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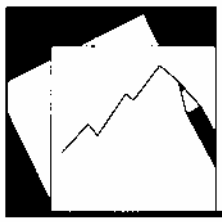

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How Useful Are Benefit Incidence Analyses of Public Education and Health Spending?

Hamid R. Davoodi, Erwin R. Tiongson, and Sawitree S. Asawanuchit

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How Useful Are Benefit Incidence Analyses of Public Education and Health Spending? [1]

Prepared by Hamid R. Davoodi, Erwin R. Tiongson, and Sawitree S. Asawanuchit

Authorized for distribution by Sanjeev Gupta

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Abstract

This paper provides a primer on benefit incidence analysis (BIA) for macroeconomists and a new data set on the benefit incidence of education and health spending covering 56 countries over 1960-2000, representing a significant improvement in quality and coverage over existing compilations. The paper demonstrates the usefulness of BIA in two dimensions. First, the paper finds, among other things, that overall education and health spending are poorly targeted; benefits from primary education and primary health care go disproportionately to the middle class, particularly in sub-Saharan Africa, HIPCs and transition economies; but targeting has improved in the 1990s. Second, simple measures of association show that countries with a more propoor incidence of education and health spending tend to have better education and health outcomes, good governance, high per capita income, and wider accessibility to information. The paper explores policy implications of these findings.

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Keywords: benefit incidence, public spending on education and health, targeting, progressivity

Authors' E-Mail Addresses: hdavoodi@imf.org; etiongson@worldbank.org; sawitres@bot.or.th

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Contents Page

I. INTRODUCTION

Developing countries face many challenges in the design and implementation of fiscal policy. Unlike advanced economies, developing countries do not have a de facto progressive tax policy and an effective tax administration to alter the post-tax distribution of income (Alesina, 1999; Zee, 1999; Atkinson, 2000; Chu, Davoodi, and Gupta, 2000; Tanzi and Zee, 2000). Similarly, for a given pool of resources, these countries have a limited administrative capacity and a small menu of instruments for implementing cash transfer programs that could alter the post-transfer distribution of income, consumption, or other indicators of welfare (Tanzi, 1998; Chu, Davoodi, and Gupta, 2000; Bourguignon, Pereira da Silva, and Stern, 2002). As a result, governments in developing countries tend to distribute resources through in-kind transfers, which primarily consist of the delivery of social services such as education, health care, and social safety net programs. Although other categories of government spending are also important for individual welfare, social services are normally regarded as being the most important for enhancing the long-run earning potential of the population, particularly the poor.[2]

Given the size of social spending in the budgets of many developing countries and the desire to enhance the quality of fiscal adjustment while pursuing macroeconomic stability, policymakers are striving to increase the effectiveness of expenditure policy, particularly social spending, and of the expenditure management system, including the ability to track all propoor spending.[3] These aspects of fiscal policy are important features of programs supported by the Poverty Reduction and Growth Facility (PRGF) and are regarded by many low-income countries as important policy challenges in their Poverty Reduction Strategy Papers (PRSPs).[4] As many low-income countries attempt to make their budgets propoor by, among other things, increasing the share of social spending, they also strive to ensure that the poor receive an appropriate share of the increased allocation. On both efficiency and equity grounds, the case for government subsidies for the provision of basic services is well established (Demery, 2000). Because the poor often have limited access to services that could enable them to escape from poverty, the government is expected to target the provision of these services to the poor. But how does one ascertain the extent to which either the increased allocation or the existing allocation is reaching the poor?

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[2] In addition to social spending, what constitutes propoor spending depends on country-specific priorities. For example, propoor spending in some countries with PRSPs also includes infrastructure such as the expansion of rural feeder roads, improvement in water supply, and irrigation schemes.

[3] The paper abstracts from improvements needed in a country's tax administration and public expenditure management systems, both of which can constrain expenditure policy by limiting domestic revenue mobilization and by impeding the translation of expenditure policies to expenditure outcomes; see *Actions to Strengthen the Tracking of Poverty-Reducing Public Spending in Heavily Indebted Poor Countries,* available via the Internet: http://www.imf.org/external/np/hipc/2002/track/032202.htm

[4] See Gupta and others (2002).

Benefit incidence analysis (BIA) is a tool that addresses this question.[5] It brings together elements of the supply of and demand for public services and can provide valuable information on inefficiencies and inequities in government allocation of resources for social services and on the public utilization of these services. BIA is an easy-to-use tool for ex ante design as well as ex post monitoring and evaluation of the effectiveness of social spending programs. BIA has been carried out for a number of countries: some with PRSPs, some with PRGF-supported programs, transition economies, middle-income countries, and even some advanced economies. Perhaps reflecting these considerations, BIA has recently been included in the World Bank's experimental tool kit for Poverty and Social Impact Analysis (PSIA) of economic policies.[6] BIA is not without its limitations, however; and the paper will elaborate on some of these limitations.

Despite the importance of distributional concerns in the design and implementation of fiscal policy in developing countries, a comprehensive data set is not available on the incidence of social spending for a large cross section of countries. Such a data set can be useful for (1) informing policymakers about the current incidence of social spending, i.e., the extent to which different segments of population (e.g., the poor or the rich) are benefiting from the current allocation of social spending, and changes in the incidence of spending over time; (2) establishing a basis or a benchmark for comparison of benefit incidence in one country with other countries; (3) analyzing if specific policy reforms in the past may have accounted for the current observed incidence or changes in the incidence of spending over time; and (4) showing whether a propoor benefit incidence is actually translated into better social outcomes for the poor.

The paper makes two contributions to the literature on BIA and policy analyses. First, it compiles a large data set on the incidence of health and education spending, based on existing studies utilizing BIA. The data set covers 56 countries in which BIA(s) were performed between 1960 and 2000. These countries represent different stages of economic development and various levels of health and education services. [7] Second, the paper uses the data set to summarize the incidence of social spending and explore the relationship between benefit incidence on one hand and indicators of access to education and health and social outcomes on the other.

The remainder of the paper is organized as follows. Section II describes the basic data requirements and the methodology of BIA. It clarifies some relevant concepts such as the targeting and progressivity of social spending, establishes the relationship between these concepts and BIA, and describes some common pitfalls in the use of BIA and limitations of BIA. This section will be valuable to macroeconomists who work on countries with PRGF-

[5] There are other tools such as the World Bank's Public Expenditure Tracking Surveys which answer a related aspect of the incidence analysis; see http://www.worldbank.org/poverty/psia.

[6] Ibid.

[7] Some studies do exist but they have a limited country coverage; see the data section of the paper.

supported programs and need to assess progress in poverty reduction in PRSPs. Section III describes the data set. Section IV documents the observed incidence of spending in the set of countries included in the dataset. Section V subjects the data set to some empirical analysis. Finally, Section VI provides conclusions and policy recommendations.

II. Data Requirements for and Methodology of BIA

The earliest examples of analyses of the incidence of social spending are studies by Gillespie on Canada and the United States (1964 and 1965, respectively). The methodology of BIA in its present form was introduced in two studies of developing countries: Selowsky (1979) on Colombia, and Meerman (1979) on Malaysia. These two classic studies have been replicated in various country case studies, including several refinements of the original methodology.[8] There are also several excellent early surveys of BIA (McClure, 1974; Selden and Wasylenko, 1992) and more recently by Demery (2000) and Younger (2001). This section of the paper will address data requirements and methodology of BIA as well as the weaknesses and strengths of BIA.

A. Data Requirements

Three kinds of information are needed for the calculation of the incidence of government spending on the service it provides, such as primary education or basic health care. These are

1. government spending on a service (net of any cost recovery fees, out of pocket expenses by users of the service, or user fees);
2. public utilization of the service; and
3. the socioeconomic characteristics of the population using the service.

Government spending data are typically obtained from budget execution data as reported by the ministry of finance, the relevant line ministry, or the central statistical agency. The data used in benefit incidence analyses are typically reported on an aggregate basis. As such, the analyses cannot reflect the variation in the quality of services provided to different groups of users. For instance, health clinics in rural or low-income areas may not be as well staffed or equipped as clinics in urban or high-income areas. Lacking information on such quality variation, however, benefit incidence analyses are forced to maintain the hypothesis that quality is invariant.

Abstracting from their aggregate nature, there are three important issues that need to be resolved regarding measurement of spending on government services. First, for many countries, spending data tend to be on a cash rather than a commitment basis, and differences

[8] These studies include those on advanced economies by, among others, Ruggles and O'Higgins, (1981); O'Higgins and Ruggles (1981); Wagstaff, Van Doorslaer, and Paci (1989); as well as developing countries by, among others, van de Walle and Nead (1995); Sahn and Younger (1999); Castro-Leal and others (1999); Lanjouw and Ravallion (1999); Lanjouw and others (2002); van De Walle (2002); and Bourguignon (2002).

between commitment and cash recording can often be large, particularly for the education and health sectors in low-income countries. BIA studies typically must rely on cash data as the only reliable information available.[9] However, if commitment data are available and reliable, they should be used as they correspond to the cost of services consumed by the public.

Second, the government spending data should be comprehensive. They should cover all levels of government, and both recurrent and capital spending. In practice, spending is often underreported because subnational data are not available. In the case of recurrent versus capital spending, studies typically use recurrent spending since capital investment yields benefits that extend over a much longer horizon. However, the service flows from existing capital should not be ignored. Unfortunately, however, the calculation of service flows poses its own set of problems; see Demery (2000) for a more detailed discussion and examples.

