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Benefit Incidence Analysis in Developing Countries

Thomas M. Selden
and
Michael J. Wasylenko

Benefit incidence analysis offers an important perspective on budgets and can illuminate the distributional impacts of proposed reallocations of government resources among projects.

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This paper — a product of the Public Economics Division, Country Economics Department — is part of a larger effort in the department to study the impact of public expenditure on household welfare, especially of the poor. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Carlina Jones, room N10-063, extension 37754 (November 1992, 55 pages).

As interesting and difficult as it is to allocate tax burdens to individuals, the profession knows even less about allocating benefits. Selden and Wasylenko survey the literature on benefit incidence since DeWulf's (1975) review, focusing on the methodology and results of benefit incidence analysis in developing countries.

Research in this area faces all the general-equilibrium difficulties faced by tax incidence analysis as well as the difficult task of measuring benefits from publicly provided goods and services. Despite the inherent pitfalls of this methodology, Selden and Wasylenko believe that benefit incidence analysis can provide an important perspective on the budget by combining data on household use with data on project costs. In particular, benefit incidence analyses can help illuminate the distributional impacts of proposed reallocations of government resources among projects. The value of such research is especially high considering the scarcity of recent research in this area.

Selden and Wasylenko review the existing methodology, survey the available results, and point out areas in which further research might have large payoffs. They also make specific methodological suggestions that might help ensure that future research is as useful for policymakers as possible. For example:

• Aggregate results based on the zero-government counterfactual rely on strong assumptions about fixed relative prices and incomes, government efficiency, and the relationship between marginal and total benefits. And those studies are often not designed to identify which types of public services benefit the poor. Researchers should focus more on providing benefit incidence studies on specific government functions or programs that can help policymakers reach conclusions about proposed reallocations of resources among government programs.

• Benefit incidence should be assigned to households based on household survey information on usage rather than on ad hoc assumptions that assign benefits based on income or the number of members in the household.

• Improved annual cost measures for services need to be developed, particularly for capital inputs.

• Researchers should group households by deciles and whenever possible should consider other groupings based on household income adjusted for household composition, age, location, and other relevant socioeconomic variables.

• Careful attention to life-cycle benefits, benefit shifting, rent-seeking, out-of-pocket costs, displacement of private sector efforts, average versus marginal incidence, and several other issues can significantly increase the value of benefit incidence analysis to policymakers.

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BENEFIT INCIDENCE ANALYSIS IN DEVELOPING COUNTRIES

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BENEFIT INCIDENCE ANALYSIS IN DEVELOPING COUNTRIES

I. Introduction

Measuring benefits of government expenditures across income, race and other characteristics of individuals is an elusive empirical issue. As interesting and as difficult as it is to allocate tax burdens to individuals, the profession knows even less about allocating benefits.[1] In this paper, we review the recent literature on benefit incidence and offer suggestions concerning further research, focusing particular attention on benefit incidence in developing countries.

Benefit incidence studies have a long history, but the interest in benefit incidence surged as a result of Robert McNamara's optimism about the degree to which government spending can alter the income distribution and living standards of the poor in developing countries. According to McNamara, "Shifts in the patterns of public expenditure represent one of the most effective techniques a government possesses to improve the conditions of the poor" (McNamara, 1972, p. 17). Knowledge of benefit incidence by income and other variables can be useful in reallocating public resources toward programs that benefit the poor.[2]

The literature on benefit incidence has three distinct periods. In the early literature or pre-1975, benefits are allocated to households either on a per capita basis or in proportion to the income of the household. Both allocation mechanisms yield obvious conclusions about benefit incidence. There is also a preoccupation in the early literature with allocating the entire budget including the benefits of so-called pure public goods, such as defense.

Aaron and McGuire (1970) attempt to reduce the inherent arbitrariness of the allocation of pure public good benefits to households by deriving benefit measures based on a specific utility function. The parameters of their utility function suggest a strong pro-rich distribution of benefits, at least in developed countries.

DeWulf (1975) in his review of the many early studies quite rightly criticized them for not accounting for different income elasticities for different public services and a host of other problems. After the DeWulf critique, a second wave of benefit studies in both developed and

developing countries turned to the allocation of expenditure made on more specific goods to households based on micro data on household utilization of the public services. Examples include Reynolds and Smolensky (1977) for the United States, Meerman (1979) for Malaysia, and Selowsky (1979) for Colombia. The latter two studies led the research on benefits in developing countries away from very general allocation systems and toward more specific benefit assignments based on utilization of public services. The disaggregation of general results made the studies of greater value to policy makers allocating resources among social goods.

The second period studies are distinguished from the first period studies in three ways: (i) use of micro data describing households' utilization of public services to allocate the public expenditure on particular social goods among households; (ii) recognition of the importance of accurate income measurement for households, and accounting for the size of the household as well as its total income in categorizing households into income quintiles, and (iii) disaggregation of services within a social function. For example, separate benefit incidence computations were performed for primary, secondary and post secondary educational spending.

We generally agree with the direction the post-1975 literature has taken. By not dwelling on the entire fiscal picture researchers have more rapidly developed the stock of knowledge about specific social expenditures in developing countries. We believe the approach since 1975 has great potential for informing policy choices on shifting resources within programs to target benefits to the poor more accurately. Nonetheless, researchers studying developing countries may need to pay extra attention to (i) expenditures made through off-budget programs such as public enterprises, (ii) benefit shifting especially for agricultural programs, (iii) differential public service quality, especially between urban and rural areas, (iv) the effects of benefits on inter- and intra-family transfers, and (v) the effects of benefits on urban-rural migration.

In a recent third wave of benefit incidence, Gertler and Glewwe (1989), Gertler and van der Gaag (1988), Gertler, et al. (1988), and Laraki (1989), estimated demand curves for various social services. Demand curves for particular population subgroups can be used to calculate changes in welfare based measures (or compensating variation) of social services benefits. Studies using welfare-based measures of benefits for a wide range of public functions can yield

valuable information to policy makers and help target the limited resources for redistribution toward those public services of maximum benefit to the poor. However, these studies do not, to date, offer benefit measures on the broad range of government services that more traditional benefit incidence studies offer.

The next section of the paper reviews the methodology of benefit incidence, followed by a section focusing particular attention on methodological issues in developing countries. The fourth section briefly examines recent empirical results on benefit incidence obtained for developed countries. The fifth section examines the empirical results for developing countries, and in the last section we present our conclusions, including recommendations for further research and guidance to researchers charged with doing benefit incidence studies within a limited time frame.

II. Methodology

There is some confusion in the empirical literature about terminology, necessitating some preliminary remarks. Musgrave (1959), McLure (1974), McLure and Thirsk (1975), Meerman (1979), DeWulf (1981), and Piggott and Whalley (1987), distinguish between expenditure incidence and benefit incidence. The former concept refers to the changes in relative factor and product prices and real incomes that result from government input purchases and the production of public output. Expenditure incidence does not explicitly account for the benefits of public goods (McLure et al., 1975, p. 195). Benefit incidence examines the consumption of government services by income or other subgroup, and ideally would include the shifting of government benefits and the relative price and real income changes due to changes in the demand for private goods.[3] We adopt this terminology, recognizing that it differs from that used by some authors.

Ideally, the total benefit incidence of existing government programs (the "post-fisc" equilibrium) would measure benefits relative to a counterfactual world without government (the "pre-fisc" equilibrium). No research has yet established a counterfactual world, without government. Most empirical studies of benefit incidence allocate public expenditures, and not consumer surplus benefits, to households based on their utilization of the services. The consumer

surplus and expenditure-based measures of benefits are illustrated in Figure 1 for the case of efficient provision of the public good (at q_0). The compensating variation or total benefit measure consists of areas "A" and "B" in the graph (Aaron and McGuire, 1970; Maital, 1975; Meerman, 1979; Hewitt, 1987; Piggott and Whalley, 1987). Conventional expenditure-based benefit incidence studies typically allocate the expenditure on the public good among households, represented by area "A" on the graph. Benefits are then compared among households in different income groups or other socio-economic groups.

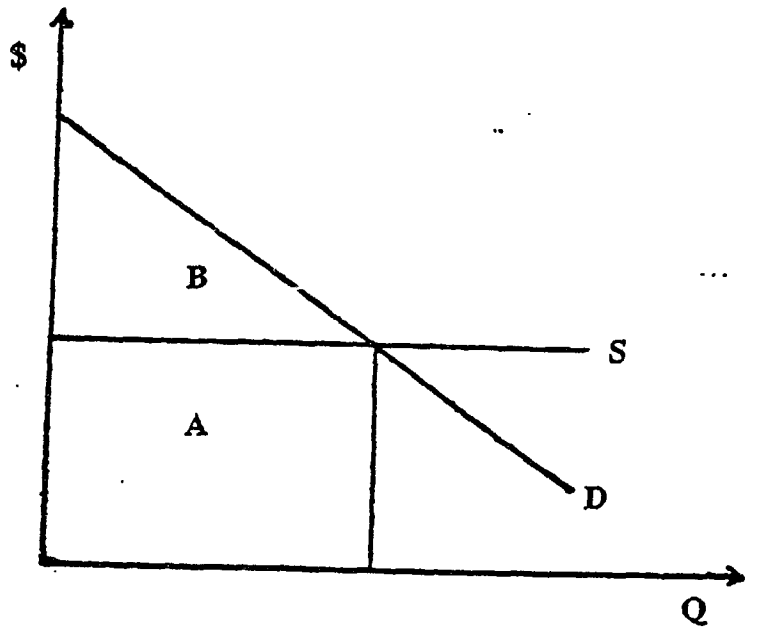
On the one hand, this typical method of measuring household benefits does not consider a number of important issues that affect benefit incidence. For example, it assumes that all relative prices and real incomes are fixed, and benefits are not shifted, marginal benefits are equal to average benefits, and average cost is a good proxy for marginal benefit. These assumptions expose the traditional methodology to numerous criticisms. Many programs, such as agricultural programs, are designed to affect real incomes and relative prices. In addition, public transfers to low-income households may crowd out private transfers and shift benefits to the households formerly making private transfers (Hochman and Rodgers, 1969; Barro, 1974, 1978; Lampman and Smeeding, 1983; Andreoni, 1990; Cox and Jimenez, 1992). Added to these basic issues are those surrounding the treatment of benefits from physical capital expenditures and from human capital investments that accrue to households in more than one time period.

