vary over a substantial range. Some estimates place the price elasticities for outpatient and delivery care as well as prenatal, well-baby, and immunization services at values very close to zero. The implications are that for such services user fees would do little to discourage health and medical care use while serving the self-financing function. On the other hand, estimates closer to unity have been reported by some analysts, implying that user fees might undermine the goals of the project by discouraging participation by the targeted beneficiaries. Where user fees are to be introduced or raised significantly or where nonfinancial costs to users are altered significantly by a project, the impact of such change on demand should be allowed for.

Where detailed household surveys are not possible because of the dearth of time and resources or simply because of the absence of quantitative data, rapid appraisal survey methods are relied on. Rapid appraisal methods lie between informal and formal modes of data collection used to provide decision-related information for project or program conceptualization, formulation, and evaluation (Kumar 1993). There are five methods of rapid appraisal for data collection: (i) key informant interviews; (ii) focus group discussions; (iii) community/group interviews; (iv) structured direct observation; and (v) informal surveys. There are, however, limitations with the rapid appraisal methods. For example, the reliability and validity of the information generated can be questionable in many instances, due to factors such as the use of informal sampling; individual biases of the investigator/interviewer; and difficulty in recording, coding, and analyzing the quantitative data. Further, they do not generate quantitative data from which generalizations can be made for a whole population, and the general credibility of these methods is low compared to formal survey methods. These limitations should be weighed against the obvious strengths of rapid appraisal methods. Such methods can rapidly generate relevant information with relatively low investment of resources. Moreover, experience shows that they can provide an in-depth understanding and information on the project or program conceptualization and design. Nevertheless, rapid appraisal methods should be used selectively, depending on the purpose of the study, availability of time and resources, and more importantly, the nature of the information required. Focus group discussions, community interviews, and structured direct observations have been used in rural health sector projects, particularly in data-scarce situations.

The project also has to assess whether benefits will accrue to the targeted group. Beneficiaries, losers, and unintended beneficiaries must be identified. Sometimes unintended beneficiaries should be counted in the benefits column, for example, when a program targeted toward pregnant women will benefit the mother and child. Other times they are counted as costs, as when a program that lowers fees across-the-board to improve access of the poor to medical care also benefits the nonpoor who use the facilities.

C. Analysis of Alternative Project Designs

Good project appraisals consider a range of alternative approaches. The range of project designs should consider the following factors: (i) variation in the combination of components needed to address a particular objective; (ii) range of intervention modalities,

e.g., whether an intervention should be provided in health facilities or through outreach workers; (iii) different types of inputs, e.g., medicines, contraceptives, equipment, personnel; (iv) alternative institutional arrangements for the management and delivery of services including whether the services could be contracted through the private sector; and (v) different scenarios for the timing and phasing of the project.

The project should identify the components needed to achieve its objectives. This involves not only what will be done, but also when, by whom, and how well. In terms of the combination of inputs, substitutability of inputs should be explored, especially when there are weaknesses in the delivery system. For example, if the country does not have enough qualified doctors, then how can lesser-trained medical personnel be used to achieve the same outcomes? Rather than use expensive equipment that is costly to maintain, are there simpler technologies that may require more personnel but are equally effective? Evaluation of alternative designs should consider the role of pilot projects and operational research on alternative strategies, and the process of scaling up from pilot projects to more general implementation. This is especially true for activities for which there is limited operational and scientific evidence on implementation issues and impact.

When the project objective is to improve some dimension of the health status of a particular population, the analysis needs to consider the range of interventions that will most likely improve health, and the factors that mediate the effect of those interventions. The most cost-effective interventions are not always in the traditional health sector. Investments in education, environmental protection, water quality, food supply, poverty alleviation, and economic growth may have an overall greater impact on health status than direct intervention in the health care delivery system. Within the health sector, a well-targeted health promotion activity, which changes population behavior, may have much greater health benefit than millions of dollars spent on therapeutic interventions for the same problem.