The third measurement issue is the treatment of out-of-pocket expenses, cost recovery fees, and other so-called user fees. Information on such fees is either typically hard to obtain or is not as reliable as government spending data. Moreover, they are not available by income or consumption group. Therefore, some studies merely use the reported government spending data regardless of its sources of financing or whether financing is supplemented by user fees. Ideally, information on user fees is needed by income or consumption group so that net benefit can be calculated. When such information is available and reliable, it should be netted out by each income or consumption group.[10] In many countries education and health care facilities may impose user fees, an estimate of which is normally included in the annual budget of the relevant line ministry. In such cases, user fees are retained in the facility and merely supplement other budgeted spending, in which case the decision on whether to adjust aggregate spending would be based on whether the goal is to measure gross or net benefits. Studies of BIA that adjust only aggregate spending for user fees—for instance, when information by income group is not available—implicitly assume each group pays a flat tax. Treatment of out-of-pocket expenses and other fees are best handled in a combined incidence analysis of taxes and government spending in which fees paid by users are treated much like any other taxes; see Devarajan and Hossain (1998) for an example of the Philippines. However, combined benefit incidence studies are rare for developing countries.

The second and third kinds of information identified above—public utilization of the service and the socioeconomic characteristics of the population using the service—come from

[9] In addition to the differences between cash and commitment data, substantial differences can also exist between spending data provided by line ministries and those provided by the ministry of finance. These differences are especially pronounced where donor financing of education and health care is large and where line ministries have better information on donor flows than the ministry of finance. Although these flows are not typically counted as government spending in the calculation of a BIA, they influence the public utilization of a service, as do any other in-kind provisions of services to a health care facility, school, or the ministries of education and health (e.g., donations of cars and gasoline).

[10] This treatment would not solve the related counterfactual problem; namely, what would have been the size of government spending on a facility had there been no user fees?

household surveys. Without knowledge of these two indicators, BIA cannot usefully distinguish the poor from the nonpoor. Note, however, that without information on spending by demographic group, BIA treats utilization as a qualitative variable—people either use the service or not—and abstracts from any variation in the quantity of the service consumed by each user. As noted above, this is an important limiting factor in the usefulness of BIA.

B. Methodology of BIA

BIA involves a five-step process that can be easily implemented using popular spreadsheet software programs:

1. Obtain the average unit cost of providing a public service by dividing government spending on the service (net of any cost-recovery fees and out-of-pocket expenses by the users) by the total number of users of the service.

Users of a service are regarded as ultimate beneficiaries of the service (e.g., students enrolled in primary schools or patients visiting a health center). For example, teachers are not regarded as ultimate beneficiaries of government spending on education even though their wages and benefits comprise a sizable portion of government spending on education. Data on the number of users are obtained from a household survey although information from service providers on the number of users may be more accurate than that provided by a household survey.[11] There can be discrepancies between the number of users as reported in official statistics and those found in a survey. The design of a survey is therefore important. A survey should represent the population or at least its coverage should match the purpose of the investigation. In particular, spending data on a service should match the data from the household survey on the use of the same service.

2. Define the average benefit from government spending on a service as the average unit cost of providing the service, which is derived from the previous step.

This assumption "attributes" or "imputes" benefits from government in-kind transfers to individuals' welfare as measured by their income or consumption. This is a strong assumption; the alternative is the more complicated task of estimating a demand curve for a public service and deriving benefits from users' willingness to pay as summarized in the demand curve.[12]

3. Rank the population of users from poorest to richest using a welfare measure and aggregate them into groups with equal numbers of users.

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[11] Demery (2000) discusses the implications of the resulting bias. Note that even though service providers may have better records on users of a service, they do not often have information on patients' consumption or income.

[12] See Younger (1999) for an application of incidence analysis involving the estimation of demand for social services.

This step is easy to implement, but it also requires a choice among alternative units of analysis. The unit of analysis in a household survey can be either the household, comprising all family members living together or an individual within the household, and the welfare measure is typically either income or consumption. Both sets of information are needed to rank users. While it is not necessary to group the ranked population, BIA, as typically implemented, aggregates the ranked users into equal groups—say, quintiles or deciles. Other groupings are possible, subject to design limitations, such as poor vs. nonpoor, where the poverty line is used to define the demarcation; rural vs. urban; male vs. female; ethnicity; region; religion; age; race; or the educational background of the parents. Such information is typically found in surveys for poverty assessment as well as health and demographic surveys.

The choice of individual vs. household can make a significant difference in grouping users into quintiles or deciles, and in estimates of benefit incidence. This distinction is naturally related to the task of identifying users of a government service. An apparently more "propoor" incidence of social spending on education can result, for example, when quintiles are defined by households rather than by individuals. This tends to occur since generally poorer households have more children than richer households. Demery (2000), for example, finds this to be the case in the Côte d'Ivoire where the poorest quintile, defined by households, gains 29 percent of benefits from primary education as compared with 19 percent when the quintile is defined by individuals. Which method of aggregation should one use? Demery (2000) recommends defining quintiles by individuals (i.e., population quintiles) when a service is provided to individuals (e.g., students enrolled at a school) but by households (i.e., household quintiles) when a service is provided to households (e.g., water and sanitation services). However, practice is not uniform. For example, Sahn and Younger (1999, 2000) use households as the unit of analysis in looking at the incidence of education and health spending in eight countries in Africa. It is perhaps best to calculate benefit incidence using alternative methods of aggregation and report both.

The choice of welfare measure for ranking users (from poorest to richest) can also make a significant difference to estimates of benefit incidence. The most widely used indicator is per capita household expenditure, in which each member of the household receives an equal weight. An alternative indicator is per adult equivalent household expenditure, which takes into account the higher consumption needs (welfare) of the adults; as a result, adults are given a higher weight than children.[13] Demery (2000) shows that when per adult equivalent household expenditure is used instead of per capita household expenditure, primary education spending in Ghana in the early 1990s becomes less propoor, while secondary and tertiary education become more prorich; however, no difference in benefit incidence is found between the two measures when spending on all three levels of education is combined. In contrast, Sahn and Younger (1999, 2000) find no reversal in the benefit-incidence pattern

[13] The conceptual basis for equivalence scales may be problematic and typically must make arbitrary assumptions about equivalent welfare, but researchers studying low-income countries often find this concept attractive to work with; see Demery (2000).

between the two measures when applied to eight countries in Africa, including Ghana. Therefore, no consistent pattern or no general rule seems to exist in this area. Therefore, it makes sense to report benefit incidence based on both welfare measures. Many BIA studies tend to report only the per capita measure.

4. Fourth, derive the distribution of benefits by multiplying the average benefit derived from the previous step by the number of users of the service in each income or consumption group.

The fourth step implicitly assumes that the average benefit from or cost of a service delivery does not vary with income or consumption level, or indeed any other factor. This assumption abstracts from two problems. First, the quantity of service may vary across users, as noted above, either because of variation in spending or the cost of producing the service.[14] Second, the value that users may place on a given service may also vary across households. For instance, a BIA typically assumes that the quality of a service is the same in rural and urban areas and ignores the potential effects of corruption or uneven quality of the public expenditure management, both of which can produce different benefits to users from the same US$1 of government spending. However, the simplicity of this assumption produces tractability, but at the cost of precision. With respect to variation in the value of a given service to different users, a demand-function approach to estimating benefit incidence would be more appropriate, but it is computationally more demanding and more data intensive. As described later, BIA can take care of some of these criticisms, but not all.

The first four steps can now be illustrated by some simple algebra as applied to the case of education spending. The analysis of health spending follows the same approach. Total benefits from government spending on "all" education (i.e., the combined primary, secondary and tertiary spending) accrued to group j is estimated as [15]

$$X_j = \sum_{i=1}^{3} E_{ij} \frac{S_i}{E_i} = \sum_{i=1}^{3} \frac{E_{ij}}{E_i} S_i \qquad j = 1,2,3,4,5 \qquad (1)$$

where X_j is the benefit incidence in local currency accrued to income or consumption group j from (net) government spending on level i (primary, secondary, or tertiary education) denoted as S_i, also measured in local currency; E_{ij} represents number of students enrolled in level i from group j where each group is a quintile; and S_i/E_i is the unit cost of providing education at level i. Groups are typically ordered from lowest to highest with respect to the classifying variable. If desired, the groups in the middle of the distribution can be aggregated

[14] Cross-subsidies can, for example, arise in countries in which different regions have widely different revenue-raising capacities and cost-of-living differences.

[15] The description of the methodology closely follows that of Demery (2000). Spending on education can occur on more than three levels (e.g., preschool, vocational training, junior secondary, senior secondary), but the majority of studies focus on the three traditional levels.

to define a "middle class" (Tanzi, 1974; Alesina, 1998; Tanzi and Schuknecht, 2000; and Easterly, 2001).

By dividing both sides of expression (1) by total (net) government education spending, *S*, one obtains the share of benefits accrued to quintile *j* from total government spending on education:

$$x_j = \sum_{i=1}^{3}\left(\frac{E_{ij}}{E_i}\right)\times\left(\frac{S_i}{S}\right) = \sum_{i=1}^{3} e_{ij}s_i \qquad j = 1,2,3,4,5 \qquad (2)$$

where $x_j = X_j/S$; e_{ij} is the quintile *j* share of total students enrolled at primary, secondary and tertiary levels; s_i is share of government spending for a given level, i, in total education spending; and $S = \sum_{i=1}^{3} S_i$. The data compiled in this paper report on estimates of x_j for various levels of education and health services. By construction, estimates of x_j across quintiles would add up to one.

It should be pointed out that the scale or the level of spending matters in BIA as summarized in X_j. For instance, by using X_j, we would conclude that a country that spent \$1 on the poorest student and nothing on other students effectively focused benefits on the lowest-income group, but a country that spent \$10 on students in the bottom group and \$5 on students in the other group had a less "propoor" policy.[16] Unfortunately, using X_j would not allow cross-country comparisons of the share of benefits received by each quintile. As a result, BIA typically uses its normalized counterpart x_j as it aids interpretation across different expenditure components for a given country, across countries and over time. This practice, however, hides potentially important information.