On the other hand, expenditure-based benefit measures are more comparable to tax burdens and to private disposable income than are compensated variation measures, insofar as tax burdens and disposable income do not include the consumer surplus related to private spending (Aaron and McGuire, p. 909; Maital, pp. 407-408). Also, total benefit measures require information about the demand schedule for the public good and may be difficult to implement. In any event, for many small policy changes the total benefit and expenditure-based approaches should yield similar results (Selden and Wasylenko, 1992).

Despite its limitations, we believe the expenditure-based incidence approach can provide a useful first look at the allocation of government expenditure among households. The

Figure 1

Measuring Benefits:
Average Cost Versus Total Benefit



A = Total Cost

A + B = Full Consumer Benefit

(Diagram Reflects Assumption That Marginal Benefit Equals Marginal Cost)

Source: Authors

expenditure-based incidence approach can be especially useful for examining the distributional impact of marginal changes in the government's budget.

Benefit incidence studies typically examine public expenditures by three major categories: public spending on general goods, such as defense, public spending on specific public goods, such as education and health care, and cash and in-kind transfers. We follow that rubric in examining benefit incidence methods for public expenditures. We also examine below the appropriate allocation of capital expenditure, interest payments and side payments made to government officials. We then make a number of recommendations to help insure that future research is as useful as possible.

General Benefits

Attribution rules for general benefits can be distinguished by whether they are (i) rigorously derived from assumptions about preferences (Aaron and McGuire, 1970; Maital, 1973), or (ii) simply postulated (ad hoc) as intuitively appealing. Aaron and McGuire develop a utility-based method to allocate the expenditure on pure (general) public goods among households. The Aaron and McGuire approach requires that utility functions be separable in public and private goods and that the public good is consumed in equal amounts by all individuals. In addition, their approach requires choosing parameters for the utility function. The ad hoc methods, on the other hand, allocate expenditures on pure public goods to households on the basis of their proportion of total income or of their proportion of total population.

Both the utility-based distributors and the more ad hoc distributors can lead to implausible results. For example, with United States data, Maital (1973), using Aaron and McGuire's approach, finds a strongly pro-rich incidence for general public goods.[4] In another study of expenditures in the United States, Reynolds and Smolensky (1977) use an ad hoc allocation rule and find benefits for pure public goods to be more pro-poor than even public cash transfer programs. Moreover, Denzau and MacKay (1976) and Philpotts (1987) question Aaron and McGuire's assumptions of separable utility in private and public goods and of all individuals receiving the same amount of the public good. Indeed, by lumping expenditures on several general public goods together, researchers assume that the benefit-income relationship is invariant

among the public goods (DeWulf, 1981). Given these difficulties, many recent authors consider the allocation of general benefits so problematic that they exclude such goods from their studies.

Specific Benefits and Transfer Payments

There are three main methods to allocate specific benefits and transfers. The first approach is to make ad hoc assumptions about the incidence of particular programs. For instance, agricultural benefits are often distributed in proportion to farm income. The second approach is to infer the incidence from legislative intent, making a strong assumption that benefits flow to intended beneficiaries. The third, and by far the most informative, approach uses household survey data to determine household members' utilization of particular programs.

Of course, allocable public expenditure may also have external (or "nonrecipient") benefits, as when education affects general productivity and social order, as well as the productivity of the individual receiving the education. One way of accounting for external benefits is the Tax Foundation (1967) approach of treating portions of some specific and transfer benefits as if they were general. However, in most cases the amount of indirect benefits and the allocation of these benefits are arbitrary choices that may provide misleading measures of benefit progressivity.

Also, it is important to consider benefit shifting. As noted, public transfers crowd out private interfamily transfers, so that some of the benefits from new public transfers may accrue to private donors who may diminish their inter-family transfers. Agricultural program benefits can also be shifted from farmers to consumers in the form of lower food prices or to landlords in the form of higher demand and rents for land. In fact, Allen (1982) has shown that even lump-sum transfers can have large enough relative price and income effects to offset the benefits from cash transfer programs. Most incidence studies do not analyze benefit shift or external benefits. In cases where shifting and external effects may be important, researchers should consider a range of possible shifting and external benefit assumptions in assessing the distributional impact of certain programs.

Capital Expenditures

Many public expenditures, including infrastructure projects, other capital spending, as well as current expenditures for education, provide benefits to households for multiple years. Data on government capital expenditures are generally available by function for several years, but allocating the benefits of these capital expenditures to households will generally involve mapping the present value of the multi-year benefits to households. In an expenditure-based framework, one would multiply the value of the capital stock by the sum of the opportunity cost of capital and depreciation as a proxy for capital services in each year. Of course, capital stock value data are typically not available in most countries. In practice, benefit incidence studies handle multiple period benefits in a variety of ways, and we reiterate several methods when we discuss specific studies.[5]

Interest Payments

Several earlier studies incorrectly allocate government interest payments for bonds to households as government benefits. Interest payments should never be treated as transfer payments to households (Hammes and Wills, 1987), as the interest payments double-count benefits that have already been counted in the allocation of service flows from the capital expenditure. Some studies use interest payments as a proxy for services from capital expenditures, however, and avoid double-counting by not separately allocating service flows from capital expenditures.[6]

Rent-Seeking and Side Payments

In both developed and developing countries, benefits can be shifted and dissipated through what has become known as "rent-seeking," whereby individuals or groups of individuals attempt to influence government behavior (Rowley, Tollison, and Tullock, 1988, and Mohammed and Whalley, 1984). It appears reasonable to subtract rent-seeking expenditures by individuals from the cost of the government good or service to more closely approximate the net benefit to the individual. Data on side-payments is generally not available, but researchers should be mindful that side-payments may reduce the direct benefits of the program.

Measurement Issues

Benefit incidence analysts inevitably face a large number of problems in developing reliable benefit allocations. We discuss below several important measurement issues, such as the unit of evaluation, the period of analysis, the grouping of households on the basis of income and other socio-economic variables, and some limitations of incidence measures.

Unit of Evaluation: Household or Individual. Benefits to individuals are the focus of many social programs. However, the fundamental economic or income unit is the household. Individuals typically combine the resources of the household, and expenditures are made either as part of a household decision or by adults on behalf of the interests of household members. While most studies examine benefit incidence among households, in some applications it is important to bear in mind that government programs can have important effects on the intra-family distribution of resources among individuals, particularly in developing countries (see section III, below).

Period of Analysis: Lifetime or Current Period. Two issues--the period used to measure income and the period over which one measures benefits from government programs--are important in this context. With respect to income, economists generally agree that permanent or lifetime income, rather than current income, better reflects the economic position of households.

The expenditure survey data available in most countries, including the United States, do not permit a lifetime incidence analysis.[7,8] However, DeWulf (1975) argues that a lifetime perspective on income is theoretically problematic. Imperfections in the capital market that preclude borrowing against future earnings and the shortsightedness of consumers make the life cycle approach to fiscal incidence not particularly relevant to individual welfare. This argument may apply with particular force in developing countries given their widely-recognized credit market imperfections.

Measuring program benefits, that accrue over time raises additional research questions. For instance, many studies allocate educational benefits to households based on the participation of students in school. This distribution of benefits is then compared to the distribution of

parental income. However, if educated children eventually move to higher income brackets, it may be equally appropriate to argue that the benefits to education accrue to members of higher income brackets (Pechman, 1972; DeWulf, 1981). Data often preclude knowing the future income status of a given program recipient, making it difficult to assess the incidence of future benefits from education or other programs.[9]

Grouping Households by Income and Other Variables. The most common grouping of households is by income. Researchers have used both pre-fisc income (pre-tax income, excluding transfer payments and benefits from government programs), reflecting the focus on the zero government counterfactual, as well as post-fisc income (adjusted for taxes, transfers and government program benefits) measures. Numerous authors have debated the appropriate measurement of income, and we direct the reader to the excellent discussions in Bird and DeWulf (1973) and Smolensky, Hoyt, and Danzinger (1987). For developing countries, researchers need to pay special attention to both noncash (or in-kind) income and different living costs in urban and rural areas. Different living costs across urban and rural areas will make nominal income a poor measure of the relative economic well-being across areas.

We feel that there should be more emphasis placed on the use of income deciles (or at least quintiles), as several studies use arbitrary income levels to group households. The use of deciles facilitates both international comparisons and intertemporal comparisons, particularly when significant inflation has occurred between the analysis periods. Another important issue concerns adjustment for household composition. One approach is to use household equivalence scales (van der Gaag and Smolensky, 1982). Meerman (1979) and Selowsky (1979) use per capita household income to construct income deciles. Both researchers also confirmed a very weak correlation between household total income and household per capita income, so that accounting for family size in income measures will generally yield a different ordering of households' well-being.

Finally, in addition to income there exists a wide range of variables that one might use to distinguish among households, including race, religion, ethnicity, tribal affiliation, age, geographic location, and urban-rural location. When the data exist, we believe that it is often

informative to disaggregate by these variables in conjunction with income, so that one might, for instance, know the benefit incidence of health spending on the rural poor.[10]

Average Versus Marginal Incidence. In many cases, policy makers are less concerned about existing program benefits than about the incidence of marginal program benefits (i.e., the incidence of benefits from an increase in the program expenditures). The marginal beneficiary may be, for example, significantly poorer than the average existing beneficiary. For instance, marginal students enrolled in schools of all levels may be less well-to-do than the average student enrolled, because the well-to-do gain access first. Similarly, additional rural health clinics are likely to be located in more remote and more impoverished areas than rural health clinics on average. Public sewers and rural electrification are other examples of publicly-provided goods to which households in higher income groups gain access first.

Standard benefit incidence measures only capture the average mix of beneficiaries. While these measures may be appropriate for calculating post-fisc inequality, they may be poor guides for policy decisions at the margin. Examining the benefit distributions of a program within a country at successive points in time may help identify the marginal beneficiaries of the program expansion (see Selowsky, 1979 and van de Walle, 1992). In addition, behavioral models, such as those developed by Gertler et al., may allow the researcher to simulate the effect of small policy changes on the beneficiary mix. Finally, more detailed institutional analyses of barriers to participation in certain programs, as discussed below, may offer important insights into the marginal beneficiaries of policy interventions and of expanded program expenditures.

Aggregate Measures of Progressivity. Several researchers have followed Reynolds and Smolensky (1977), who report pre-fisc and post-fisc Gini coefficients.[11] While such aggregate or "global" measures make comparisons of progressivity among studies more expedient, there is clearly a loss of information as one moves from reporting the incidence results by decile and by government program or functional expenditure category, to any aggregate measure. Thus, we are skeptical about the practical value of aggregate measures.