D. Cost-Benefit and Cost-Effectiveness Analyses

Cost-benefit analysis of health sector projects requires that health outcomes be valued in monetary units in order to calculate the net economic benefit of a project or program. Cost-effectiveness analysis only requires that a quantitative measure of health effectiveness or utility be defined (Weinstein 1996, Sloan 1996). Monetary valuation of health benefit through reduction in mortality and morbidity as a result of a health project is known to be very difficult. There are various possible approaches, however. The most popularly known approaches are the human capital approach and willingness-to-pay approach. Under the former, improvements in health status are viewed as investments that yield future gains in productivity. However, this approach is criticized in that it ignores the consumption value of health. The latter is considered an accepted measure of the value of life. This is often estimated by examining earnings premiums for risky jobs or safety expenditures by consumers. However, this approach may work well in a developed country context, but has practical limitations in the context of developing countries. In the case of cost-effectiveness analysis, effectiveness or utility of a project or program can be measured in terms of non-monetary values such as years of potential life gained or healthy years of life gained, or disability-adjusted life years or quality-adjusted life years. Because of this, cost-effectiveness analysis is more popularly used than conventional cost-benefit analysis in the economic analysis of health sector projects.

One of the main components of the cost-benefit analysis is the calculation of internal rate of return, which is used to ensure that the project's benefits are larger than its costs, as a way to compare the returns across the portfolio of projects. The general purpose of projects is to generate a social benefit from correcting market failures (e.g., improving health by subsidizing "public good" activities, reducing inequity, and strengthening insurance markets). For the project to have a positive rate of return, the social benefit less the direct costs of the project must be larger than the economic opportunity cost of capital.

Despite the importance of rates of return in helping governments make project decisions to ensure an efficient allocation of resources, health sector project evaluations typically do not often conduct cost-benefit analysis. The main reason is that the primary output of the sector is health status, which is difficult to value in money terms (as indicated above). Since health status is a nontraded good it is difficult to calculate a market price with which to value outputs. Moreover, there is no consensus as to how to value it and even substantial reluctance to even try. However, where physical investments are made and full cost recovery is expected, financial and economic rates of return on investment can be calculated.

However, the difficulty in valuing health outcomes does not exempt the project from formal economic evaluation by assessing the impact of the project in terms of its health outcome effects, improvements in access to care, and improvements in efficiency. At the minimum, projects whose objectives include improving health outcomes should conduct cost-effectiveness analysis. The methodology for this analysis is well known and has been applied in many developing country settings (Jamison and Mosley 1993, World Bank 1993, and Barnum 1996). While cost-effectiveness analysis does not provide rates of return nor allow direct comparisons with other uses of funds (e.g., water supply or roads projects), it does provide a quantitative assessment of how much health we are getting for the investment and it helps in choosing among alternative project designs. Essentially, cost-effectiveness analysis examines health projects from the point of view of minimizing cost for the same level of output or objectives. Box 2 presents an example of possible analytical tools for economic evaluation of health sector projects.

Since there are difficulties in quantifying economic benefits from health projects, quantitative cost-benefit/outcome analysis should normally concentrate on comparing costs from different project alternatives. The general procedure for cost-effectiveness analysis requires specifying incremental project impact, that is, the difference between a health outcome "with" and "without" a particular project, and comparing this with incremental cost, that is, the difference between resources used "with" and "without" the project. As indicated earlier, health outcomes can be measured in various forms, for example, in terms of Years of Life Gained (YLG), Healthy Years of Life Gained (HYLG), and Disability-Adjusted Life Years (DALYs). As with project appraisal in any other sector, both impacts and costs should be converted to a present figure by discounting, although the choice of discount rate for health projects is a matter of controversy in the academic literature. ADB (1997) recommends a 10-12 percent discount rate for all projects. World Bank (1993) uses 3 percent to discount DALYs, and its most recent handbook on economic analysis of investment operations implicitly uses 10 percent for discounting costs of health projects (World Bank 1998). However, there is consensus that life saved today is more valuable than life saved tomorrow.