Expression (2) reveals the simplicity and intuitive appeal of BIA. It shows that the more the government spends on the education level that is more widely utilized by a given quintile, the more that quintile will benefit. In other words, benefit incidence depends on the composition of the users of education services as defined by the users' income or consumption, and the composition of education spending. It is this aspect of BIA that has provided a rationale behind the widely held policy recommendation that governments should in general focus more on primary education and basic health care than other levels such as tertiary education and in-hospital care.[17]

Estimates of benefit incidence therefore capture the joint behavior of users and the government. Put another away, what determines a quintile's benefit incidence is the

[16] This issue is further explored in the next section.

[17] Higher rates of return to additional years of primary schooling and basic health care, among others, also underlie this policy recommendation; see Filmer, Hammer, and Pritchett (1998) and Psacharopoulos (1994) for additional discussion.

quintile's average participation rate (e_{ij}) or average utilization of government-provided education services, as well as the intrasectoral allocation of education spending (s_i) by the government. However, BIA says nothing about what factors determine e_{ij} and s_i. Section V will address this point.

Expression (2), when applied at each level of education, also shows that each quintile's share of benefit incidence from spending at any given level is in fact the quintile's average participation rate. Therefore, to ensure higher benefits for the poor from spending, say, on primary education, one needs to adopt policies that encourage the poor to utilize primary education more intensively than the nonpoor. Again, this statement does not imply that scale of government spending on primary education does not matter. It matters up to the scale of average participation rate. For example, to get the absolute amount of benefit or subsidy accrued to a quintile from government spending on primary education, average participation rate at the primary level by that quintile has to be multiplied government spending on primary education. When BIA uses the normalized counterpart x_j, however, only the average utilization rate by quintile matters.

As noted, BIA makes strong assumptions which deliver simple results. However, some of these assumptions can be relaxed within a BIA by slightly modifying expression (2) to allow for differences in unit costs arising from differences in users' characteristics such as their region (e.g., urban vs. rural), gender, ethnicity, religion, and income level.[18] The modification essentially amounts to summarizing the unit costs by levels of education, as before, but also by discrete categories that define the aforementioned characteristic of users; see Demery (2000) for these extensions.

5. Compare the resulting distribution of benefits with a number of benchmark distributions.

From a policy point of view, this last step is the most important component of a BIA since it informs policymakers on how well government spending on a service is targeted, how it compares with the incidence of other types of government spending (e.g., primary education vs. secondary and tertiary education), or how the resulting benefit incidence stacks up against the past incidence of government spending in the same country or against incidence of spending in other countries.

Thus far, BIAs have typically focused on either five or ten discrete points (that is, quintiles or deciles) on the distribution of benefits. In general, the distribution of benefits can be better captured through concentration curves for each type of government spending, since these curves describe the entire distribution and not just five or ten points. Concentration curves for benefits from government spending are similar to those for taxes, cash transfers, income, or consumption. Distribution of income or consumption as summarized usually by the Lorenz

[18] The distinction between the poor and the nonpoor stems from the fact that the bottom quintile may not necessarily encompass the entire population of the poor as defined by a poverty line.

curve is in fact the concentration curve for income or consumption, respectively.[19] Analogously, a concentration curve for benefits from government service plots the cumulative proportions of households (or individuals), ranked from the poorest to the richest, on the horizontal axis, against the cumulative proportions of benefits received by households (or individuals) on the vertical axis. The Gini coefficient of income or consumption, for example, is the most widely used statistic to summarize the Lorenz curve for income or consumption, respectively.

Figure 1 provides a visual implementation of the fifth step; it shows three possible concentration curves and two benchmarks: the 45-degree line and the Lorenz curve of income or consumption. In principle, studies of BIA that have access to the underlying data can show the various distributions as in Figure 1 and summarize the entire benefit structure of government spending in measures of inequality much like the Gini coefficient of income or consumption, other measures of inequality, or indeed a concentration coefficient.[20] Unfortunately, many BIA studies do not follow such an approach. Instead, they provide information on quintile or decile shares of benefits, as such information is perhaps seen as more intuitive to policymakers than a summary statistic or concentration curves. This paper also relies on quintiles since it does not have access to the underlying data. However, it is important to define concepts that are based on concentration curves, as some BIA studies have started displaying concentrative curves and reporting concentration coefficients.[21] In addition, the concepts based on the concentration curves, besides being more precise (as seen later), provide some justification for the use of quintiles or deciles.

Against this background, concepts of targeting and progressivity are useful for implementing and understanding the fifth step of a BIA:

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[19] See Milanovic (1995) for an application of concentration curves for cash and in-kind transfers in Eastern Europe and Russia, and Sahn and Younger (1999) for concentration curves for taxes, benefits from government spending, income, and consumption for eight countries in sub-Saharan Africa.

[20] A concentration coefficient is defined analogous to a Gini coefficient except that instead of being bounded between 0 (perfect equality) and +1 (perfect inequality), it ranges from -1 (the poorest recipient receives all the benefits) through 0 (perfect equality—each recipient receives the same level of benefits) to +1 (the richest recipient receives all the benefits). For a benefit s in local currency, concentration coefficient $C_s = 2\,\mathrm{cov}(s, r_y)/\bar{s}N$ where $\bar{s}$ equals average level of benefits, N equals number of recipients, and $\mathrm{cov}(s, r_y)$ is the covariance between s and ranking of recipients r_y as defined by income or consumption. This coefficient can therefore be easily calculated using any popular spreadsheet software so long as information on the underlying components is available.

[21] Examples are Milanovic (1995) for Eastern Europe and Russia, Sahn and Younger (1999) for eight countries in sub-Saharan Africa, and Mahal and others (2001) for 16 states of India.

- **Targeting**. Benefits from government spending on a service are said to be propoor if the concentration curve for these benefits is above the 45-degree line (Figure 1).[22]

Such a concentration curve results in a negative concentration coefficient and is concave rather than convex. An implication of the concavity for quintiles is that Q1 exceeds Q5 and that Q1 is larger than 20 percent, i.e., benefits of government spending disproportionately go to the bottom quintile in *absolute terms and relative to their share in the population.* Analogously, benefits are said to be *prorich* if Q1 is less than Q5 or when the concentration curve for the benefits lies below the 45-degree line. The latter results in a positive concentration coefficient.

Note that it is problematic to conclude that targeting that is more propoor is also better. For instance, the example above of spending a small amount only on the poorest user is the most propoor targeting possible, but it might not be preferred to a more even—and more generous—distribution of benefits. Moreover, society may prefer universal public education over all alternatives, despite the fact that it is not propoor. It is reasonable to conclude that when the lowest income group does not receive a proportionate share of benefits that spending is poorly targeted. It is not reasonable to conclude that the larger than proportionate share of spending the better the targeting.

Along these lines, a less extreme benchmark than targeting is progressivity:

- **Progressivity.** Benefits from government spending on a service are said to be progressive if the concentration curve for these benefits is above the Lorenz curve for income or consumption, but below the 45-degree line (Figure 1).

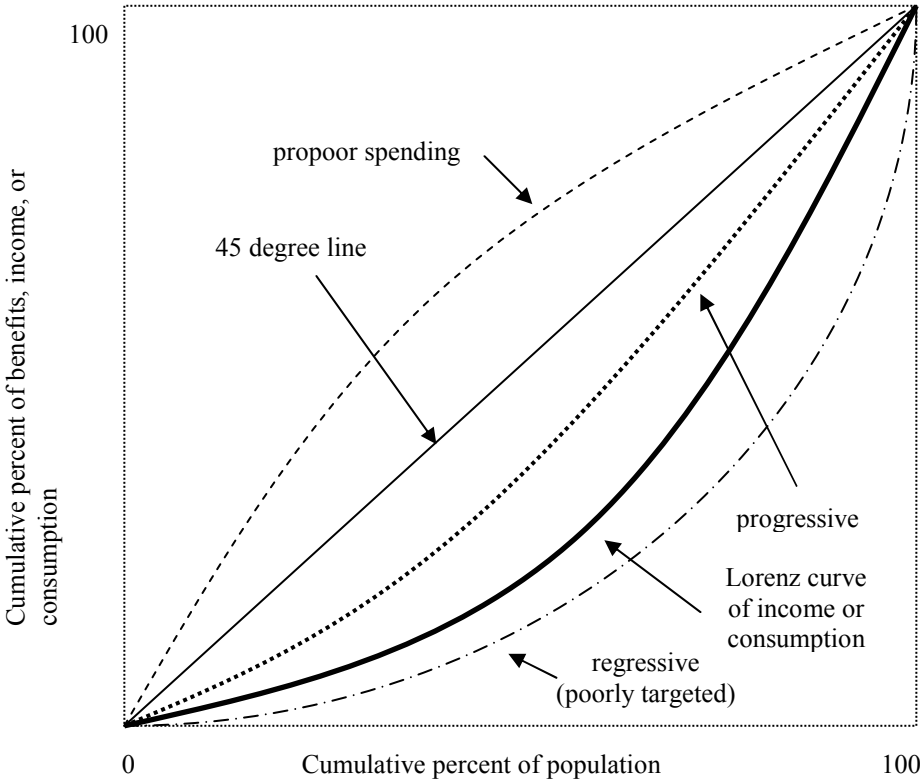
This concept simply means that lower-income groups get a larger share of the benefits from government spending than they do of either income or consumption. Note that propoor distributions of benefits are a proper subset of progressive distributions. A concentration curve that satisfies this criterion results in a positive concentration coefficient and can be either convex or concave. This concept, when cast in terms of quintiles (the most widely used definition of progressivity), translates into a Q1 that is larger than Q5, when each is represented as a fraction of income or consumption. That is, the benefits from government spending go disproportionately to the bottom quintile in *relative terms,* or the benefits from government spending decreases as a share of income or consumption decreases as the level of income or consumption increases.[23] A falling trend from Q1 to Q5 (the quintile shares of benefit to the poorest and richest) can be unambiguously taken as evidence of progressivity. Analogously, government spending on a service is said to be *regressive* if spending on Q1 is less than spending on Q5 when each is expressed as fraction of income or consumption, or

[22] This definition have been used by many researchers, including, Milanovic (1995), Sahn and Younger (1999, 2000), and Demery (2000), also referred to as "well-targeted" spending.