Furthermore, we believe that better targeting of benefits to the poor requires the greatest possible disaggregation of the benefit data. For instance, in the health sector it is far more useful

to report benefit incidence by type of care and by health program, than to report the benefit incidence from aggregate spending on health care. The former allows a quick assessment of the distributional impact of reallocating resources within the health sector, whereas the latter only allows one to gauge the overall impact of moving resources into or out of the health sector.

Computable General Equilibrium Models

Piggott and Whalley (1987) have analyzed net fiscal incidence for the Australian economy within a computable general equilibrium (CGE) context. The model is quite complex even though Piggott and Whalley make many simplifying assumptions, such as efficient provision of public goods. The main point of their exercise is to compare the results from a general model that accounts for the consumer surplus from public goods and for the marginal welfare costs from taxation to the results from a more typical case in the literature where taxes and benefits are simply allocated among households throughout the income distribution.

Three major points emerge from their model. First, for marginal increases in public goods, consumer surplus effects from additional public goods are minimal, but the welfare effects of taxes used to finance the additional public goods are substantial. Second, if public goods are substantially reduced, the consumer surplus effects can be substantial and the reduced consumer surpluses affect low-income and high-income households differentially. According to their simulations, smaller marginal reductions in public goods favor higher income households. A third finding is that the general equilibrium welfare results can range from favoring high-income households to favoring low-income households depending on their assumptions about the elasticities among substitution of goods in the household utility functions.

The results of the general equilibrium analysis do not bode well for reaching definitive answers on benefit incidence or on net fiscal incidence. The sensitivity of the general equilibrium results to parameter specifications of the model means that definitive answers to benefit incidence depend on the accurate estimation of the parameters of the model. Absent better empirical knowledge about functional form and elasticity parameters, general equilibrium models may dramatize the weaknesses in benefit incidence studies but the models may also not yield precise estimates of fiscal incidence.

Two Measures of Benefits for Local Public Goods

Several researchers have estimated a demand curve for local public goods through evidence on voter behavior or property values.[12] The resulting demand curves can then be used to derive consumer surplus measures of public good benefits. In one recent example, Martinez-Vasquez (1982) estimates a demand function for local public goods in St. Louis using cross-section data for the State of Missouri. From the demand function, he derives the marginal benefits of local public goods, matches them with tax shares paid by individuals, and derives a measure of the net fiscal incidence of local public goods across income and other population groups.

Chaudry-Shah (1989) uses the capitalization of expenditures and taxes into property values as another vehicle to measure fiscal benefits. He sets up hedonic equations and measures the impact of expenditure benefits and taxes on property values in the Edmonton, Canada metropolitan area.

Both the demand curve and capitalization methodologies have only been applied using cross-sectional data; as the application of the methods requires that the expenditures on the good vary systematically with the location of the recipient. The hedonic or capitalization approach has some further limitations in that the methodology assumes that both benefits and tax burdens are fully capitalized into property values. Yinger (1982) using bid-rent theory has shown that benefits will not be totally capitalized into property values. The less than total capitalization of benefits implies that the hedonic method does not offer much promise for accurate estimation of local net fiscal benefits.[13]

III. Methodological Issues Specific to Developing Countries

In addition to the general methodological points discussed in section II above, benefit incidence studies for developing countries encounter a number of special considerations. These include the large role that state enterprises may play in the delivery of specific public goods, disparity in services provision between urban and rural areas and within urban and rural areas, resalability of specific public goods, the expanded role for agricultural subsidies, as well as the

influence of public services on rural to urban migration. These issues apply to some extent in developed economies, but take on special importance in developing economies.

Public Enterprises

Important public infrastructure services such as water, sewerage and electricity in many developing countries are delivered through public enterprises. In estimating benefits, the economic costs for services of the enterprise should be considered along with the amount of user fee paid for the service. In some countries, the user fee will equal the cost of the service and ideally, consumer surplus or compensated variation should be used to measure consumer benefits. If the enterprise runs an economic loss, then the net subsidy from central revenue should also be allocated to households that receive these subsidized services.[14] Deciding the amount of the implicit subsidy from the central government will generally not be an easy matter, especially for enterprises that report accounting profits, but actually suffer economic losses.

The benefits from access to public services, such as power for example, may appear concentrated in the middle and upper income deciles of the population and in more urbanized areas. However, some households may install evasion devices so that their electricity use is not detected and billed. The implicit subsidy involved with illegal connections is often pro-poor.[15] In summary, public enterprises with their subsidies and user fee orientations pose a particularly challenging service provision area for benefit estimation.

The Geographic Distribution of Benefits

In many instances both the quantity and quality of output from a public service vary by location within a country. This regional variation is particularly acute between urban and rural regions. In developing countries regional variation in service delivery, together with regional differences in cost-of-living, make it very important to report results at least for urban and rural regions (particularly given the large fraction of the population living in rural areas in most developing countries) and for other relevant regional divisions within the economy. In particular, services from public enterprises, schools, health clinics and hospitals, and transportation may have differential impacts in urban and rural areas, in addition to the more obvious examples of agricultural programs and land reform.

There can also be significant variation in public services within the urban and rural sectors, underscoring the point made above. For example, Selowsky (1979) finds significant variation in educational, health and public utility services among urban areas of different sizes. Meerman (1979) finds significant variation in many public services among different rural provinces of Malaysia.

In-Kind Transfers and Informal Markets

The potential for resale of in-kind goods provided by the government exists in both developing and developed countries. However, this potential may be greater in most developing countries due to their larger informal sectors. To the extent that informal sector resale occurs, the in-kind good provided to one person may confer benefits on several more individuals. For example, sellers of in-kind goods receive the benefit income from the sales net of queuing costs but buyers receive the consumer surplus from the good.[16] Such transactions will make tracing the benefits of public services particularly difficult, as individuals are unlikely to reveal in household surveys the resale of in-kind goods.

Government Benefits and the Intrafamily Distribution of Resources

While many studies in developing countries use the household as the unit of analysis, this ignores important effects of government programs on both intrafamily transfers among related households and the intrahousehold distribution of resources. A first set of issues concerns the difficulty of defining what constitutes a family in developing countries. Often the most appropriate resolution of this issue would depend on the culture of the country, but available survey data may not support culturally-relevant family definitions. For example, in Jamaica, fathers may have children by several women while being married to none of them. Yet the father may provide partial support to the children and the mothers. Identification of such families may not be possible with existing data.

Another set of issues concerns the potential of government benefits to displace the existing pattern of intrafamily transfers.[17] For example, Cox and Jimenez (1992) estimate that the institution of social security payments in Peru reduced private transfers from young to old by 20 percent.

Finally, government programs may differ in their effects on the intrahousehold distribution of resources. For instance, recent theoretical analyses illustrate the well-known possibility that in-kind benefits, being less fungible than cash benefits, can in some cases be more effectively targeted at particular household members (Ross, 1988). Thus, benefits in the form of food or education can be more beneficial for children than cash of equal value, if cash benefits accrue differentially to the head of household (World Bank, World Development Report, 1990). Also, many projects influence the role and status of women in the household (Fryer, 1986), though comparatively little is known about such effects.

Food and Agricultural Programs

In many developing nations the agricultural sector plays a fundamental role in development. Much of the population is directly or closely involved with agriculture (including many of the most disadvantaged members of society), and a large fraction of GDP typically originates in the agricultural sector. Thus, agricultural growth rates and the distribution of income within the rural economy are of interest in and of themselves. Also, development theory has long stressed the importance for growth of transferring agricultural resources, both peasant labor and agricultural output, to the industrial sector (Lewis, 1954; Fei and Ranis, 1964; Sah and Stiglitz, 1987)--though excessive migration from rural to urban areas can cause crowding, unemployment, poverty-stricken squatter colonies, and civic unrest (Williamson, 1988, surveys this literature).[18]

Agricultural programs in developing countries include: subsidization (or taxation) of fertilizer, seed, and pesticides; subsidization of credit; subsidization of technology adoption; subsidization (or taxation) of output and use of price controls, including government purchases (sales) and trade restrictions; irrigation schemes, improved transportation, and other rural public works; and pro-poor land redistributions, restrictions on tenure, land settlement, and the consolidation of holdings. Of these, only output taxation, regulation of trade, and regulation of land tenure would not be classed as government expenditures.

Conventional analyses of these programs typically allocate benefits to households in proportion to farm income, though in some cases benefits are partially allocated to food

consumers or to farmers in particular income brackets (DeWulf, pp. 87-88, surveys the early literature; see also Meerman, 1979; Foxley et al., 1979; Bahl et al., 1986).[19] These allocation rules assume that there is zero benefit shifting. In addition to the benefit shifting that reflects the relative elasticities of supply and demand, benefit shifting may arise due to interlinked markets and informal labor contracts, changing social sharing mechanisms, and migration effects.

Programs involving input subsidization, credit subsidization, technology subsidization, or output subsidization can all be analyzed as negative taxes. In developed country tax incidence studies, commodity subsidies are often believed to be at least partly passed forward to consumers. One argument against forward shifting to consumers of subsidies in developing countries is that in many cases the government maintains a fixed consumer price via export (import) controls or government purchases (sales) (Meerman, p. 234). However, shifts in agricultural subsidies would require additional government policy changes to maintain fixed consumer prices (Sah and Stiglitz, 1987). Thus, the analyst faces a very complex issue.

In any event, even when subsidies do accrue to the agricultural sector, the subsidies may not accrue to intended low-income farmers. For example, traditional economic relations in agricultural markets are often characterized by interlinked markets and informal labor contracts, whereby peasants, who may be the statutory beneficiaries of subsidies, are kept near subsistence through a variety of channels as landlords, moneylenders, and merchants appropriate any increases in surplus (Braverman and Stiglitz, 1984; Bhaduri, 1983; Bell, 1988). Thus, in many countries sizable fractions of the population remain indebted, landless, and near subsistence, even in the post-fisc equilibrium, raising doubts as to the distributional effects of government subsidies.