Box 2: Analytical Tools for Economic Evaluation of Health Projects

Scope of Comparisons (in increasing order of complexity)	Best Choice of Analytical Tool	Examples
Single intervention Single disease Single age group	Cost effectiveness, when Definition of effects is narrow	Tuberculosis therapy Measles immunization Family planning methods
Multiple interventions Multiple diseases Single age group	Broader definition of effects; Weighted cost-effectiveness (cost-utility) analysis	Child health program EPI (immunization)
Multiple interventions Multiple diseases Multiple age groups		Formulation of primary health care programs, public health strategy
Alternative delivery systems and interventions across the sector		PHC vs. hospitals Preventive vs. curative, lower-level vs. upper-level services
Health sector investments compared to investments in other sectors Complex project objectives	Must use cost-benefit analysis	Education vs. health Health vs. agriculture Industry project with both health status and economic efficiency objectives

Source: Adopted from World Bank (1998, 77).

E. Quantification and Valuation of Costs and Benefits

Much of the attention in the general project evaluation literature has been focused on computing costs correctly for these calculations (ADB 1987, 1997; Little and Mirrlees 1991; Squire 1988; World Bank 1991, 1994, 1995; UK-ODA 1996). These issues are well discussed and not unique to the health sector. The economic principles and pricing procedures are the same as in other projects. Over (1991) provides a detailed manual for costing health sector projects. As a result, we will not focus on general costing issues here, but rather focus on the more problematic issue of measuring project benefits.

The health sector is different from other types of projects in that benefits are more difficult to measure and value in monetary terms. Like all projects, the health sector has incremental and nonincremental benefits. Nonincremental benefits from improving

managerial and planning capacity are, as in other projects, measured by calculating cost savings. There is nothing specific to the health sector that makes this activity more difficult than in other sectors. Therefore, estimates of cost savings should be provided for institutional capacity building activities when these are designed to improve efficiency.

The more difficult cases are in terms of measuring incremental benefits. There are three major types of incremental benefits: (i) general improvements in health outcomes, (ii) improvements in access to care and health outcomes for vulnerable populations, and (iii) improvements in utility from risk reduction. The last benefit is extremely difficult to measure and has not been measured in the application of project evaluation. Further applied research would be needed to make operational the valuation of utility from risk reduction. There are, however, a number of approaches in measuring other health benefits and redistribution benefits. Box 3 provides examples of potential benefits from health sector projects.

As mentioned earlier, one of the main reasons why health projects have often been exempt from formal economic evaluation has been the difficulty in valuing health outcomes. Much of the recent literature on valuing health has focused on aggregating mortality and/or morbidity across demographic groups and disease types (e.g., Murray and Lopez 1996). Apart from YLG, HYLG, and DALY, there is the Quality-Adjusted Life Year (QALY). Box 4 presents examples of measures of performance for health sector projects. The purpose of these exercises is to get aggregates that can be used to compare alternative investments. All of these aggregations have implicit value judgments. They are necessarily arbitrary methods relying on restrictive assumptions and no one is a priori better than the other in measuring the welfare benefit from health (Hammer 1996).

Despite this debate, there are a number of measurements that project evaluation exercise should pursue. At the minimum, projects whose objective is to improve health outcomes should provide data on basic indicators of health outcomes and the amount expected for the project intervention to change these indicators. There are three types of measures commonly collected in household surveys. The most common measures of health status collected are morbidity and mortality. Morbidity describes the number of cases resulting from a particular disease or health problem, usually by incidence or prevalence. Morbidity measures may be either self-perceived or observed. Mortality refers to the number of deaths resulting from a particular disease or health problem. Commonly constructed indicators include crude mortality rates, age-specific mortality rates, and cause-specific mortality rates. Mortality rates are usually expressed as the probability of death in an age interval. A second set of commonly collected measures captures nutritional status through anthropometry (size and weight measurements). These measures include standardized health-for-age, weight-for-height indicators for children, and body mass index for adults. The third set of indicators measures physical and cognitive capacity and is especially useful for measuring adult health status. These indicators capture physical and cognitive functioning problems caused by: (i) developmental disability due to congenital incapacities or by malnutrition; (ii) acute disability due to injury or communicable disease; and (iii) chronic disability caused by noncommunicable disease, by alcohol and drugs, or by mental illness (Peabody et al. 1997).