[23] Note that, by contrast, a tax is said to be progressive when the share of taxes in gross income increases with the level of income.

when the concentration curve for the benefits lies below the Lorenz curve for income or consumption (Figure 1). The last possibility results in a positive concentration coefficient which is a more precise measure of regressivity than the other two. Intuitively, government spending on a service is regressive when benefits from the service are distributed less equally than either income or consumption. However, a rising trend from Q1 to Q5 (the quintile shares of benefit) cannot unambiguously be taken as evidence of regressivity.[24] In this case additional information is needed on either the Lorenz curve of income or consumption or the income/consumption share of each quintile.

Figure 1. Concentration Curves for Government Spending and Various Benchmarks



According to these definitions, when benefits from government spending are propoor, they are progressive as well, but not vice versa. The worst case scenario, in terms of these concepts or when poverty or extreme poverty is the focus of the analysis, occurs when benefits are not only prorich but also regressive, i.e., concentration curves lie below the Lorenz curve of income or consumption. This tends to occur, for example, in the case of

[24] This corresponds to the case when the Lorenz curve of income or consumption crosses the concentration curve of the benefits.

university education or tertiary care (e.g., in-hospital care) when the benefits accrue primarily to the richest group in the population.

It is quite possible that concentrative curves for benefits, much like the distribution of income (or consumption) for two countries or two points in time for the same country, may cross the Lorenz curve or indeed each other. In such cases, and also generally, comparisons can be made more precisely by the so-called dominance tests; these tests compare how "close" the two distributions are in a statistical sense. Sahn and Younger (1999, 2000) conduct such tests for incidence of education and health spending in eight countries in sub-Saharan Africa. Unfortunately, dominance tests, (based on t-tests) of differences between various ordinates on two curves, tend to accept the null of nondominance (i.e., that two concentration curves are "close" in a statistical sense) too often, thus making it harder to distinguish one concentration curve from another. Sahn and Younger therefore recommend supplementing dominance tests with "extended" Gini coefficients and leaving out the ordinates on the concentration curve in the bottom 5 percent and top 5 percent of the distribution.

C. Limitations of BIA

While BIA is widely used, it suffers from a number of limitations, in addition to those mentioned above, that should be taken into account when considering the usefulness of BIA.

Weak conceptual framework. BIA represents an "equilibrium" outcome of government and household decisions. It does not specify a model underlying the behavior of either government or households. By contrast, studies of demand functions for public services (e.g., Younger, 1999) address this shortcoming, but these are rare.

Costs vs. benefits. BIA uses the cost of providing public services as a measure of the value attributed to such services. BIA thus makes a strong assumption that the costs of provision are a good approximation to the benefit that users attach to government services. As usually implemented, BIA also does not cover the *entire* cost of providing public services (e.g., cost of tax administration), including pecuniary and nonpecuniary costs.

Static vs. dynamic. BIA captures at best benefit incidence of government spending at a point in time. To get a dynamic picture of incidence over time, BIA has to be conducted for different years. However, again, behavioral models can better capture dynamic gains from government spending than a BIA can.

Average vs. marginal. Estimates of benefit incidence often represent *average* incidence. This means that BIA does not typically provide information on who benefits from an expansion or contraction in government spending which are important issues to policymakers; see Younger (2001) for a study of marginal incidence.

Redistribution of income versus more broadly defined redistribution. When a concentration curve for benefits, for example, is compared with a Lorenz curve, BIA of in-kind transfers such as social spending is often interpreted as altering the distribution of

income (or consumption), but it is really altering the distribution of a more broadly defined measure of welfare that includes in-kind benefits as well as cash income or consumption. In contrast, a cash-transfer program administered by the same government, when effective, alters the post-transfer distribution of income (or consumption) itself.[25] In practice, these two types of redistribution are often equated, which perhaps justifies why some regard social spending or in-kind transfers in general as promoting the redistributive objective of fiscal policy. Section V of the paper will explore whether this interpretation receives any empirical support.

III. DATA SET

Data on the benefit incidence of public spending on education and health are drawn from more than 80 sources, ranging from journal articles, unpublished manuscripts, books, various World Bank reports (e.g., poverty assessments, public expenditure reviews, and social sector reviews), and survey articles.[26] There have been three previous studies that also compiled large cross-country data sets on the benefit incidence of education and health spending. These are Filmer, Hammer, and Pritchett (1998), Li, Steele, and Glewwe (1999), and Yaqub (1999). The first two studies report data on the incidence of health and education spending, respectively, while the third reports on both types of benefit incidence.

Table 1 compares the data set compiled for this paper with these three studies, using four categories of education ("all" and its subcomponents: primary, secondary, and tertiary) and four categories of health ("all" and its subcomponents: primary heath care, health centers, and hospitals).[27] The data set compiled for this paper improves on previous attempts in at least five dimensions as summarized in Table 1.

1. It has more observations than each of the three previous studies.

2. It represents benefit incidence data over time, in contrast to the three cited studies, thus allowing one to look at changes over time.

3. In comparison with the benefit incidence data in the 1990s, the explicit focus of Filmer, Hammer, and Pritchett (1998), and Li, Steele, and Glewwe (1999), it has 15 and 18 more countries in the "all" education and "all" health categories, respectively.

4. There is substantial heterogeneity in the secondary education category, as many countries offer a variety of services at this education level.

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[25] Both approaches ignore the counterfactual response of households or governments. The budget allocated for a service may also not reach the intended beneficiary, due to early capture by other "users" of a public service; see Reinikka and Svensson (2001) for a study of leakage of public funds in Uganda.

[26] A complete bibliography of all the sources, which includes country case studies as well as methodological papers on BIA and the underlying data, is available from the authors upon request.

[27] See the appendix for details on assumptions underlying the comparison in Table 1.

5. Finally, it reports the auxiliary identifiers of a BIA, which are important as discussed in the previous section (not shown in Table 1).

Against this background, the compiled data set contains the following information:

1. The quintile share of benefits covering Q1, Q2, Q3, Q4, and Q5 (by gender, region, PRGF-eligible countries, and HIPCs).

The gender and region dimensions of quintile shares in the data set (the latter referring mostly to an urban-rural dichotomy) are not as comprehensive as one would have hoped, but this information has been recorded in the data set as long as it was available in the original study. Only recently have studies of BIA started disaggregating benefit incidence data along these two dimensions. In addition, the data set was not restricted to studies that report all quintiles. Data from studies that report only Q1 and Q5 are also recorded since they augment our understanding of benefit spending incidence.

Table 1. Coverage of Data on Benefit Incidence of Public Education and Health Spending

Study	Education					Health				
	Total 1/	All 2/	Primary	Secondary	Tertiary	Total 1/	All 2/	Primary Health care 3/	Health Centers	Hospitals
Davoodi, Tiongson, and Sachjapinan (2003) 4/										
1960-2000 5/										
Number of observations	370	82	86	106	87	168	76	31	26	54
Number of countries	56	47	48	46	45	50	44	22	21	27
1990s 5/										
Number of observations	255	49	64	75	61	108	39	26	21	38
Number of countries	48	37	43	43	40	34	26	20	19	23
Li, Steele and Glewwe (1999)										
1990s 5/										
Number of observations	92	22	22	24	24	0	0	0	0	0
Number of countries	22	22	22	22	22	0	0	0	0	0
Yaqub (1999) 6/	158	44	37	41	36	77	31	23	0	23
Filmer, Hammer and Pritchett (1998)										
1982-95 5/										
Number of observations	0	0	0	0	0	54	15	13	9	13
Number of countries	0	0	0	0	0	21	13	12	9	12
1990s 5/										
Number of observations	0	0	0	0	0	45	10	12	8	10
Number of countries	0	0	0	0	0	17	8	11	8	9

Source: See text.

1/ Refers to total number of countries and observations for every possible level of spending disaggregation as reported for each quintile in each study. The reported "Total" may not add up to sum of the sub-categories as some categories (e.g., kindergarten, social health insurance) have not been classified as a sub-category.

2/ Coverage of the "All" category may not coincide with sum of its components. Some countries have more than one observation over time.

3/ Refers to one of the following categories: health centers, clinics, child health, and preventive care. There is, therefore, some overlap with the "Health Center" category.

4/ The data set compiled for this paper.

5/ Years refer to years of household survey and spending data used in the calculation of benefit incidence data.

6/ Time period is not indicated in the source. The "Total" category is defined as sum of the components (not given in the source). Components of All health are referred to as "Lower Levels" and "Hospital Levels" in the source. "Lower Level" for health in Yaqub (1999) is assumed to refer to primary health care in the Table. Similarly, "Middle Level" for education in Yaqub (1999) is assumed to refer to secondary education.

2. The type and coverage of spending (i.e., disaggregate components of education and health, budget vs. actual, and current vs. capital).

Data on the incidence of both education and health spending are included in the data set, in contrast to some previous studies that only covered one (e.g., education in case of Li, Steele, and Glewwe, 1999). In addition to the three usual categories of education spending (primary, secondary, and tertiary) and the combined three categories ("all"), other categories of education are also recorded in the data set (for instance, lower secondary, upper secondary, vocational training, and preschool). However, the majority of studies cover the usual three and the "all" education categories, which form the basis of the empirical analysis in the paper.