Benefits from government land reform and land settlement are typically treated differently than other benefits. Meerman assumes that land settlement costs accrue to resettled households. Foxley assumes that land reform costs benefit agricultural labor. Both approaches encounter the well-known problem that cost may be a poor proxy for benefit (especially given the investment nature of such spending). In addition, while land reform often offers the only prospect of breaking the cycles of poverty inherent in an unequal distribution of land, critics observe that the

poorest farmers quickly return to their landless state. If social support systems have been destroyed in the process of reform, the poorest members of society may even be net losers (Fitzgerald, 1987). The allocation of benefits is clearly problematic in this context.

Migration

Many developing countries are vulnerable to brain drains or the loss of the investment in human capital when wages or other amenities are higher in alternative countries (Lee and Tan, 1984). Government funded scholarships for attending universities in other countries often carry provisions that require the recipient to return to the home country and work for the government for a period of time. Enforcement, however, varies widely among countries. In addition, residents educated at domestic universities or high schools often can emigrate with few or no restrictions.

In addition to emigration from the country, public services will often induce migration from the rural to the urban areas. Better educational opportunities, better infrastructure and the prospect of a job in the modern sector could induce migration from the rural to the urban areas of a country (Todaro, 1969; Williamson, 1988), and thus shift benefits between regions. Providing better public services in urban compared to rural areas can lead to lower relative wages between urban and rural areas if the public services differential induces migration from rural to urban areas. The wage effects of geographically specific public services may significantly offset the benefits from providing urban public services.

IV. Developed Country Benefit Incidence: Empirical Results

The benefit incidence literature for developed countries focuses primarily on the direct benefits of government spending as proxied by their costs, largely ignoring the income and price effects of government spending and making at most, minor allowances for benefit shifting. Studies of this type for the United States include Gillespie (1965), Aaron and McGuire (1970), Herriot and Miller (1972), Musgrave, Case, and Leonard (1974), Maital (1973, 1975), Reynolds and Smolensky (1977), and O'Higgins and Ruggles (1981a).[20] Other developed country studies

include LeGrand (1982) and O'Higgins and Ruggles (1981b) for the United Kingdom, Gruske (1985) for West Germany, and Leu et al. (1985) for Switzerland.

Of these, only O'Higgins and Ruggles (1981a and 1981b) allocate expenditures by variables other than income, including number of earners per household, race, and sex. However, they do not examine these variables in conjunction with income. In none of the studies is household income adjusted for household size or composition. Nor do the studies consider the benefit effects of government spending on the intra-household distribution of resources.

Table 1 summarizes the main findings of this literature. There is general agreement that among the studies that specific government services have a pro-poor distribution in percentage terms when benefits are calculated as a percentage of income. Transfer payments are clearly pro-poor, and the allocation of so-called pure public goods depends greatly on one's assumptions about the distribution of their benefits among households.

However, examining the distribution of expenditure (not as a percentage of income) on specific government services in each group can yield very different answers about progressivity (DeWulf, 1975; and Meerman, 1979), as the results reported in Table 1 also indicate. Given the different conclusions reached from these two benefit incidence measures (expenditure and expenditure as a percentage of income), we recommend following O'Higgins and Ruggles (1981a and 1981b) who report both sets of figures. We examine these results in greater detail below.

Specific Government Services

Specific or "allocable" government services include education, agriculture, highways, and a variety of in-kind transfers (including transfers in the form of health care, housing, and food).[21] Educational benefits are typically distributed on the basis of school-age children per household. In the United States education benefits are generally found to be pro-poor in percentage terms and pro-rich in dollar terms. Similar results are found for the United Kingdom (O'Higgins and Ruggles, 1981a and LeGrand, 1982) and Switzerland (Leu et al.). However, such conclusions may be premature insofar as the studies surveyed typically ignored the following considerations: (i) the investment return to educational achievement across income groups,

TABLE 1

SELECTED INCIDENCE STUDIES FOR DEVELOPED COUNTRIES[a]

Study, Country, Year of Data	Allocables (Net of Transfer)	Transfers	Public Goods	Total
Reynolds and Smolensky, United States, 1950	- (+)	+ (+)	-[c] (+)	- (+)
Gillespie, United States, 1960				
Scenario A	o (+)	+ (+)	o[d] (+)	o (+)
Scenario B	o (+)	+ (+)	-[e] (o)	- (+)
Scenario M	o (+)	+ (+)	-[f] (-)	- (+)
Reynolds and Smolensky, United States, 1961	- (+)	+ (+)	-[c] (+)	- (+)
Herriot and Miller, United States, 1968				
Scenario C	- (+)	+ (+)	o[d] (+)	o (+)
Scenario A	- (+)	+ (+)	-[e] (+)	- (+)
Scenario M	- (+)	+ (+)	-[f] (-)	- (+)
Musgrave, Case, and Leonard, United States, 1968				
Scenario POP	+ then - (+)	+ (+)	-[g] (+)	- (+)
Scenario INC	+ then - (+)	+ (+)	-[e] (o)	- (+)
Scenario CAP	+ then - (+)	+ (+)	-[h] (+)	- (+)
O'Higgins and Ruggles, United Kingdom, 1981				
Scenario 1	+ then o (+)	(i)	-[d] (+)	o (+)
Scenario 2	+ then o (+)	(i)	-[e] (o)	- (+)
Scenario 3	+ then o (+)	(i)	-[h] (+)	- (+)
Leu, Frey, and Buhmann, Switzerland, 1980	NA (+)	[illegible]	[j] (+)	NA (+)
Grüske, West Germany, 1963-78	- (0)	NA (+)	0[d] (+)	- (+)

[a]"+" = pro-poor, "o" = neutral, and "-" = pro-rich. The reported progressivity results are based on the distribution of expenditures across income deciles. The signs in parentheses are progressivity results based on expenditure as a percentage of income in each decile. For a more detailed presentation of these results, including more extensive notes on the various methodologies, see Selden and Wasylenko (1990).

[b]Typically includes defense, international security, public health, and other general expenditures.

[c]Distributed one-half by households and one-half by household income.

[d]Distributed by households.

[e]Distributed by household income.

[f]Maital's (1975) calculations based on Aaron and McGuire (1970) (treats all non-transfer expenditures as public or general.)

[g]Distributed by individuals.

[h]Distributed by capital income.

[i]Transfers included with allocable expenditures in first column.

[j]Distributed one-half by population and one-half by income.

SOURCES: Reynolds and Smolensky, 1977, pp. 112-114, 124-129; Gillespie, 1965, pp. 138, 139, and 174; Herriot and Miller, 1972, pp. 46, 49; Musgrave, Case, and Leonard, 1974, pp. 285, 292, 294, and 300; O'Higgins and Ruggles, 1981a, pp. 307-308; Leu, Frey, and Buhmann, 1985, p. 353; Grüske, 1985, pp. 245-248.

(ii) the distinction between measuring benefits and allocating costs, (iii) the wide variation in school quality across jurisdictions (an obvious problem if quality is correlated with income).

Benefits from government health spending, in the United States are typically found to be pro-poor in both dollar and percentage terms (Gillespie, 1965; O'Higgins and Ruggles, 1981b), though a number of studies do not report health benefits separately from other social services. In the United Kingdom, however, health care benefits are not pro-poor as households in the lowest-income deciles (O'Higgins and Ruggles, 1981a) and in lower socio-economic groups (LeGrand, 1978) use the national health service at lower than average rates. Thus, health spending in the United Kingdom is typically pro-poor only when benefits are measured as a percentage of income. Health spending in Switzerland is distributionally neutral in absolute terms (Leu et al., 1985). Thus, even in developed countries national health systems may be less pro-poor than more carefully targeted programs.

Government expenditures on agriculture primarily consist of crop price supports (prior to 1980 these were largely crop purchases). Other agricultural expenditures include extension, research, and farm mortgage insurance (typically ignored, since it is an off-budget item). Agricultural expenditures are typically distributed on the basis of farm proprietorship (e.g., Musgrave, Case, and Leonard, Table 5) or net farm income (e.g., Reynolds and Smolensky, Tables E.1-E.3). Because farm ownership increases with income, but more slowly than income, the studies surveyed conclude that agriculture expenditures are pro-poor in percentage terms and pro-rich in absolute terms.

Government highway expenditures in developed economies are small in relation to all government expenditures (roughly 5 percent in the United States in 1970). Highway expenditures are typically allocated to households as drivers of automobiles and to households as consumers of transported products (this is perhaps the only time benefit shifting is brought into the analyses). Reynolds and Smolensky use a 50-50 split between drivers and consumers (Reynolds and Smolensky, Table E.2), while Musgrave, Case, and Leonard use a two-thirds/one-third split (see their Table 5). No authors explicitly account for the investment nature of highway

expenditures, an especially large problem given the positive net investment during all periods analyzed.

Transfer payments are clearly pro-poor in both absolute and percentage amounts if they are fully allocated to recipients in any given year. However, these incidence measures of public transfers do not account for their displacement effects on interhousehold private transfers. Moreover, social pension payments should probably be viewed from a lifetime perspective, accounting for both taxes paid and cash benefits received. O'Higgins and Ruggles analyze social pensions by age bracket and offer a perspective on the incidence of transfer payments across generations of beneficiaries. Benefit analysis by age and income bracket helps distinguish between the incidence on the younger and older elderly and discern how the lowest income households fare in each generation of elderly.

General Public Goods

There is widespread disagreement not only about how to distribute general public good benefits, but also about which goods and services to include in this category. Most authors follow the Tax Foundation (1967) definition of public goods to be "national defense, general government (excluding interest), transportation (excluding highways), commerce and finance, housing and community developments, health and sanitation, civilian safety and miscellaneous" (from Aaron and McGuire, p. 915). Other authors exclude public housing and health expenditures, allocating benefits from those goods on the basis of use. Unfortunately, as noted by DeWulf (1981, p. 69), no studies allow public good income elasticities to vary by the type of public good, so that programs as different as defense and community development are assumed to have the same relationship between benefits and income.

Benefit incidence for general public goods in the United States, the United Kingdom and Switzerland are presented in Table 1. General goods are widely agreed to be pro-poor in percentage terms and pro-rich in dollar terms, though many authors have criticized the results for the arbitrary assumptions used to distribute benefits among households.

In contrast to the standard benefit incidence results above, Piggott and Whalley use a CGE model for Australia to calculate both the marginal benefit and the full consumer surplus measures

from general public goods. In particular, their marginal benefit measure suggests that general expenditures are pro-poor, while their equivalent variation measures suggest the reverse. While the assumptions underlying their results are no less restrictive than the studies in the Aaron and McGuire marginal benefit tradition, the CGE results illustrate the problems involved when marginal benefit measures are used to make inferences about large changes in public programs.