In order to move from quantifying the benefits in terms of movements in the disaggregated health indicators to cost-effectiveness or cost-utility analysis, the changes in health indicators need to be aggregated across morbidity and mortality measures and across in-

dividuals with different socioeconomic characteristics. Two common aggregate indices are the DALY and QALY. These indices can be used in determining relative priorities across different programs in health care. However, as indicated earlier both of them are far from perfect and one should probably use both measures to investigate the sensitivity of the results to aggregation assumptions.

A DALY is a composite index of death and disability that gives greater weight to interventions addressing death at an early age and conditions involving extreme disability.

Box 3: Examples of Potential Benefits from Health Projects

- I. Effects of reduced morbidity on productivity
 - (a) fewer days lost from acute stages of illness
 - (i) from worker
 - (ii) from members of family caring for the ill
 - (b) fewer days of productivity temporarily reduced through either changed pace of work or failure to work
 - (c) fewer days of lower productivity from permanent disability
- II. Effects of reduced mortality on productivity
 - (a) fewer worker days lost through premature death
 - (b) less family time lost
- III. Consumption benefits
 - (a) increased output of unmarked household goods (such as house repairs, woodgathering, kitchen garden, pond cultivation, homemade articles)
 - (b) increased leisure (note interaction of leisure and productive time use; the value of leisure time is output foregone)
 - (c) higher quality of life
 - (d) intrinsic value of life and reduced suffering
 - (i) to the individual
 - (ii) to others
- IV. Greater efficiency of the school system (i.e., more efficient learning)
 - (a) Resource saving - less wasted education expenditure
 - (b) higher future productivity due to better physical and mental development
- V. Reduced expenditures by household on
 - (a) medical care, drugs, traditional healers
 - (b) Supplementary food (e.g., in cases of malaria and diarrhea)
- VI. Other benefits
 - (a) Externalities (example: herd effect of immunization)
 - (b) fertility reduction following established increase in child survival
 - (c) new lands (examples: outer islands of Indonesia, and malaria; Voltaic river basin, and oncho)
- VII. Direct government resource savings resulting from internal efficiency improvements (Such savings usually should not be counted as a benefit in addition to such items as those above.)

Sources: de Ferranti (1985) and World Bank (1998, 93).

Box 4: Examples of Measures of Performance for Health Sector Projects

Program	Process Measures (Cost per ...)	Outcome measures (Cost per ...)
Training	MD-trained Nurse-trained VHW-trained	
Inpatient care	Bed day Delivery Surgical procedure	Death averted Year of life gained HYLG, DALY, QALY
Outpatient or outreach care: General	Outpatient visit	Death averted Year of life gained HYLG, DALY, QALY
MCH	MCH visit Pregnancy monitored Child monitored Immunized child Contraceptive acceptor	Death averted, etc. (as above) Month increase in birth interval Malnourished child avoided Birth averted
Disease-specific programs: Malaria/schisto Leprosy/TB/STDs	House sprayed or hectare of water treated Case treated	Unit reduction in morbidity (slide positive rate, egg count, etc.) Death averted Year of life gained HYLG, DALY, QALY
Nutrition	Breastfed child Weaned child Supplemented person year Low birth weight avoided	Death averted YLG, HYLG, DALY, etc. Unit change in malnourishment

Source: Adopted from World Bank (1998, 92).

The calculation of DALYs is influenced by a number of factors. First, it requires accurate information on age of death and cause of death, as well as the incidence and duration of morbid conditions. Second, the total number of DALYs clearly depends on age structure. Since mortality and morbidity in children are weighted more heavily than similar conditions in older adults, countries with younger populations and with a large number of child deaths will end up with a larger DALY burden. Third, because of different weights given to years lost at different ages, there is an implicit emphasis on economic productivity in assessing ill health. Fourth, the discounting of future years of life lost implies that lives saved in the future count much less than lives saved today. Fifth, the disability weights depend on “expert” assessment. Sixth, the normalization of disability weights to one means that

the impact of a disease is weighted less for disabled people than people without any disability. As DALYs are age-biased, their use is of limited value in the economic analysis of health sector projects targeted at old people's health.