Unlike for education, there is substantial diversity across countries in terms of categories of health. This diversity ranges from hospital outpatients, hospital inpatients, health centers, and social health insurance to primary health care, secondary health care, preventive care, curative care, and the combined "all" health. All these categories are recorded in the data set, if they were reported in original studies. To make analysis of the benefit incidence of health spending tractable, however, the paper analyzes only the benefit incidence of spending on hospitals, health centers, a proxy for primary health care, and combined health. Due to the diversity in provision of health services it was not clear in some studies of what the "all" health category consisted, but many studies indicated that the coverage has been exhaustive. That is, it included all health services used by patients in the household survey as well as the relevant health spending, although coverage may vary across countries. Future research in this area should provide more information on the exact coverage of health services and health spending.[28]

With respect to the definition of spending, a small number of studies BIA were based on budgetary allocations to health and education. The vast majority, however, used actual cash outlays.[29] Most studies appear to use recurrent spending on both education and health sectors, and this information has been recorded in the data set to the extent it was available. Future BIA studies would greatly advance research by being more precise in their definition of spending.

If two BIAs for the same country and the same time period differ in their coverage, the study with a broader coverage is used in the analysis in this paper and recorded in the data set. For

[28] In fairness, it should be pointed out that in comparison to education-sector analysis, inputs for the health sector have multiple uses, which make it much harder to demarcate one category of health spending from another. In addition, cross-country diversity in institutional arrangements for health service delivery significantly contributes to blurring of the demarcation line.

[29] Note that this distinction is irrelevant when incidence at the most disaggregate level is the focus of analysis. Incidence at this level depends only on utilization rates as shown in the previous section.

example, public tertiary spending on both universities and nonuniversity higher education (vocational schools, technical schools, and others) is chosen over spending on universities only. The same rule applies for primary, secondary, and combined public education spending. Chile provides an example in this respect. The Chilean tertiary data in 1990 by two different authors show opposite results. Petrei (1996) defines tertiary education in Chile as budget allocations to universities, and presents an even pattern of incidence, with the richest quintile obtaining 20 percent of the benefits. However, Mujica and Larranaga (1993) define tertiary education to include also implicit aid to universities and show a much larger share for the richest quintile as receiving 34 percent of the benefits.

A BIA of Costa Rica provides another example. Petrei (1996) shows the richest quintile in Costa Rica received 22.5 percent of all public education spending in 1986. However, Sauma and Trejos (1990) record the gain for the richest quintile at 24 percent. The reason for the difference is that Sauma and Trejos included universities and other higher education in their data while Petrei included only universities. Based on the first criterion, only the Sauma and Trejos study is included in the data set.

Where possible, the "all" education or "all" health categories should correspond to the total of the individual categories. However, this criterion was not enforced in cases where it would have precluded the inclusion of a country in the data set. Failing to make this compromise would have unduly limited the number of studies included in the data base.

3. The choice of welfare measures for ranking recipients (e.g., consumption or income; per capita or per adult equivalent).

Most studies rely on income and a small minority relies on the per-adult-equivalent concept. Due to the limited informational content of many BIA studies, the data set has sparse information on this important auxiliary identifier. However, given the discussion in the previous section, if both per adult equivalent and per capita quintile shares were available for the same country and same time period, only per adult equivalent data were recorded in the data set since it accounts for the different consumption needs of each member of the household. This, for example, was the case for Ghana in 1992 and South Africa in 1993. Similarly, if both individual and household quintile shares were reported, individual share data were preferred to household share data, following Demery's (2000) recommendation as explained in section II. Finally, in some earlier studies either household income or expenditure were used and not the per capita or per adult equivalent counterparts. This can be quite misleading since households may have above-the-mean household income (due to a larger number of wage earners in the household), but the household income per capita equals the mean, which results in a different ranking. As a result, if quintile shares for both household income (expenditure) and household per capita income (expenditure) were available, only the per capita version of the data were recorded in the data set. In some cases, the auxiliary information on population of households or individuals from the original source was used to construct per capita welfare measures.

4. Source of data.

Every attempt was made to include data from original sources even when a secondary source was available. There were often divergences between the two sources, since secondary sources often involved some imputed values, or—in some cases—a misreading of the original data sources. Data from secondary sources were recorded in cases where access to an original source was not possible. As the data set was being compiled for this paper, there were cases where information from secondary sources were discarded in favor of the original sources when the latter became available.

5. Data transformation.

There have been many BIA studies, including some in the 1990s, that did not provide quintile or decile information in a tabular form.[30] Such data were sometimes given in a graphical form, i.e., in form of concentration curves. In these cases, quintile data were painstakingly recorded in the data set by literally reading off the published concentration curves or adjusting population numbers, when needed, to construct quintiles with equal number of individuals or households in each quintile. Similarly, when decile information was provided, this was converted to quintile shares using approximations to the initial decile distribution. In some other cases, utilization rates by quintile were used as proxies for benefit-incidence data. This is valid, as explained in Section II, when the incidence refers to the most disaggregated levels of education or health spending.

IV. Exploratory Analysis of the Incidence of Education and Health Spending

Tables 2 to 5 report the benefit incidence of public spending on education and health for developing and transition economies and four regional groups for the poorest (Q1) and richest (Q5) quintiles. The five groups are sub-Saharan Africa, Asia and Pacific, Western Hemisphere (excluding Canada and the United States), Middle East and North Africa, and transition economies. The tables also summarize benefit-incidence data for PRGF-eligible and non-PRGF eligible countries, and within PRGF-eligible countries, HIPCs, and non-HIPCs. Using the same classifications, appendix tables report Q2, Q3, and Q4 as well, since information from all quintiles is useful when assessing the degree of progressivity of education and health spending. The tables also imply a measure of middle-class capture of gains from public spending. As stated in Section II, this is simply the sum of the benefits accrued to middle three quintiles.

[30] In some cases, even the authors of some studies were contacted to get their data in a tabular form although in many cases these efforts were unsuccessful. However, we would like to thank Professor Younger for providing the quintile share data from the published concentration curves in Sahn and Younger (1999) and his other studies.

The analyses in this section and the next rely primarily on the data from the 1990s.[31]

A. Incidence of Spending in the 1990s

Education

Overall spending on education is on average prorich, a finding that holds for all regional averages. However, there is also evidence of substantial cross-country heterogeneity. Only 16 percent of benefits accrue to the poorest quintile. In contrast, the richest quintile receives about 27 percent of benefits, more than its share in the population. There is little evidence, however, of middle-class capture; on average, the middle 60 percent of the population distribution receives about 58 percent of the total benefits (Table 2; Appendix Table 9). The difference between minimum and maximum benefits is evident across all education levels for any given quintile and among countries for a given quintile.

Table 2. Benefit Incidence of Public Spending on Education in the 1990s
(Unweighted average; in percent of total spending)

	Sample Size 1/	All 2/		Primary		Secondary		Tertiary	
		Poorest	Richest	Poorest	Richest	Poorest	Richest	Poorest	Richest
Sub-Saharan Africa	10	12.8	32.7	17.8	18.4	7.4	38.7	5.2	54.4
Asia and Pacific	4	12.4	34.8	20.3	16.9	8.3	37.3	2.5	69.0
Western Hemisphere	14	19.2	20.7	29.5	9.4	15.1	17.8	4.7	41.6
Middle East and North Africa	2	15.3	24.1	24.7	12.4	11.0	24.4	4.0	46.9
Transition	7	15.3	24.0	19.3	20.0	12.5	24.6	8.7	32.6
Total	37	15.8	26.3	22.8	15.1	11.3	27.9	5.4	46.3
Memorandum items:									
Minimum		5.0	9.7	7.4	4.3	1.9	9.6	0.0	24.6
Maximum		33.3	46.0	39.4	27.8	24.3	60.8	18.3	93.1

1/ Number of countries based on overall spending. Some countries may have more than one observation.
2/ Consists of primary, secondary, and tertiary education. The components may not sum to the total because of differences in sample size across education levels.

Methodological differences account, in part, for the relatively more propoor incidence of education spending in the Western Hemisphere. As explained in the previous section, a more propoor incidence of social spending can result, for example, when quintiles are defined by households rather than by individuals. This happens to be the case in the Western

[31] This is done for three reasons. First, the 1990s is the decade with the largest sample representative of countries at various stages of development; it represents 86 percent and 68 percent of countries for education and health, respectively. Second, it is a decade that coincides with the emergence of the Highly Indebted Poor Country (HIPC) Initiative, and the PRGF initiative, and thus provides a useful benchmark for program evaluation. Third, it contains fairly comparable data and consistent quality over time for the same countries, thus allowing the analysis of changes in incidence over time. The full data set from the 1960s through 2000 is available from the authors.

Hemisphere as the majority of surveys use household quintiles. For example, the share of benefits accruing to the lowest quintile increases by 7 percentage points when based on households rather than individuals.[32] However, the general findings in Table 2 do not change when the sample is restricted to only those surveys that are based on individual quintiles as individual quintiles are used in other regions. The findings are also robust to whether income or expenditure is used as a measure of welfare. Again, most income-based surveys occur in Western Hemisphere.

Spending on primary education is on average propoor and progressive. However, there are differences across regions.[33] Based on the quintile information alone, one cannot say unambiguously that primary education spending is also progressive in sub-Saharan Africa and transition economies. The finding of propoor spending is primarily driven by the propoor incidence of spending in the Western Hemisphere, and the Middle East and North Africa (Table 2; Appendix Table 9). For all 43 countries, on average, about 23 percent of benefits from primary education spending accrue to the poorest quintile, as compared with 15 percent for the richest quintile. The poorest quintile in Western Hemisphere and Middle East and North Africa gain 30 percent and 25 percent of benefits, respectively. The middle class captures most of the gain in sub-Saharan Africa (64 percent), followed by Middle East and North Africa (63 percent) and Asia and Pacific (62 percent).[34] Primary education is often regarded as an important tool for ensuring (universal) access to a formal education system, building human capital, and fighting poverty. For primary education to play such a role, it is imperative that the poor's share be higher than what is indicated by the data, although, it is important to note, this does not require propoor spending in the targeting sense. This is particularly the case in sub-Saharan Africa and transition economies and poorer countries in Asia and Pacific (e.g., Cambodia, Lao P.D.R.) where the poor's share is less than 20 percent.