V. Developing Country Benefit Incidence: Empirical Results

Studies of Total Public Expenditure Benefits

Since the critical review by DeWulf, we are aware of only four comprehensive benefit incidence studies: Meerman (1979) for Malaysia, Foxley et al. (1979) for Chile, Bahl et al. (1986) for Korea, and Riboud (1990) for Costa Rica. Of these studies, Foxley et al., and Bahl et al., examine all government expenditures, whereas Meerman and Riboud place most of their emphasis on specific government expenditures. The results of these full benefit incidence studies are presented in Table 2. All four studies find government expenditures to be pro-poor in percentage terms, while Meerman and Foxley et al., find government expenditures to be pro-rich in dollar terms and Riboud finds government expenditures to be neutral in dollar terms.

In Meerman's benefit analysis, only about 33 percent of expenditures are allocable directly to households based on their use of particular government services. Other specific expenditures are assigned to households in proportion to their income, but Meerman does not assign to households the benefits from general or unchargeable expenditures.[22] The total benefits based on use of services, have a pro-rich distribution, but less so than the benefits assigned in proportion to income.[23]

Foxley et al., analyze Chilean public expenditures (and taxes) using a 1969 survey of households in Chile. They follow Meerman's methods for allocating specific services to households based on their utilization of the service, when information of the service utilization is available. Nonetheless, most of the analysis allocates expenditures to households based on consumer expenditure, household income and, in some cases, on a per household basis (see Foxley et al., Table 21). The results also show that the distribution of expenditures is more

TABLE 2

SUMMARY RESULTS FOR TOTAL PUBLIC EXPENDITURE BENEFITS IN FOUR DEVELOPING COUNTRIES

Author, Country, Year of Data	Total Expenditures
Meerman, Malaysia, 1974	–[a]
Bahl et al., South Korea	
Urban 1965	+
1968	+
1971	+
1974	++[b]
Rural 1965	+
1968	+
1971	+
1974	+–[b]
Foxley et al., Chile	
I	+
II	+
Riboud, Cost Rica, 1986	+

[a]A "plus" indicates that public expenditures are pro-poor on equality enhancing, while a "minus" indicates that public expenditures reduce equality on a pro-rich. Progressivity results are based on expenditure as a percentage of income compared across income groups. Bahl et al. also examines the percent of total expenditure spent in each income class. They find expenditures distributed more equally than income and with more progressivity over time.

[b]A "++" indicates that public expenditures are pro-poor and have become increasingly pro-poor in that region of the country during the 1965 to 1974 time period. A "+–" indicates that public expenditures are pro-poor but have become less pro-poor in that region of the country during the 1965 to 1974 time period.

SOURCES: Meerman, 1979, p. 321; Bahl et al., 1986, pp. 150-215; Foxley et al., 1979, p. 119; Riboud, 1990, Table III. 4.

pro-poor than the distribution of income. Unfortunately, the lowest income group in the Foxley et al. study has 30 percent of the households in Chile. To some extent the most interesting part of benefit incidence is what happens within the lowest 30 percent of the income distribution, especially to the bottom 10 or 20 percent of the households in the income distribution. Thus, their results shed little light on benefit incidence in the poorest households.

Bahl et al. examine the distribution of benefits in South Korea, in conjunction with taxes, for 1965, 1968, 1971, and 1974. They analyze benefits for urban and rural residents using household data. The data are separated into current and capital components, and 5 percent of the annual capital expenditure is assumed to accrue to households as capital services in the current year. Debt repayment is used to approximate the current services that accrue to households from past capital expenditures. Because debt repayment is apparently not available by expenditure category, Bahl et al. do not present benefits for individual functions. However, they do allocate the general components of expenditures to households based on both a household income or on a per household basis. For example, one-half of health benefits is allocated to households based on household income and one-half of health benefits is allocated on a per household basis. One-half of education expenditures is allocated to households based on the number of students in the household and the balance is allocated on the basis of household income. They use income, consumption or per household bases to allocate expenditures on other functions to households.

The results suggest that benefits are distributed more equitably among family income deciles than income. Moreover, in urban areas, the modernization of South Korea lead to a more equitable distribution of benefits in 1974 than in 1965. But while the distribution of benefits in rural areas is pro-poor in 1974, it is not as pro-poor in 1974 as in 1965.

The results of this study are interesting, but not very rich in comparison to the more elaborate analysis of the health and education sectors that Meerman and others offer. Nonetheless, the Bahl et al. study represents what is feasible when all functions are included in the analysis, several different years are analyzed and the time frame for completing the project is limited.

Education

Government expenditures on education average roughly 11 percent of total government spending in low-income and lower-middle-income developing countries. However, perhaps because of issues surrounding equality of opportunity, rigidity in class structure, the external effects of human capital, and interest in increasing fees to finance secondary education, education has played a central role in the benefit incidence literature (for an early discussion of these issues, see Psacharopoulos, 1977). In particular, existing benefit incidence calculations offer important insights into the likely effects of reallocating government resources from higher education to primary or secondary education.

Several recent studies done for various developing countries examine the distribution of educational benefits across income classes (see Table 3). Meerman (1979) for Malaysia and Selowsky (1979) for Colombia represent the best known studies, but Foxley et al. (1979) for Chile, Castenada (1989) for Chile, Riboud (1990) for Costa Rica, and Selden and Wasylenko (1992) for Peru also report benefit results for education. Additional benefit incidence studies for education include Jallade (1974) for Colombia, Dasgupta and Tilak (1983) for India, Meesook (1984) and van de Walle (1992) for Indonesia, Hammer et al. (1992) for Malaysia, and Petrei (1987) for five countries in Central or South America.

All of these studies use household surveys to examine school attendance by household and allocate educational benefits to households based on the number of children in the household attending school. Most examine the distribution of benefits separately for urban and rural households, and in some cases for households in different size urban areas. Meerman also examines the benefits across races within Malaysia.

The studies typically find that benefits are pro-poor as a percentage of household income for primary and secondary education and pro-rich for post-secondary education. Indeed, benefits from primary and secondary education are often pro-poor when examined on a dollar basis, as well. The pro-poor incidence occurs due to the greater number of children in lower-income households. Thus, the results of these studies summarized in Table 3 generally confirm the arguments of Psacharopoulos (1977) that expenditure on primary education is pro-poor, while

TABLE 3

DISTRIBUTION OF EDUCATIONAL SUBSIDY IN SELECTED DEVELOPING COUNTRIES, BY COUNTRY AND REGION

Author, Year of Data, Country	Primary	Secondary	Higher Education	Total
Total Country				
Meerman, 1974, Malaysia (expenditure)[b]	+[a]	0	–	+
Selowsky, 1974, Colombia (expenditure)	+	+	–	0
Jallade, 1970, Colombia (expenditure)	NA	NA	NA	–
Foxley, et al., 1969, Chile (expenditure/income)	+	+	+	+
Castenada, 1986, Chile (expenditure)	+	+	–	+
Petrei (contribution to Gini Coefficient)				
Argentina	+	+	–	+
Costa Rica	+	+	–	+
Chile	+	+	–	+
Dominican Republic	+	–	–	–
Uruguay	+	+	–	+
Meesook, 1978, Indonesia (Share of recurrent expenditure compared to share of school-age children)	+	?	–	–
van de Walle, 1987, Indonesia (expenditure)	+	–	–	0
Dasgupta and Tilak, 1977, Andhra Pradesh India (expenditure)	+	+	–	+
Selden and Wasylenko, 1985, Peru (expenditure)	+–	+–	+	NA
Hammer, Nabi, and Cerone, 1989, Malaysia (expenditure)	+	+	–	+
Urban				
Selowsky, 1974, Colombia (expenditure)	+[a]	?	NA	+
Jallade, 1970, Colombia (expenditure)	?	?	–	–
Petrei (contribution to Gini Coefficient)				
Costa Rica	+	+	–	0
Uruguay	+	+	–	+
Meesook, 1978, Indonesia (Share of recurrent expenditure compared to share of school-age children)	+	+	–	–
van de Walle, 1987, Indonesia (expenditure)	+	–	–	+
Dasgupta and Tilak, 1977, Andhra Pradesh India (expenditure)	+	+	–	+
Selden and Wasylenko, 1985, Peru (expenditure)	+–	+–	+	NA

TABLE 3 (CONT.)

Author, Year of Data, Country	Primary	Secondary	Higher Education	Total
Rural				
Selowsky, 1794, Columbia (expenditure)	+	–	NA	+
Jallade, 1970, Columbia (expenditure)	NA	NA	NA	+
Petrei (contribution to Gini Coefficient)				
Costa Rica	+	–	–	+
Uruguay	+	–	+	+
Meesook, 1978, Indonesia (Share of recurrent expenditure compared to share of school-age children)	+	?	–	–
van de Walle, 1987, Indonesia (expenditure)	+	–	–	+
Dasgupta and Tilak, 1977, Andhra Pradesh India (expenditure)	+	+	–	+
Riboud, 1986, Costa Rica (expenditure)	NA	NA	NA	?
Selden and Wasylenko, 1985, Peru (expenditure)	+–	+–	+	NA

[a]+ = pro-poor; – = pro-rich; 0 = neutral; +– = expenditures per household increases for first few deciles and decreases thereafter; ? = no clear pattern; NA = not available.

[b]Expenditure indicates that the equality conclusions are based on educational expenditure for households across income groups; expenditure/income indicates that the equality conclusions are based on educational expenditures as a percentage of income across income groups.

SOURCES: Meerman (1979), p. 112; Selowsky (1979), pp. 66-67; Jallade (1974), pp. 36-40; Foxley et al. (1979), Castenada (1989), pp. 30 and 60; Petrei (1987), pp. 84-88; Dasgupta and Tilak (1983); Meesook (1984); Riboud (1990), Table III.4; van de Walle (1992), Table 14; Selden and Wasylenko (1992), Table 3.

expenditure on higher education levels tends to be pro-rich, but the exact point in the education system at which the rich become favored differs among countries. These same results generally hold for both urban and rural areas, although secondary education is less likely to be pro-poor in rural areas than in urban areas due to low attendance rates by the poor in rural areas.