On the other hand, QALYs are measured on an absolute scale of utilities ranging from zero to one where zero represents death and one represents perfect health. Health levels are assigned to individuals based on questionnaires in which respondents are asked to assign a utility level to their health status. The expected number of QALYs is the expected number of life years, adjusted for improvements in the quality of life years due to the alleviation or prevention of morbidity and for side effects of treatment. Given a schedule of age-specific mortality probabilities with and without the program or practice in question, the expected net increase in life years is the difference in life expectancies with and without the program or practice.

Finally, placing a monetary value on health outcomes can extend economic analysis from cost-effectiveness to cost-benefit analysis. There are two main approaches to valuing health outcomes: the human capital approach (HC) and the willingness-to-pay (WTP) approach. The HC approach regards all health improvements as an investment in human capital, which yields incremental future income arising from an increase in the effective supply of labor. The value of human capital can be measured in terms of the future expected lifetime earnings of the individual concerned, adjusted to allow for such factors as working life expectancy and participation rates in the labor force. The value of life is then obtained by discounting these future earnings to their present value.

The HC approach is relatively easy to apply, since it only requires knowledge of the earnings profiles and life expectancies of typical individuals in the target population of each health care intervention. However, the approach only provides minimum values of life since it disregards the psychological benefits that the patient and the patient's family derive from treatment and possible cure even in the absence of any resultant increase in future earnings. The approach also implies that the value of health is greater for those with higher earnings and therefore discriminates against the young, elderly, females, and the poor.

The WTP approach, on the other hand, is more founded on economic theory, which suggests that the value of health benefits depends on how much society is willing to pay to receive benefits or avoid costs. WTP may be estimated based on observed or stated behavior. In the first case, the approach would be to observe the number of visits that take place at each of a range of prices. Observing consumer behavior with respect to a variation in prices can help build a demand schedule. The second approach involves asking the respondent to state how he or she would tradeoff various commodities and services against income or time. A stated value refers to what a person says he or she is willing to do; and observed value to what he or she actually does when faced with a real choice. Either approach may be relevant, depending on the type of decision to be made.

F. The Role of the Counterfactual in Measuring Net Benefits

Establishing the health benefit of the project requires measuring health outcomes with the project with respect to the counterfactual, i.e., health outcomes without the project. The net benefit is the difference between health outcomes with and without the project. This means that a standard total burden of disease analysis is not sufficient to calculate project benefits. Identifying the level of (total) burden of a particular disease does not provide

information on the benefit of an intervention. Rather we need to measure the marginal benefit or impact of the intervention.

The counterfactual is complicated by the fact that we must forecast the extent to which the private sector will be displaced by the expansion of the public sector or public financing. The calculation of net benefits requires measuring the health outcome produced by project activities, which is the efficacy of the intervention times the number of individuals who benefit from the activities. The number of individuals who benefit should be calculated based on demand analysis, which includes the effects of fees and quality improvements on utilization. However, measuring the net effect on health requires subtracting the reduction in the use of private services times the price sector efficacy. It is important to note that the cost-effectiveness analysis used in the 1993 World Development Report Investing in Health does not net out the change in the private sector in any of its calculations.

However, the above analysis is not limited to investigating how project activities affect individual utilization decisions. Project activities also affect private provider location, price, and quality decisions, i.e., competition from the public sector affects the supply of private sector alternatives. Evidence of the importance of private sector responses is contained in a study in which public sector user fees were varied experimentally in two of Indonesia's 27 provinces. Gertler and Molyneaux (1996) report that when public user fees were increased, private doctors and private nurse/paramedics increased their fees in response to the increased demand.