Spending on secondary and tertiary education primarily benefits the nonpoor and there is a strong evidence of middle-class capture. The richest quintiles on average obtain almost 28 percent and 46 percent of benefits from secondary and tertiary education spending, respectively. This finding confirms the widely held belief that higher education tends to

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[32] This is from a regression using the sample from the 1990s of Q1 on a constant and dummy variable for whether an observation is grouped by households ("1") or individuals ("0"). A complete analysis of covariance could not be carried out since dummy variables corresponding to each auxiliary identification code are not available for all quintiles. When the analysis is restricted to the data for which information on all dummy variables are available, the sample becomes too small to be of use for any meaningful covariance analysis.

[33] Primarily Armenia and Kazakhstan drive the result for transition economies. The finding on Asia and the Pacific is not surprising since the available sample consists only of Cambodia, Lao P.D.R., Indonesia, Nepal, Pakistan, and Vietnam. It thus excludes all but one of the East Asian high performers. In fact, Indonesia has a propoor incidence. The data from the 1980s suggest that primary spending in Malaysia, much like Indonesia, is propoor. In Malaysia, the poor captured about 35 percent of benefits from primary spending in the 1980s.

[34]The Middle East and North Africa region consists of only Morocco and Tunisia. Hence, the reported finding cannot be generalized to all countries in the region. The middle-class capture in the Middle East and North Africa category is primarily due to the rather low share of the richest quintile.

benefit the nonpoor (Table 2; Appendix Table 9).[35] Of the five regional groups, the middle three quintiles in the Western Hemisphere capture about 67 percent of the gains from secondary education, the highest among all levels of education.[36] This finding is consistent with the observation made some 30 years ago by Tanzi (1974), based on limited evidence. Tanzi also stipulated that the gain primarily accrues to the urban middle class. The next section will explore this issue more closely.

Improving the incidence of primary education spending represents a challenge in HIPCs and PRGF-eligible countries. Spending on primary education in PRGF-eligible countries is not well targeted (Table 3) and the data show no evidence of progressivity (Table 3; Appendix Table 10). The poor in richer non-PRGF eligible countries gain as much as 26 percent from primary education spending compared with about 20 percent in PRGF-eligible countries. Moreover, for secondary and tertiary education the richest quintile in the HIPCs gains more than its counterparts in Western Hemisphere countries despite the fact that HIPCs are on average poorer than Western Hemisphere countries (Tables 2 and 3). This finding may suggest that the rich in highly indebted countries have managed to utilize public education system at secondary and tertiary levels more intensively than the rich in the Western Hemisphere.[37] It may also mean that access to private education in HIPCs is not as extensive as in the Western Hemisphere. The next section will explore some aspects of this type of capture. [38]

Table 3. Benefit Incidence of Public Spending on Education in the 1990s:
PRGF vs. non-PRGF
(Unweighted average; in percent of total spending)

	Sample Size 1/	All 2/		Primary		Secondary		Tertiary	
		Poorest	Richest	Poorest	Richest	Poorest	Richest	Poorest	Richest
PRGF-eligible	16	13.5	30.6	19.7	17.3	8.9	34.5	5.8	49.8
HIPC	13	13.2	31.6	18.8	17.1	7.6	37.9	4.3	55.6
Non-HIPC	3	14.8	26.1	21.3	17.8	11.3	28.2	9.9	34.9
Other countries	21	17.5	23.0	25.6	13.1	13.5	22.2	5.0	43.5

1/ Number of countries based on overall spending. Some countries may have more than one observation.
2/ Consists of primary, secondary, and tertiary education. The components may not sum to the total because of differences in sample size across education levels.

[35] Note that this finding does not necessarily imply that investment in higher education is unproductive.

[36] Western Hemisphere does not include Canada or the United States.

[37] In absolute terms, the rich in the Western Hemisphere may benefit more than in HIPCs.

[38] See Corbacho and Davoodi (2002).

Health

Overall spending on health is on average prorich, particularly in sub-Saharan Africa, but is well targeted and progressive only in the Western Hemisphere. Only 17 percent of the benefits from health spending accrue to the poorest quintile as compared with 23 percent for the richest quintile (Table 4). In sub-Saharan Africa, the poorest quintile gains only 13 percent vs. almost 29 percent for the richest quintile. In fact, sub-Saharan Africa records the largest disparity between the poorest and richest quintiles. In contrast, the poor in the Western Hemisphere receive almost 23 percent of benefits vs. 15 percent for the richest quintile.[39] Evidence of prorich—although still progressive—spending does occur in the Western Hemisphere (e.g., Nicaragua with the poor receiving only 10 percent of the benefits), but it is more than offset by the propoor incidence of social spending in the rest of the hemisphere (e.g., Costa Rica's poor receive about 27 percent of benefits; Chile's, about 32 percent).

Spending on primary health care and health centers benefit the poor more than spending on hospitals, but is still not focused on the poor (Table 4; Appendix Table 11). These observations may not be surprising as it is generally believed that spending on hospitals primarily benefits the rich while the poor's access is limited for a variety of reasons—for instance, user fees and location of hospitals (i.e., hospitals tend to be concentrated in urban areas rather than rural areas where the poor primarily live)—and the fact that hospitals tend to be more specialized and offer services not aimed at curing the common ills of the poor.[40] The Western Hemisphere is the only region in which the poor and the rich benefit equally from health-center spending, but there is much diversity in the region and averages can be misleading as, for example, a propoor incidence of social spending in Peru is averaged out by the prorich benefit incidence in Ecuador.

Spending on primary health care is poorly targeted in all regions. The poorest quintile receives the lowest in sub-Saharan Africa and transition economies (about 15 percent) as compared with about 22 percent to 23 percent for the richest quintile. In addition, sub-Saharan Africa shows extreme disparities in benefit incidence, which are close to the minimum and maximum incidence data on health spending reported in Table 4, particularly for hospital care.

[39] As in the case of education, benefit incidence estimates for Western Hemisphere are mostly based on households which tend to show a more propoor incidence pattern.

[40] See Filmer, Hammer, and Pritchett (1998) for more details.

Table 4. Benefit Incidence of Public Spending on Health in the 1990s
(Unweighted average; in percent of total spending)

	Sample Size 1/	All 2/		Primary health care 3/		Health centers		Hospitals	
		Poorest	Richest	Poorest	Richest	Poorest	Richest	Poorest	Richest
Sub-Saharan Africa	9	12.9	28.6	15.3	22.7	14.5	23.7	12.2	30.9
Asia and Pacific	2	10.8	30.9	19.7	16.9	18.4	16.8	9.1	38.0
Western Hemisphere	10	23.1	15.2	20.4	19.1	19.1	19.9	17.0	22.2
Middle East and North Africa	1	16.4	23.6	...	...	...	...	...	...
Transition	4	13.6	27.0	14.9	21.5	14.5	21.3	11.4	29.4
Total	26	16.9	23.2	17.3	20.8	16.4	21.4	13.3	28.7
Memorandum items:									
Minimum		4.0	4.9	8.0	10.0	7.5	10	1.0	12
Maximum		43.1	48.0	28.0	36.0	28.0	36	27.6	55

1/ Number of countries based on overall spending. Some countries may have more than one observation.
2/ Includes more than hospitals and health centers.
3/ Refers to one of the following categories: health centers, clinics, child health, and preventive care.

The challenge is to improve the incidence of health spending in HIPCs and PRGF-eligible countries, and make it at least progressive (Table 5; Appendix Table 12). This finding is driven primarily by the incidence of spending in sub-Saharan Africa. Given the complementarity of education and health spending as means of investing in human capital , it is imperative that interventions that improve incidence of both education and health spending are adopted more rigorously than others. Notwithstanding this finding, there is considerable heterogeneity among county groupings. For example, the cross-country dispersion for the poorest quintile is much smaller for PRGF-eligible countries than for non-PRGF eligible

Table 5. Benefit Incidence of Public Spending on Health in the 1990s:
PRGF vs. non-PRGF
(Unweighted average; in percent of total spending)

	Sample Size 1/	All 2/		Primary health care 3/		Health centers		Hospitals	
		Poorest	Richest	Poorest	Richest	Poorest	Richest	Poorest	Richest
PRGF-eligible	13	13.1	28.3	17.8	22.5	18.0	21.3	18.6	20.7
HIPC	11	13.0	28.2	16.8	23.0	17.0	21.5	17.7	20.7
Non-HIPC	3	14.0	28.5	23.0	20.3	23.0	20.3	23.0	20.3
Other countries	13	20.7	18.1	16.2	20.3	13.6	21.5	15.2	20.9

1/ Number of countries based on overall spending. Some countries may have more than one observation.
2/ Includes more than hospitals and health centers.
3/ Refers to one of the following categories: health centers, clinics, child health, and preventive care.

countries (not shown); whereas the opposite holds for the richest quintile. This finding suggests that the poor are “alike” in PRGF-eligible countries or are more “bunched” together

and the rich are "alike" in richer non-PRGF eligible countries. Strong policy interventions are needed to close these cross-country disparities; and, when successful, they tend to close disparities in cross-country indicators of health status, such as infant mortality. The next section explores this aspect of the data.

B. Changes in the Incidence of Spending

For a small sample of countries, the data on benefit incidence are available for more than one time span in the 1990s. Tables 6 and 7 report summary data on the share of spending received by the poorest and richest quintiles for selected countries for the earliest and latest years available for education and health, respectively, in the 1990s. Data from the 1980s are analyzed further below.