Incidence patterns based on a single year of data may not capture accurately the changes in behavior or policy that are in progress. For example, van de Walle (1992) examines education in Indonesia and compares her results to those obtained by Meesook for 1978. The education subsidy in 1987 is about as pro-poor as it is in 1978. However, in 1987, children from poorer households are much more likely to attend lower and senior secondary schools than they are in 1978. For Malaysia, Hammer et al. (1992) find that educational subsidies at the primary and secondary level favor the poor more in 1989 than in 1974. Higher education subsidies continue to favor higher-income households, however.

Selden and Wasylenko find that in Peru the incidence pattern for educational subsidies per school-age child differs from the incidence pattern for educational subsidy per child in school. The former pattern tends to be less pro-poor than the latter at lower-income deciles, because a lower proportion of children from lower-income households attend school, and thus, do not receive the educational subsidy. However, at higher-income the incidence pattern of educational subsidies per school-age child is also less pro-rich deciles than the per child in school measure. Children from higher-income households are more likely to attend private schools and thus forego the educational subsidy. In Peru at least, and probably in other countries, differences in the patterns of school attendance among children in different deciles and differences in the number of children in different deciles affect the incidence pattern.

These studies encounter a number of methodological problems. For instance, marginal benefits may decline with the level of education. In this case, studies that only allocate expenditure and not total benefits may underestimate the degree to which education expenditure benefits the poor, as they are more likely to consume primary education, which may have a higher marginal benefit than secondary education. Better measures of benefits would be based on willingness to pay, an approach pursued by Gertler and Glewwe (1989). Also, researchers

differ on the measurement of capital inputs. Many studies ignore capital expenditure. Bahl et al. allocate 5 percent of new capital expenditure as capital services accruing in the current year and allocate repayments on existing debt as a proxy for the services from the existing capital stock. In contrast, Meerman estimates the flow of services from the education capital stock as the (estimated) capital stock multiplied by an interest rate of 15 percent (i.e., depreciation and opportunity costs).

Another area of methodological weakness involves life-cycle questions. For instance, James and Benjamin (1987) in a study of Japan show that families with younger household heads are more likely to have both young children and low incomes while families with older household heads have older children and higher incomes due simply to the age-earnings profiles. Selden and Wasylenko (1992) find a similar pattern in Peruvian household age composition and income. At any point in time then primary education expenditures will look more pro-poor and higher education expenditures more pro-rich than they would if education expenditures were viewed from a lifetime perspective based on the permanent income of the household and total education received by household members. Another life-cycle issue missed by all studies is that in some countries college graduates are entitled to government positions they may not otherwise obtain. Thus, government spending on such individuals does not always end with graduation.

Finally, the studies all ignore changes in relative prices, incomes, and location. For instance, because rural-urban migration may be due to geographic differences in public services as well as wage differentials, and because education expenditures exhibit an urban bias, the urban benefits to education expenditures may be at least partially dissipated through increased urban crowding, lower wages, and higher land prices. In addition, benefit studies typically do not account for educational service quality differences between urban and rural areas.

Despite these caveats, benefit incidence studies can yield important insights into proposed changes in education, such as reallocating resources from higher education to primary and secondary education. A second policy might be to increase user fees for all or some levels of education. Here the evidence to date suggests that this may have adverse consequences for the poor, particularly if fees are increased for primary education. A third policy might be to target

stipends to poor students at all levels of education. In this regard, Meerman (1979) and Chernichovsky and Meesook (1985) look at the indirect costs--uniforms, transportation, foregone labor earnings and other expenses--of schooling that can become a relatively high share of income for low-income households and deter school attendance.[24,25]

Health

Government health expenditures total roughly 5 percent of government expenditures in developing countries (de Ferranti, 1985). While these expenditures are only a small portion of total spending, there has been considerable interest in recent proposals for increased user fees, improved efficiency of health care providers, and reallocation of resources from curative to preventive care. Distributional questions have played a central role in this debate, both because health care costs can be large relative to the incomes of the poor, and because of what Musgrave termed "merit goods arguments" in favor of universal health care.[26]

Recent benefit incidence calculations for public health spending in developing countries include Sahota (1977) for Panama; Meerman (1979) for Malaysia; Selowsky (1979) for Colombia; Foxley et al. (1979) for Chile; Meldau (1980) for Colombia; Meesook (1984) and van der Walle (1992) for Indonesia; Bahl et al. (1986) for South Korea; Petri (1987) for five Central or South American countries; and Riboud (1990) for Costa Rica. These studies employ a wide variety of methods for estimating expenditures and for allocating the expenditures on government health programs to households.[27] Incidence simulations based on willingness to pay have also been performed by Gertler et al. (1988) for Peru. Finally, recent studies that provide a wealth of distribution-related data, but do not provide formal benefit incidence analyses include Griffin (1990) for Asia and Castenada (1989) for Chile.

There are a large number and variety of government health programs in many developing countries and each has very different distributional implications. It follows that the best benefit incidence studies rely on survey data of household utilization of specific health services (e.g., Meerman, 1979; Hammer et al., 1992; Selowsky, 1979; and Foxley, 1979; Meesook, 1984; van de Walle, 1992; Riboud, 1990). In all cases, care must be taken to account for both monetary and nonmonetary costs of the household of utilization, especially since fees often vary with

ability to pay.[28] Moreover, the quantity and quality of care received may differ from utilization or the number of trips made to physicians or hospitals per se. Nevertheless, efforts to determine benefit incidence based on household utilization data for individual programs can be much more informative than simply allocating the benefits of the health care system as a whole by household income, by household size, or as a general good.

Benefits from curative health care expenditures are typically pro-poor in percentage terms (less so in dollar terms) (see Table 4). When researchers are able to distinguish among types of care, inpatient care is less pro-poor than outpatient care, which is, in turn, less pro-poor than preventive care. However, the incidence results vary greatly among countries. Riboud examines 1986 data for Costa Rica reported by Sauma and Trejos (1990) that suggest health expenditures in that country are significantly pro-poor. Hammer et al. (1992) find that health expenditures in Malaysia favor the poor more in 1989 than in 1974. In contrast, Meesook reports 1978 data for Indonesia suggesting that government health care benefits are significantly pro-rich in that country.[29] van de Walle finds that the health care subsidy in Indonesia remains pro-rich in 1987, although the poor have captured more of the subsidy by 1987. The health care subsidy gains accrue to the urban poor in Indonesia, and the rural poor do not gain between the time periods. Selowsky and Meesook also report benefit incidence separately by region, though in both cases the separate incidence results for each region are roughly the same as the total results.

Benefit incidence analyses of health programs can provide important insights into proposed policy changes. Two policies of recent interest are: moving resources from curative to preventive care, and increasing user fees. With respect to the former, the benefits of increased prevention programs would likely be concentrated more heavily on the poor than the rich, since higher-income households already have higher rates of inoculation and other preventive measures, and the marginal benefits would likely accrue to the poor. At the same time, publicly-funded curative care tends to be less pro-poor and reductions in curative care expenditures would affect the poor less than the rich. With respect to increasing user fees, relatively high utilization by the poor of all health services suggests that the poor will pay a substantial portion of such fees (or reduce their consumption of public health). Thus, it is critical to specify how the user fees would

TABLE 4

THE BENEFIT INCIDENCE OF GOVERNMENT HEALTH PROGRAMS, BY COUNTRY AND REGION[a]

Author, Year of Data, Country	Inpatient	Outpatient and Other Public Health	Total
Total Country			
Foxley, 1969, Chile[b]	NA	NA	+ (+)
Sahota, 1970, Panama[c]	NA	NA	NA (+)
Meerman, 1974, Malaysia[b]	0 (+)	+ (+)	0 (+)
Selowsky, 1974, Colombia[b]	+ (+)	? (+)	? (+)
Petrei			
Argentina	NA	NA	NA (+)
Costa Rica	NA	NA	NA (+)
Chile	NA	NA	NA (+)
Dominican Republic	NA	NA	NA (+)
Uruguay	NA	NA	NA (+)
Meldau, 1970, Colombia[c]	– (NA)	+ (+)	+ (+)
Meesook, 1978, Indonesia	–[d] (NA)	–[e] (NA)	– (NA)
van de Walle, 1987, Indonesia	– (+)	– (+)	– (+)
Riboud, 1986, Costa Rica	+ (+)	+ (+)	+ (+)
Hammer, Nabi, Cerone, 1989, Malaysia	+ (+)	+ (+)	+ (+)
Urban			
Selowsky, 1974, Colombia[b]	+ (+)	? (+)	+ (+)
Meesook, 1978, Indonesia	–[d] (NA)	–[e] (NA)	– (NA)
van de Walle, 1987, Indonesia	– (+)	– (+)	– (+)
Rural			
Selowsky, 1974, Colombia[b]	? (+)	0 (+)	? (+)
Meesook, 1978, Indonesia	–[d] (NA)	–[e] (NA)	– (NA)
van de Walle, 1987, Indonesia	– (0)	– (+)	– (+)

[a] + = pro-poor; - = pro-rich; 0 = neutral; ? = no clear picture; NA = not available. Results are based on benefits per household. Results based on benefits/income are presented in parentheses.

[b] Results based on survey data.

[c] Results based on ad hoc allocators across households.

[d] All hospital care.

[e] Public health clinics only.

SOURCES: Foxley, 1979, p. 108; Sahota, 1977, p. 216; Meerman, 1979, pp. 158-160; Selowsky, 1979, pp. 89-96; Petrei, 1987, p. 47; Meldau, 1980, p. 138; Meesook, 1985, p. 69; Riboud, 1990, Table III.4; van de Walle, 1992, Table 18.

be levied and how the revenues generated would be spent. These conclusions are largely confirmed by Gertler et al. (1988). They estimate the demand for public and private curative care using flexible functional forms and use the estimates obtained to simulate differential expenditure incidence analyses of increased user fees, where incremental revenues are spent on reducing time costs by opening more clinics. Gertler et al. conclude that such changes would be pro-rich, reinforcing the view that while user fees can enhance efficiency, they may reduce equity unless fees are levied progressively or revenues are used in a pro-poor manner.

Electricity, Water and Sewerage

The literature on benefit incidence has typically not analyzed the benefits from public enterprises. As services are typically not metered, calculations of the net subsidies for particular enterprises to individual households are difficult to obtain. Nevertheless, the Selowsky and Meerman studies are able to examine access to electricity, water and sewerage services among income groups in Colombia and Malaysia, respectively. In addition to these two studies, Maddock and Castano use compensated variation to measure the benefits from electric services that accrue to households in Medellin, Colombia.