G. Valuing Redistribution (Equity) Benefits

Finally, the valuation of benefits should consider targeting objectives. If the main purpose of the project is to improve access of the poor to medical care, then improvements in their use and health outcomes should be weighted more heavily in the aggregation of benefits. While benefits to unintended groups should be included, equal weighting may bias the results in a way that is counterproductive in terms of achieving redistribution goals. In particular, since the poor use medical care less than the nonpoor and in some cases benefit from it less, then equal weighting will lead to projects that favor the nonpoor.

In addition, a simple means of analyzing the extent to which the project redistributes subsidies is to conduct a benefit-incidence analysis. The analysis measures the amount of subsidies that accrue to a specific group with and without the project (e.g., poor versus rich; men versus women; children versus adults). The benefit incidence is measured by the unit subsidy of a particular service times the number of units of that service consumed by the group. The unit subsidy is the unit cost less the fee charged to users.

H. Project Sustainability Analysis

While economic analysis is critical to developing the most efficient project design in terms of the largest development impact per dollar spent, it is also important in the evaluation of whether project activities are sustainable. Sustainability refers to making project activities and consequences continue after project activities cease. There are three critical areas of sustainability where economic analysis is useful: financial impact, cost recovery, and risk assessment.

(1) Fiscal Impact

An important component of project sustainability is the fiscal impact of the project. Financing the project may increase taxes and/or reduce spending on other programs. Quantitative assessments of these impacts are required to determine if the budget and economy can afford the project both in economic and political terms. Increased taxes have a distortionary effect on the economy that retards growth and can be very unpopular. Reductions in other programs such as education, transportation, and public infrastructure and utilities may increase the cost of market failures in those sectors.

The calculation of the fiscal impact of the project will be different during and after the project ends. During the project, local co-financing of project activities comes from increased general tax revenues, reductions in allocations to other projects, and/or user charges or grants. Once the project ends, the recurrent costs of project activities that were financed by project funds must be incorporated into the budget, again financed out of increased taxes, reallocations, and/or user charges, grants, or borrowing. In addition, loan funds must eventually be paid through increased taxes of one form or another.

The analysis of budgetary impact also indicates whether the project appraised is the one being funded. Project evaluation assesses the use of funds by looking at how the additional project funds affect total budget allocations. Project funds are not financing the health sector if they reduce government allocations to the health sector and increase allocations to some other sector.

Project appraisals need to consider these costs by analyzing the fiscal impact of the project. The first steps are to quantify the long-term effect on the tax burden and the specific taxes that will be raised in order to repay loan funds. Different types of taxes have different distortionary effects and different distributional effects in terms of who bears the tax burden. The effect of the project on taxes is valued depending on the deadweight loss introduced by the distortion. Estimates of the deadweight loss and the distributional impact differ depending on the structure of the economy and the distribution of wealth. Attempts to obtain country-specific estimates are important and should be conducted as part of regular reviews of the economic performance of the economy. These costs are the same for all projects, not just those in the health sector. The marginal distortionary costs of taxes needs to be calculated only once in a while and should not be the responsibility of the project team.

The major responsibility of the project team is to assess the impact of the project on the sector budget both during and after the project by examining disaggregated budgetary trends in the sector. During the project, the appraisal needs to consider the extent to which government co-financing is required and where those funds will come from (increased subsidies to the sector or reallocation within). The appraisal should also assess whether the project funds are increasing funds for the proposed activities or just replacing government resources that are being reallocated to another use. The major issue after the project is how recurrent costs are going to be financed after project funds are exhausted. There are three possibilities, all of which have important welfare implications: user fees, increased subsidies to the sector, and reallocation of subsidies within the sector.

There may be additional macroeconomic distortions that should be considered, especially if there are increased taxes to finance current expenditures. For example, higher payroll taxes used to finance social insurance raise the costs of labor and affect economic growth.

(2) Cost Recovery and Allocation of Subsidies

The high distortionary cost of funds also means that alternatives to using public subsidies to correct market failures should be explored. In the case of insurance market failure, this means that it may be cheaper to mandate social insurance than finance a large public health care sector. In the case of improving equity, it may be cheaper to use expensive methods of targeting subsidies to the poor as opposed to across-the-board subsidies. In addition, it may be cheaper to regulate a private system using targeted subsidies than to pay for a public system.