Overall spending on education has become more propoor over time and has moved from being poorly targeted in early 1990s to well targeted in the late 1990s (Table 6). This result is due primarily to improvement in the propoor incidence of primary and secondary education spending. By contrast, tertiary education spending has become more prorich over time, but this finding has not been strong enough to overturn the general result. The shift in propoor benefit incidence is nowhere more pronounced than in Malawi. The share of benefits from primary spending accrued to the poorest quintile increased from 15 percent in the early 1990s to 25 percent in the late 1990s. A similar shift also occurred at the secondary-education level. The main reason for these observed shifts in benefit incidence has been attributed to the abolition of primary school fees in 1994 (Al-Samarrai and Zaman, 2002). Notwithstanding the usual caveats associated with event analyses, the BIA of Malawi illustrates the importance of establishing a benchmark for policy analysis; this is particularly relevant for PRSP countries. In fact, Malawi had three benefit incidence analyses in the 1990s, one before the intervention and two after. Many PRGF-eligible countries do not have even one benefit incidence analysis.

The targeting of spending on overall health improved during the 1990s, but was still poorly targeted by the late 1990s (Table 7). The largest gain for the poor was recorded in Argentina and the largest fall in Ecuador. Argentina started with a propoor benefit incidence pattern in the early 1990s and ended up being propoor in the late 1990s as well. In contrast, Ecuador started with a propoor incidence of spending in health in the early 1990s but ended up with a poorly targeted overall health care system in the late 1990s. The gain by the rich has been twice the loss by the poor. As a result, the middle three quintiles also lost ground to the richest quintile. However, the sample size is too small, so that if Ecuador is excluded, overall health spending would be found to be propoor.

Table 6. Changes in Benefit Incidence of Public Spending on Education in the 1990s

		Initial year	Latest year
All education			
Bulgaria	Poorest	17.3	20.0
	Richest	21.1	19.1
Chile	Poorest	27.0	42.2
	Richest	15.0	4.6
Cote d' Ivoire	Poorest	10.0	13.5
	Richest	38.0	34.8
Malawi	Poorest	10.0	21.0
	Richest	38.0	19.0
Mexico	Poorest	14.0	17.0
	Richest	27.0	22.0
Primary education			
Chile	Poorest	36.0	35.0
	Richest	7.0	7.0
Dominican Republic	Poorest	28.8	25.4
	Richest	9.2	9.4
Malawi	Poorest	15.0	25.0
	Richest	24.0	14.0
Peru	Poorest	31.4	34.2
	Richest	9.1	6.4
Secondary education			
Chile	Poorest	24.0	24.0
	Richest	10.0	11.0
Dominican Republic	Poorest	17.6	14.3
	Richest	14.9	15.9
Malawi	Poorest	7.0	18.0
	Richest	41.0	21.0
Peru	Poorest	21.8	19.3
	Richest	15.1	13.9
Tertiary education			
Bolivia	Poorest	8.6	9.6
	Richest	28.0	29.2
Bulgaria	Poorest	10.9	11.0
	Richest	23.6	40.0
Chile	Poorest	10.5	9.0
	Richest	34.1	38.0
Dominican Republic	Poorest	3.2	1.9
	Richest	38.3	39.3
Malawi	Poorest	3.0	1.0
	Richest	61.0	58.0
Peru	Poorest	10.8	3.6
	Richest	27.0	39.0
All countries			
All education	Poorest	15.7	22.7
	Richest	27.8	19.9
Primary education	Poorest	27.8	29.9
	Richest	12.3	9.2
Secondary education	Poorest	17.6	18.9
	Richest	20.3	15.5
Tertiary education	Poorest	7.8	6.0
	Richest	35.3	40.6

Table 7. Changes in Benefit Incidence of Public Spending on Health Care in the 1990s

		Initial year	Latest year
All health			
Argentina	Poorest	33.0	53.2
	Richest	6.0	3.9
Chile	Poorest	24.5	32.0
	Richest	11.0	6.0
Cote d' Ivoire	Poorest	10.0	11.0
	Richest	30.0	32.0
Ecuador	Poorest	20.7	8.0
	Richest	11.9	37.0
Ghana	Poorest	11.6	12.5
	Richest	32.9	31.0
Hospitals			
Ghana	Poorest	7.9	9.5
	Richest	32.6	30.8
Peru	Poorest	9.0	5.2
	Richest	26.5	33.0
Health centers			
Peru	Poorest	13.3	23.7
	Richest	15.9	10.1
All countries			
All health	Poorest	16.6	19.5
	Richest	15.3	18.3
Hospitals	Poorest	5.6	4.9
	Richest	19.7	21.3

Methodological differences do not affect the reported findings for education spending. Restricting the sample of the 1990s to consistently defined observations, i.e., same quintile definition (whether individual or households) and same measure of welfare within countries over time, leaves a much smaller sample. In the case of health spending, the sample size is not large enough for meaningful comparisons. In the case of education spending, the patterns reported in Table 6 are broadly unchanged.

However, no robust findings are found for changes in the incidence between 1980s and 1990s or for persistence of incidence. The compiled data set is rich enough that allows one to create a panel data set to investigate if incidence has changed over the 1980s and 1990s and whether the poor remain poor, i.e., is there a persistence in the pattern of incidence? To address these issues, for each type of education and health, we regressed Q1, Q5 and ratio of Q1 to Q5 on a constant and a time trend for countries with at least two observations at two points in time. We then checked for the sign and statistical significance of the estimated coefficients on the time trend. The results (not shown) generally indicated that there has been a statistically significant deterioration in propoor incidence of education and health spending. However, once the regressions controlled for cross-country heterogeneity, i.e., use of individual vs. households quintiles and income vs. expenditure, we found no robust evidence

of a either a systematic deterioration or improvement.[41] To check for persistence, for each type of education and health spending, we regressed Q1, Q5 and ratio of Q1 to Q5 on its own lagged value and checked for sign and statistical significance of each lagged dependent variable. The results (not shown) pointed towards persistence which was statistically more significant for primary education, secondary education and the combined all health spending. However, these results were found not to be robust once allowance was made for the type of cross-country heterogeneity that was also used in analysis of changes in incidence. As more data become available, future studies may be able to marshal more concrete evidence.

V. SOME MEASURES OF ASSOCIATIONS

In addition to providing valuable information on the beneficiaries of public spending, the one important sense in which benefit incidence analysis can prove its usefulness is in ascertaining whether improved incidence actually leads to better social outcomes. After all, the government provision of in-kind transfers such as education and health is intended to endow individuals with services that increase the quality of their human capital, perhaps address some redistributive concerns, and improve their welfare. In this section, we show simple measures of association between benefit incidence and selected indicators. It should be noted that this section merely represents *bivariate* measures of association. The small sample size and the range of competing hypotheses prevent us from addressing the *causes* of these associations or allowing for multivariate regression analyses. More thorough analyses have to wait until additional data become available.

Table 8 shows the simple correlation coefficients between benefit incidence (ratio of Q1 to Q5) on the one hand, and indicators of access, income, urbanization rate, inequality, education and health outcomes, and governance on the other hand. The data refer to averages for the 1990s. The results reported in the table generally hold for a broader sample of countries with benefit incidence data drawn from the 1980s and 1990s (not shown). To save space, the ratio of Q1 to Q5 is used for only two categories, combined health and combined education spending. In all the results, a higher ratio of Q1 to Q5 is interpreted as a more propoor incidence of social spending although this interpretation should not be equated with the concept of propoor (that is, in the sense of well targeted benefit incidence) used in Section II.

Bivariate measures of association in Table 8 suggest the following:

Countries with a more propoor incidence of education spending tend to have a more propoor incidence of health spending as well. The simple correlation coefficient between incidence of health and education spending is 0.62, which is statistically significant at the 1 percent level. This finding suggests that the propoor incidence of education and health

[41] Two types of heterogeneity were attempted; one involved including dummy variables which defined whether a survey uses income or expenditure; and whether a quintile uses households or individuals; the other involved running regressions with consistently defined sub-samples.

Table 8. Correlation Between Benefit Incidence and Indicators of Access and Outcomes: Average Over the 1990s

	All education Ratio of poorest to richest		All health Ratio of poorest to richest	
	Correlation Coefficient	Sample Size	Correlation Coefficient	Sample Size
Correlation Between Health and Education				
Q1/Q5 All Education	1.00	37	0.62 ***	23
Q1/Q5 All Health	0.62 ***	23	1.00	26
Access to Information and Communication				
Radios (per 1,000 people)	0.48 ***	37	0.90 ***	26
Telephone mainlines (per 1,000 people)	0.45 ***	37	0.41 **	26
Daily newspapers (per 1,000 people)	0.51 ***	35	0.20	24
Education Outcomes				
School enrollment, primary (% gross)	0.20	37	0.28	26
School enrollment, primary (% net)	0.37 *	28	0.41 *	22
School enrollment, secondary (% gross)	0.26	37	0.33 *	26
School enrollment, secondary (% net)	0.13	19	-0.05	14
School enrollment, tertiary (% gross)	0.50 ***	37	0.58 ***	26
Persistence to grade 5, total (% of cohort)	0.40 *	24	0.16	19
Illiteracy rate, adult total (% of people ages 15 and above)	-0.46 ***	33	-0.40 **	25
Health Access				
Births attended by health staff (% of total)	0.41 **	33	0.56 ***	24
Immunization, DPT (% of children under 12 months)	0.34 **	37	0.21	26
Immunization, measles (% of children under 12 months)	0.38 **	37	0.38 *	26
Low-birthweight babies (% of births)	-0.26	30	-0.25	21
Physicians (per 1,000 people)	0.14	35	0.41 **	24
Hospital beds (per 1,000 people)	0.03	36	0.08	25
Access to health care (% of population)	0.36	20	0.44 *	16
Access to sanitation (% of population)	0.45 **	20	0.54 **	16
Access to water (% of population)	0.57 ***	21	0.59 **	17
Health Outcomes				
Malnutrition prevalence, height for age (% of children under 5)	-0.56 ***	33	-0.54 ***	23
Malnutrition prevalence, weight for age (% of children under 5)	-0.48 ***	34	-0.49 **	23
Mortality rate, infant (per 1,000 live births)	-0.47 ***	37	-0.40 **	26
Mortality rate, under-5 (per 1,000 live births)	-0.46 ***	37	-0.38 *	26
Fertility rate, total (births per woman)	-0.38 **	37	-0.29	26
Life expectancy at birth, total (years)	0.50 ***	37	0.42 **	26
Income				
GDP per capita, PPP	0.59 ***	37	0.70 ***	26
Governance				
Voice and accountability	0.40 **	37	0.31	26
Political stability	0.30 *	35	0.25	26
Government effectiveness	0.47 ***	35	0.50 ***	26
Regulatory quality	0.50 ***	37	0.52 ***	26
Rule of law	0.52 ***	37	0.37 *	26
Control of corruption	0.47 ***	35	0.28	26
Others				
Urbanization rate	0.50 ***	37	0.60 ***	26
Q1/Q5 Income	-0.25	34	-0.49 **	24
Gini coefficient	0.29	34	0.52 ***	24