Selowsky examines access to infrastructure service among income quintiles in Colombia using household survey data for 1970 and 1974. He finds that households residing in urban areas having higher income are more likely to have these public services (see Table 5). Between 1970 and 1974, however, he finds a pro-poor distribution for new connections among households, but households receiving new connections are more likely to live in larger urban areas. Among households in rural areas, the new connections are not nearly as pro-poor as in the urban areas. Selowsky also examines whether supply availability or lack of demand is responsible for the lower number of connections to these public services among lower income households. His survey evidence suggests that the cost of service deters most households that are without service from connecting to the supply or that demand rather than supply constraints lead households to live without these public services.

Also using 1974 survey data, Meerman examines household access to electricity, piped water and sewerage by income quintile. His findings for Malaysia are similar to those of

TABLE 5

DISTRIBUTION OF PUBLIC UTILITY SERVICES IN TWO COUNTRIES: MALAYSIA, COLOMBIA

Author, Year of Data, Country	Urban	Rural	Country
	Electricity		
Meerman, 1974, Malaysia[b]	–[a]	–	–
Selowsky, 1974, Colombia[b]	–	–	–
Maddock and Castano, 1986, Medellin, Colombia[c]	+	NA	NA
	Household Piped Water		
Meerman, 1974, Malaysia[d]	–	–	–
Selowsky, 1974, Colombia[d]	–	–	–
	Public or Private Sewerage		
Meerman, 1974, Malaysia[e]	–	–	–
Selowsky, 1974, Colombia[e]	–	–	–

[a] + = pro-poor; – = pro-rich; 0 = neutral; ? = no clear pattern; NA = not available.
[b] Percentage of households with connections by income quintile.
[c] Compensated variation for users of electricity.
[d] Percentage of households with water supply by income quintile.
[e] Percentage of households with sewerage connections by income quintile.

SOURCES: Meerman (1979), pp. 182, 202, 213; Selowsky (1979), Tables SA-28, SA-30, SA-32; and Maddock and Castano (n.d.).

Selowsky. The distribution of service connections for electricity, water and sewerage is pro-rich, with the percentage of households in any income quintile receiving services increasing with the size of the urban area. Meerman also finds that the percentage of households connected to these services is greater for Chinese and Indian households than for Malay households.

Maddock and Castano examine the compensated variation associated with block pricing of electrical utility services in Medellin, Colombia. While they find the practice of charging higher prices for large electricity users is pro-poor, their empirical work focuses on electricity usage and does not account for households without electrical services or for households with illegal connections to electrical services (see Maddock and Castano, p. 6). Thus, the Maddock and Castano study cannot be taken as evidence of a pro-poor distribution of net benefits from electrical service. From the evidence available, the working hypothesis must be that lower income and rural households receive the least total subsidy for these public services.

The Whittington et al. (1988), Whittington et al. (1989) and Altaf et al. (1989) studies offer insight into why low income households do not connect to the public water system, even when they apparently can afford to do so. These studies suggest changes in program design that might change low-income households demand for connection to the public water system.

Altaf et al. find in Pakistan that, contrary to conventional wisdom, the annual or recurrent charge for water and not the one-time connection charge is the deterrent to the poor connecting to public systems. The availability of alternative water sources also influences the probability of connecting to public systems.

The two studies by Whittington et al. raise similar issues for two regions in Nigeria. In both regions the poor have alternative sources of water, which is from trucks that bring water to the village. Some low-income households purchase water directly from the truck, while others purchase the water from intermediaries who have purchased water from the truck. In both cases, households do not want the commitment of paying a fixed monthly charge for water, or they want the option of paying only for water during the dry season. Thus, households prefer a metered system to that of unlimited use and a fixed monthly charge. The fact that households

do not trust the quality of the water sold from the government also significantly deters households from connecting to the public water system.

Based on these results, Whittington et al. propose supplying public water to villages from a central kiosk or set of kiosks, where kiosks will be metered and water purchasers would be charged for the water that they purchase. This system avoids the substantial costs of metering all houses, and allows households to purchase the exact amount of publicly supplied water that they want. A side benefit is that the public water system can demonstrate its reliability to the households.

Food and Agricultural Programs

In many developing nations the agricultural sector plays a fundamental role in development. Much of the population is directly or closely involved with agriculture (including many of the most disadvantaged members of society) and a large fraction of GDP typically originates in the agricultural sector. Also, development theory has long stressed the importance for growth of transferring agricultural resources to the industrial sector (Lewis, 1954; Fei and Ranis, 1964; Sah and Stiglitz, 1987).[30] Finally, government food distribution programs can have important welfare effects by increasing food consumption among the poorest households and by reducing wage rates in nonagricultural occupations. We discuss agricultural programs before turning to food programs.

While any government program may differentially affect the agricultural sector through urban-rural variation, a more narrow list of government expenditures in agriculture includes: (i) subsidization of fertilizer, seed, pesticides, credit, and technology adoption; (ii) government purchases (sales) of agricultural outputs; (iii) public works development of agricultural infrastructure; and (iv) land redistribution. Benefit incidence studies that explicitly examine agriculture include Meerman for Malaysia, Foxley et al. for Chile, and Bahl et al. for Korea.

Due to the scarcity of household survey data on program participation, most studies assume that agricultural benefits are distributed in proportion to farm income, though Bahl et al. allocate benefits partly in proportion to farm income and partly in proportion to food consumption, and some authors make different distributional assumptions for land reform, small

farmer projects, and agricultural credit.[31] Moreover, due to the scarcity of cost data on individual programs, the analyses are often conducted at a very aggregate level.

Allocating the benefits of agricultural programs according to farm income leads to the conclusion that agricultural programs do not greatly affect the rural income distribution. In addition, the assumptions virtually insure that the overall contribution of agricultural programs is pro-poor to the extent rural households are poorer than urban households. While these results may be substantially correct, they offer few insights into the distributional implications of policy changes that reallocate resources among agricultural programs.[32]

The allocation of program costs by farm income involves a strong assumption that benefits are not shifted ahead to consumers. This seems unlikely even in the presence of government-imposed commodity price rigidities.[33] Benefits might also be shifted backwards to laborers. Finally, benefits may be shifted to landlords, moneylenders, and merchants, due to interlinked markets and informal labor contracts. For instance, peasants, who may be the statutory or direct beneficiaries of an agricultural program, may remain near subsistence levels of welfare in the post-fisc equilibrium as landlords, moneylenders, and merchants appropriate any increases in surplus (Braverman and Stiglitz, 1984; Bhaduri, 1983; Bell, 1988).

Given the complex shifting possibilities for agricultural benefits, one fruitful approach may be to calculate incidence using computable general equilibrium techniques. Two recent contributions in this literature are by Hertel (1989), who examines agricultural policy in the United States, and Parikh and Srinivasan (1989), who make incidence comparisons among agricultural infrastructure, fertilizer subsidies, and agricultural output subsidies. They find that the infrastructure expenditures have pro-poor distributional implications, resulting from the benefits of employment opportunities from the infrastructure projects for the poor.

Turning to food programs, Foxley et al. find the distribution of food subsidies in Chile to be pro-poor in dollar terms. Riboud (1990) also finds the distribution of food program benefits in Costa Rica to be pro-poor in dollar terms and narrowly targeted at individuals aged 5 to 14. Grosh (1990) uses survey data and finds that public food programs in Jamaica are effectively targeted at the poor. In addition, a number of studies use systems of demand equations to

simulate the welfare implications of reducing subsidies for various types of food. For instance, Laraki (1989) finds that reduced subsidies would adversely affect the poor, despite the pro-rich distribution of the food subsidy.[34]

Consumer Price Subsidies

Eastern Europe's desire to move to a private market-based economy raises questions concerning the equity effects of removing consumer subsidies. The Government of Hungary (1989) has undertaken a partial equilibrium analysis for Hungary. Data from a household survey undertaken in 1987 and updated to 1989 are analyzed. The main conclusion of the Hungarian report is that the distribution of the per capita total subsidy is pro-rich, as the amount of the per capita subsidy increases with income decile. More specifically, per capita subsidies for rent, fuels, milk and diary products, transportation, cinema and theater, and mortgage interest are pro-rich (see Government of Hungary, statistical appendix, page 39).

On the other hand, the subsidy amount as a percentage of income decreases with income decile implying that the subsidy has an equalizing effect on the distribution of income. For specific products, the subsidies to milk products, fuel, transportation, school books and mortgage interest are pro-poor when measured as a percentage of income, while subsidies to cinema and theater are still pro-rich (see Government of Hungary, statistical appendix, page 42). In addition, the analysis reveals that the total subsidy as a percentage of income increases with family size and has an urban bias.

VI. Conclusions and Suggestions for Further Research

The available empirical results for developing countries suggest that the benefit incidence of spending on human services, such as education and health, is pro-poor when measured as a percentage of income and either pro-poor or pro-rich when measured in dollar terms depending on the public service under analysis. Benefit recipients are also particularly concentrated in urban areas, perhaps because of lower delivery costs. Government agricultural programs are typically believed to be distributionally neutral in percentage terms among farmers--who may be poorer than the national average, but wealthier than agricultural laborers or rural nonfarm laborers. The

benefits of general goods, such as defense, police, and administration, are typically allocated as if they are pro-poor when measured as a percentage of recipient income and favor urban inhabitants.

For developing countries, benefit incidence studies concentrate heavily on a few countries. Few studies have been done for countries outside of Central and South America--and we are not aware of any benefit incidence studies for African countries. Given the scarcity of results and the World Bank's continued interest in distributional issues (e.g., Conable, 1990, p. 299), we believe that further benefit incidence research may yield large benefits for policy makers. In addition, while survey costs for some earlier studies were high, increasing availability of household survey data may have substantially lowered the costs of undertaking research in this area (though in some cases minor modifications of the survey instruments may be required to generate the required data).

To make sure this research is of greatest possible value to policy makers, we make a number of recommendations on conducting benefit incidence analyses. First, aggregate results based on the zero-government counterfactual rely on very strong assumptions about fixed relative prices and incomes, government efficiency, and the relationship between marginal and total benefits. Also, those studies are often not designed to identify which types of public services benefit the poor. We believe that researchers should focus more on providing benefit incidence studies on specific government functions or programs that can help policy makers reach conclusions about proposed reallocations of resources among government programs. Second, benefit incidence should be assigned to households based on household survey information on usage rather than on ad hoc assumptions that assign benefits based on income or the number of members in the household. Third, improved annual cost measures for services need to be developed, particularly with respect to capital inputs. Fourth, researchers should group households by deciles and whenever possible should consider other groupings, including household income adjusted for household composition, age, location, and other relevant socio-economic variables. Finally, careful attention to life-cycle benefits, benefit shifting, rent-seeking, out-of-pocket costs, displacement of private sector efforts, average versus marginal incidence, and

a number of other issues discussed above can significantly raise the value of benefit incidence studies to policy makers.