The high cost of funds is another reason to vigorously pursue cost recovery. Lowering the distortionary costs of funds is a hidden benefit to private resources mobilization and is usually not considered in the debate over user fees. Cost recovery not only raises revenues that help governments co-finance programs, it also reduces the amount of the loan and lowers the tax burden that is needed to pay back the loan. However, there are costs of raising fees, especially in terms of equity, and these costs should be considered in the debate.

Moreover, the structure of fees is strongly tied to the motives for public involvement in the health sector, i.e., improving health outcomes, improving equity in access to care, and correcting insurance market failure. Indeed, the motives have conflicting implications for setting fees and, as a result, fee structures need to be assessed in this context (Gertler and Hammer 1997). Therefore, part of the analysis of cost recovery is an analysis of the allocation of subsidies. Higher fees mean lower subsidies as they lower the difference between the cost of providing the service and the amount paid by the user. The structure of fees should be consistent with subsidies accruing to targeted objectives and groups. In particular, strategies for price discrimination need to be examined when equity in access to care is an issue.

Finally, a related issue that will arise in analyzing the fiscal sustainability of projects in general is that revenues from user financing must be kept within the project. If the fee revenue must be returned to the general treasury, or central Ministry of Health, then private resources are effectively mobilized to fund project activities. In the worst case, fee revenues leave the health sector and are returned to the central or local treasuries so that they do not expand health sector resources. For example, Creese and Kutzin (1995) report that this is the case in African countries such as Eritrea, Ethiopia, Namibia and Zimbabwe. A more subtle case that is harder to document is where the fee revenues just displace public subsidies by one dollar for every dollar of fee revenue raised.

(3) Risk Assessment—Institutional Capacity, Stakeholder Analysis, and Incentives

There are a number of nonmarket failures that can jeopardize project success. These include not only institutional capacity, but also incentives to key project and government decision makers that may be inconsistent with project objectives. The first step in assessing nonmarket failure risks is analysis of institutional capacity in managing and planning health sector activities. In particular, this involves assessing whether there is the necessary operational and managerial capacity to implement and run project activities, and whether there

are legal or legislative obstacles that must be removed before implementation can proceed. This has been a mainstay of project evaluation and will not be elaborated further.

A less well-discussed issue is stakeholder analysis, which is concerned with understanding the goals, incentives, and constraints of project staff and key decision makers. It is the core of “government” failure, fungibility, and the decision to provide services publicly rather than regulate private provision. Assessing the fungibility of project funds requires understanding the incentives, objectives, and behavior of senior officials. Understanding whether a project will be implemented as planned requires understanding and adjusting the incentives facing civil servants to do their work. Deciding between regulation and direct provision requires understanding who gains and who loses from the two alternatives.

Simply assuming that project activities will achieve their intended results without considering the incentive structure facing those responsible is very risky. There are two groups of incentives that are at the heart of the matter. The first are incentives specific to those actually implementing and running the activity, and the second are incentives facing private individuals and groups that may gain or lose from the way the project is implemented. The first group boils down to understanding the issues of ownership at higher levels of supervision and civil service remuneration and the form of contracting at lower levels. The second revolves around how private providers, employers, and the supply of medical manpower respond to public sector initiatives.

These incentive issues are critical in service areas such as the health sector. As a service, its value depends on maintaining incentives for good performance on the part of those providing the service. For example, just because a clinic is built does not mean that providers will show up for work and not leave early for their private practice. And if they do show up, there is no guarantee that they will treat patients appropriately. And just because governments mandate charging user fees, it does not mean that they will be collected, especially if the person who collects them does not benefit. The actual output of an investment will depend on policies concerning wages and other incentives for good performance.

There are many cases where projects fail because of bad incentives, which lead to government failure. There are also many cases where individuals bypass government clinics to go to private providers even when care is free (for example, Kloos 1990, Korte et al. 1992) so that public facilities are underused. Some of the reasons include lack of concern and politeness by the medical care provider, providers being absent so that the real hours of operation were few, and a lack of drugs because they were diverted to other uses. Much of this failure is attributed to low pay and moonlighting options of providers. A number of studies show that public hospitals are extremely inefficient (for example, Lewis 1991, 1996; Barnum and Kutzin 1993). In some cases, less than 12 percent of expenditures were actually used for patient care. The culprit again was the low remuneration and lack of financial incentives to improve performance. If the financial viability of the enterprise has no impact on pay and promotion, the quality of care and management will suffer.

Identification of losers or payers of a particular project design may provide insights as to the source of opposition from various stakeholders. Examples include social insurance plans that require co-payments by employers; expansion of public hospitals that compete with private providers; shifting risk to private providers through capitation; or raising taxes to finance the project.

I. Project Framework Analysis

The work in terms of developing project goals that have strong public rationales and fit into the macro and sector contexts is strengthened through Project Framework (originally called Logical Framework or Project Cycle Management) analysis (see Commission of European Communities 1993). The analysis starts with problem analysis; based on that it sets objectives, outcomes/outputs; defines activities and inputs to achieve project objectives; and lists risks and assumptions. By doing so, the project framework analysis reviews and synthesizes government plans, sector reports, and analyses of household, provider, and institutional databases. For each year of implementation and operation, it provides explicit and verifiable targets that are linked through input-output, output-objective relationships. Targets should be quantified where possible to guide project design and to facilitate monitoring and evaluation. Through a combination of surveys and review of existing studies, baseline targets should be identified in order to track the achievement of expected outcomes. The identification and quantification of expected outcomes should be extended from mere process outcomes to health outcomes. Project framework analysis also identifies weaknesses in current data and institutional structures so that the appraisal can assess risks and develop a technical assistance project to fill in gaps prior to final appraisal. Project framework is therefore useful in designing a project and facilitating monitoring and evaluation of its implementation and management. Like in many bilateral and other multilateral development banks, project framework analysis is a requirement in the ADB's project preparation and processing cycle. A variant of project framework is commonly used in the preparation and evaluation of DFID funded projects (UK-ODA 1996).

IV. Conclusions

The paper has reviewed the key conceptual issues, methods, and approaches regarding economic analysis of health sector projects particularly in reference to multilateral development banks like the World Bank and the ADB, and bilateral aid agencies like the DFID, together with the relevant body of literature. Major findings suggest the following conclusions:

- (i) Economic analysis of health sector projects is meant to aid decision making by selecting projects that achieve desired health outcomes at the minimum cost of resources.
- (ii) Economic analysis should be broad enough to look at the macroeconomic and sector implications, economic efficiency, equity considerations, and project sustainability.
- (iii) As in the case of any project, it is desirable for all health sector projects at the initial planning stage to assess demand or need for the proposed project, and to consider alternative variants of the project, and select the most appropriate one.

- (iv) Normally, cost considerations in relation to desired health outcome/benefit should be one of the key factors in selecting what alternative to pursue.
- (v) A rationale for public sector involvement should be established, and a most efficient delivery system, regardless of public or private sector involvement, should be found.
- (vi) Regarding economic evaluation techniques, in the case of projects where health benefits/outcomes are meaningfully valued in monetary terms, they may be subjected to a full cost-benefit analysis in which the economic values of health benefits are compared with the economic costs of the project, and an internal rate of return higher than economic opportunity cost of capital, commonly 10-12 percent, will be the basis for project selection.
- (vii) Where health benefits/outcomes are not possible to value in monetary terms because of the intrinsic difficulty of health benefit valuation, a cost-effectiveness- to-health-outcome ratio, based on weighted and discounted cost per unit of health outcome such as HYLG, may be relied on.
- (viii) Like in the case of any project, economic analysis of health sector projects should go beyond the calculation of cost-benefit or cost-effectiveness ratios and examine the project's distributional impact, to find out whether the benefits are likely to reach the targeted beneficiaries, and to assess whether there are adequate arrangements for necessary institutional capability and financial resources to sustain project activities.
- (ix) A project framework analysis is useful in both the design and implementation of health sector projects.

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