Of course, even if researchers adhere to these guidelines, benefit incidence analysis remains an exercise in the allocation of government outlays rather than rigorous research into welfare-based benefit measures. Thus, while we believe this literature is very informative, we also believe that it is desirable, whenever possible, to complement benefit incidence studies with other forms of research. One direction for additional research is to estimate the full consumer surpluses associated with policy reforms. Important work in this area includes the on-going research efforts of the World Bank's Living Standards Measurement Survey. Another important line of inquiry includes more "institutional" research into the details of service delivery that thwart the utilization of programs targeted by lower-income households. Important examples of this sort of research include Whittington et al., Meerman, Meesook, and Chernichovsky and Meesook.

In addition to formal research efforts, project teams will typically perform benefit incidence analyses under severe time and financial constraints. How can more formal research inform field work and missions that need reliable benefit incidence answers under more severe time pressures? In general terms, the research findings suggest several focal points for short-term missions. First, compared to other countries at similar levels of development, does the expenditure pattern for the country in question suggest a misallocation due to an unusual share of GDP spent on general goods as opposed to social services? Second, with any social service, do expenditures seem skewed towards the primary urban area relative to population living in the secondary urban or rural areas, and are expenditures concentrated on services that studies reveal benefit households in higher income deciles? Such concentrations of benefits suggest reforms, such as reallocation of services to rural areas, and increasing user fees for the social services consumed at higher income deciles. Costs recovered could then be allocated to services known to benefit the poor. Third, studies that have examined the reasons for low participation of poorer households in public services of interest to the mission can give the mission a head start in identifying potential institutional barriers preventing the poor from consuming services. Armed

with a set of potential problems in targeting benefits to the poor, missions can identify alternative programs or specific short-term studies that could lead to more effective policy making.

Endnotes

1. For two reviews of the tax incidence literature, see Bird and DeWulf (1973), and Shah and Whalley (1992).

2. Recent theoretical analysis of targeting include Besley and Kanbur (1988), Besley and Coate (1989), and Ravallion (1989).

3. The incidence effects of government regulations are not examined by either tax, benefit, or expenditure incidence analysis, and therefore constitute a fourth, and relatively unexamined, area of incidence analysis (Willig and Bailey, 1981).

4. There is some ambiguity in the terms pro-rich and pro-poor. Pro-rich means that benefits from public goods are higher for households with higher incomes, while the opposite holds when benefits have a pro-poor distribution. As discussed later, some research examines benefits per household in measuring pro-rich or pro-poor, while other research examines benefits as a percent of household income in measuring pro-rich or pro-poor.

5. For an excellent example of what is possible in this regard, see Meerman (1979).

6. An example of this approach that avoids double counting is Bahl et al. (1986). The reasonableness of using interest payments as a proxy for capital services depends on the country's borrowing practices, the rate of capital depreciation, and whether borrowing exclusively finances public capital rather than current expenditure.

7. Researchers have adjusted current income data in a variety of ways to account for the problems that the use of current income introduces to the incidence analysis. For example, to avoid nonsensical results in his United States tax burden estimates, Pechman (1985, pp. 77-80) eliminates from his data the 5 percent of households with the lowest current income. The households are for the most part only temporarily in the low-income group and have consumption and other variables that do not match-up with their reported current income. Davies, St. Hilaire and Whalley (1984) examine lifetime incidence of taxes for Canadian households. They find that both lifetime incidence and annual incidence analyses suggest a mildly progressive pattern for tax burden in Canada. But income taxes are less progressive in lifetime than in annual incidence calculations. Other taxes are less regressive in their lifetime incidence than in their annual incidence. In research discussed later in this paper, James and Benjamin (1987) analyze education benefits correcting for deficiencies in current income measures of well-being.

8. An exception is Burkhauser (1986) who examines the distribution of social security benefits in Panama using the earning histories of beneficiaries. While cross-section analysis based on current income suggests a pro-poor distribution, since most beneficiaries had retired, many of these beneficiaries had relatively high earnings prior to retirement, so that the distribution of benefits may, in fact, be pro-rich from a permanent income perspective.

9. Despite limitations on data to implement lifetime income and benefit incidence analysis, Auerbach and Kotlikoff (1987) and Holtzmann (1989) demonstrate the problems with the conventional single period analyses. While conventional analysis could be misleading, Holtzmann also shows that lifetime benefit analyses are very sensitive to the assumptions made about individuals' time preference, risk aversion and other parameters.

10. Meerman (1979) is an excellent example of a study that examines benefits for a number of socio-economic and geographic partitions of an economy.

11. A number of recent refinements to the Gini measure have been proposed. Kienzle (1982) and Bridges (1984) develop aggregate expenditure measures based on the tax incidence measure developed by Suits (1977). Lambert and Pfahler (1988) modify the aggregate expenditure approach to obtain measures that are invariant to equal additions to each individual's tax payment and benefit from government spending, drawing on the tax progressivity analyses of Kakwani (1977).

12. Linn (1980) reviews the findings on the distribution of local government expenditure benefits and tax burdens for three cities in Colombia.

13. In fact, Chaudry-Shah (1989, p. 373) states that he finds capitalization of a very small portion of expenditures. For a review of capitalization as it applies to local public finance, see Chaudry-Shah (1988). For other analyses of hedonic pricing, see Follain and Jimenez (1985), Kanemoto (1988), Kanemoto and Nakamura (1986), and Scotchmer (1985).

14. For evidence on the deficits of public enterprises, see Nair and Filippides, 1988. Selowsky (1979, Chapter 5) provides a detailed methodology for calculating the subsidy to users of public enterprise services, and Linn (1980) provides a helpful discussion of alternative methods to calculate consumer subsidies from public enterprises.

15. For example, Maddock and Castano (n.d.) data suggest that about 10 percent of electricity is stolen in Medellin, Colombia. They suggest that much of the stolen electricity (though not all) benefits poor households.

16. Several papers have examined the valuation of benefits from in-kind goods (Olsen, 1972; DeSalvo, 1975; Smeeding, 1984; and Olsen and York, 1984). For a theoretical discussion of benefits with queuing costs, see Alderman (1987).

17. Such effects occur in developed countries (e.g., Lampman and Smeeding, 1983), but may be even more pronounced in developing countries. In fact, private transfers are an important component of household income in developing countries examined in the research papers reported in Rempel and Lobdell (1978) and Cox and Jimenez (1992). Also, Knowles and Anker (1981) find significant transfers from young to old in Kenya, while Butz and Stan (1982) discover similar results in Malaysia as do Ravallion and Dearden (1988) in Java.

18. While the urban-rural and industrial-agricultural distinctions do not exactly coincide, there is often important overlap.

19. One problem in this regard is that factor incomes already include subsidization, so that subsidies must be netted out of factor income to obtain *ex ante* income (Meerman, p. 234).

20. To our knowledge, more recent studies for developed countries do not exist. We speculate that the lack of recent studies is partly due to theoretical objections to the benefit incidence methodology, and partly due to a shift in focus toward analysis of individual programs or sets of programs.

21. Public housing and health expenditures are in some cases classified as public goods.

22. In a subsequent analysis, Meerman (1980) examines who "pays" for administrative expenditures by calculating the difference between income and after-tax income adjusted for specific government benefits. He finds that higher income groups overwhelmingly pay for "social overhead" expenditures.

23. Meerman presents the results as expenditure benefits per household in each decile as a percentage of average household per capita income for all households in the sample. Thus, he has simply normalized total benefits or divided total benefit per household by a constant (average household income). Thus, the distribution of benefits is on a total basis rather than as a percentage of income.

24. For instance, Meerman finds that out-of-pocket costs, such as uniforms, shoes, lunch, transportation, books and supplies, amount to 13 percent of household income in the first income quintile and 11 percent of household income in the second income quintile.

25. Obviously there are a wide range of policy alternatives and we do not pretend to summarize them here. For a good summary of the policy options see Psacharopoulos, Tan and Jimenez (1986), Jimenez (1986), (1987) and (1989), and Mingat and Tan (1985), (1986a), and (1986b). For a detailed discussion of the role of education in development, see Psacharopoulos and Woodhall (1985) and Tan and Mingat (1989). Psacharopoulos (1985) also examines the return to education.

26. Technically, if one adopts a merit goods perspective, the relevant question is not how government health benefits affect the post-fisc income distribution, but instead how such benefits affect the post-fisc distribution of health or health care (Foxley, 1979, pp. 106-110).

27. Of course, average cost may be a poor proxy for marginal benefit. For example, if marginal cost equals average cost, user fees set below marginal cost suggest that individuals will utilize care until marginal benefit is below marginal and average cost. There may also be an insurance value associated with health care, which is not represented in the average cost measure of health care benefits.

28. However, note that higher fees paid by the rich are often associated with higher quality of care, so that studies using average cost per visit should probably use average fee per visit in calculating household benefits (Meerman, pp. 159-160). Also, see Selowsky (p. 81) for the appropriate treatment of premium contributions to public health care plans.

29. Unfortunately Meesook's data do not permit her to distinguish between government and private hospital care. Nevertheless, even if all private care were consumed by the well-to-do, the distribution of public hospital subsidies would still be pro-rich overall.

30. Of course, excessive migration to urban areas can also cause crowding, unemployment, poverty-stricken squatter colonies, and civic unrest (Williamson, 1988, surveys this literature).

31. For instance, Meerman allocates land settlement costs to resettled farmers, and Foxley et al. allocate agricultural credit to medium and large farmers.

32. When survey data on utilization exist but there are no corresponding data on program costs, researchers might follow Meerman and Selowsky, both of whom derive useful insights from utilization data alone.

33. That is, it can be argued that forward shifting to consumers of agricultural benefits in developing countries does not exist when the government acts to maintain a fixed consumer price (e.g., Meerman, p. 234). In this case, however, there are really two government actions, an agricultural program and a price program, so that one should explicitly examine the incidence effects of both.

34. Other related studies include Alderman and von Braun (1985), Pinstrup-Anderson and Alderman (1987), and Behrman and Deolaikar (1990).

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