Source: See text.
(***), (**), and (*) denote significance at the 1, 5, and 10 percent levels, respectively.

spending go hand in hand; education and health spending may be complementary ways of transferring in-kind services to the public, and countries should explore the sources of these complementarities.

Countries with better access to information and communication tend to have propoor education and health spending. A higher level of awareness about government social programs and their eligibility criteria are expected to increase public utilization of these programs, and lead to an improved incidence of benefits. Three measures of information and communication are used which are merely proxies for access to information about public services. These are the number of radios per 1,000 people, the number of telephones per 1,000 people, and daily newspaper circulation. The results for all three measures suggest that better access to and wider availability of information is associated with the higher utilization of public health and education services by the poor, hence, a more propoor incidence of benefits. The correlation coefficients between the ratio of Q1 to Q5 for health and education and the three measures are positive and statistically significant.

Countries with a more propoor benefit incidence tend to have better education and health outcomes and wider access to health care. For example, the illiteracy rate is significantly and negatively correlated with propoor education and propoor health incidence of spending. Malnutrition rates and mortality rates are significantly and negatively associated with better targeting of education and health spending. Access to sanitation and safer water are positively associated with propoor education and health spending. Importantly, a variable measuring closer proximity to health facilities is positively and significantly associated with a propoor incidence of health spending, but interestingly not with education spending. This confirms anecdotal evidence from some PRSPs (e.g., Nicaragua) in which distance to public health facilities was cited as a constraint on the poor's utilization of public services[42] as well as some new evidence from Ethiopia (Collier, Dercon and Mackinnon, 2002). The above observation may also reflect the presence of common factors. Access to safe water and access to sanitation are two such factors. While this finding is largely consistent with our other findings, there are some exceptions. For example, it is not clear why propoor education spending is positively correlated with tertiary enrollment. While it is the case that tertiary education spending disproportionately favors the rich, as Tables 2 and 3 have shown, the positive correlation may signify the higher subsidy per student at the tertiary level than other levels.

The incidence of education and health spending tends to be more propoor in richer countries than in poorer countries. The correlation coefficient is relatively high (0.70 for health and 0.6 for education) and statistically significant. Tables 3 and 5 also provided additional evidence (benefit incidence in PRGF-eligible vs. non-PRGF eligible countries) that supports the above hypothesis. Although policymakers in low-income countries would

[42] The measure of access to health care is taken from the 1997 edition of *World Development Indicators* and is defined as "the share of the population covered for treatment of common diseases and injuries, including availability of essential drugs on the national list, *within one hour's walk or travel*."

like to see a more propoor incidence pattern of social spending , these correlations show that making benefit incidence more propoor takes time; propoor benefit incidence increases with the stage of economic development, which also perhaps reflects inadequate institutions and capacity constraints. Ravallion (1999a) provides a theoretical model which is consistent with this evidence. In addition, previous evidence was limited to only county case studies (e.g., provinces in Argentina as analyzed in Ravallion, 1999b). The positive correlation may also indicate that in richer countries private care is more available and relatively more affordable, hence, allowing poorer households to utilize public services more.

The incidence of education and health spending becomes more propoor with improvements in governance. In recent years, a large body of literature has emerged on how poor governance cuts into governments' revenues and distorts the allocation of expenditures, thereby diminishing the quality of public-provided services and creating adverse distributional outcomes (Abed and Gupta, 2002). The empirical evidence presented in Table 8 suggests that better governance (greater accountability, rule of law, effective governments, quality of regulations, political stability, and lower corruption) is also associated with propoor benefit incidence.

Countries with higher (income or consumption) inequality tend to display a more propoor incidence of education and health spending. This empirical observation receives support using two measures of inequality: the Gini coefficient and share of consumption or income of the poorest quintile to the richest quintile. This cross-country evidence is consistent with the evidence for South Africa presented by Shan and Younger (1999, 2000). South Africa is one of the most unequal societies, and yet Sahn and Younger found that primary education is propoor. The above finding also provides a consistent cross-county pattern, something that was not found in Sahn and Younger in their study of eight sub-Saharan African countries. The empirical evidence is consistent with policymakers' intention of reducing income or consumption disparities.[43] However, it must also be pointed out that the above correlation does not imply that making education and health spending more progressive or more propoor will necessarily tend to redistribute income or consumption in favor of the poor since in-kind transfers are only *hypothetically* impounded into the distribution of income or consumption purely on account of application of the BIA methodology.

[43] A recent paper by de Mello and Tiongson (2003) shows that countries with higher income or consumption inequality tend to spend less on government redistributive spending. This is not at odds with the findings in this paper, as government redistributive spending in de Mello and Tiongson (2003) refers to cash transfers whereas BIA of social spending is based on in-kind transfers; and it is known that developing countries tend to rely more on in-kind transfers than cash transfers (Bearce, Glomm and Janeba, 2000).

Countries with a large urban population tend to have a more propoor incidence of education and health spending. The correlation coefficient between urbanization and propoor benefit incidence is statistically significant and positive. This finding is ad odds with Tanzi's (1974) claim that it is the middle class in urban areas that captures most of the gain from public spending on education and health. It also seems to refute some limited evidence (from the data set compiled for this paper, but not shown) that points out the presence of a pro-urban bias in the benefit incidence structure. However, the latter result also suggests that the poor in urban areas may indeed capture most of the gain as they are better placed to utilize these services than the poor in rural areas, who have to travel long distances, incur other costs to come to urban areas, and join the queue. The correlation may also reflect the impact of stage of economic development as more urbanized countries tend to have higher per capita income. Clearly more research and more data are needed to analyze these issues.

VI. Summary and Policy Recommendations

This paper, a byproduct of painstaking efforts over a number of years, has produced the largest cross-country data set on incidence of public education and health spending. The data set provides valuable insights for an important question in fiscal policy, namely, who benefits from public spending on education and health? Due to many inherent definitional problems in compiling such a data set, in the methodological intricacies and pitfalls in the application of BIA as well as the increasing importance of BIA in countries with PRGF-supported programs and in PRSPs, a major part of the paper was devoted to a description of the data requirements for a BIA, its methodology, interpretation, and the resolution of the methodological intricacies in creating the data set.

Specifically, the rather demanding concepts of targeting and progressivity were examined in terms of more easily understood concepts and graphs that should be of use to policymakers and macroeconomists, particularly those working on countries with PRGF-supported programs. The data set compiled for this paper is a significant improvement over previous data sets in terms of country coverage, availability of data over time, and the level of auxiliary information needed for a BIA.

The data set is used to provide stylized facts on the incidence of public health and education spending. In particular, we find that overall health and education spending are poorly targeted. Spending on primary health care and health centers tend to benefit the poor more than spending on hospitals, but spending on both primary health care and health centers are poorly targeted. Spending on primary education is propoor and progressive, but not in sub-Saharan Africa, transition economies, HIPCs, PRGF-eligible countries, or countries with PRGF-supported programs. In fact, the middle class captures most of the gain from primary education and primary health care, particularly in sub-Saharan Africa, HIPCs, and transition economies. This is a real cause for concern, given the high poverty and the increasing size of budgetary allocation to social spending in these countries. In addition, there is a substantial gap in benefit incidence between PRGF-eligible and non-PRGF eligible countries in both education and health. In particular, in terms of either overall education or overall health spending and primary education or primary health care, sub-Saharan Africa and HIPCs do

not have a propoor benefit incidence and yet these are exactly the group of countries for which benefit incidence analysis is helpful and policy challenges are daunting.

The above findings pose a challenge to policymakers; namely, if the current users of public education and health services are not policymakers' intended beneficiaries, then what policies should be adopted to change the observed benefit incidence, and, thus, improve targeting of social spending? Policymakers in countries with high poverty need to make every attempt to tilt incidence of public social spending in favor of the poor, and increase utilization of public services by the poor, to make services at least progressive. Progress in this area requires addressing a number of issues: quality of public education and health care; formal and informal (out-of-pocket) costs facing the poor; governance; gender bias; location of public health care and education services; pro-urban bias; and searching for other modalities of in-kind transfers besides joint public financing and public provision of health care and education services.

The data set is also used to examine changes and persistence in the incidence over time. The targeting of spending on overall health improved during the 1990s, but was still poorly targeted by the late 1990s. For countries with available data, overall spending on education has become more propoor over time and has moved from being poorly targeted in early 1990s to well targeted in the late 1990s, a result that is primarily due to improvement in the propoor incidence of primary and secondary education spending. No robust findings are found for changes in the incidence between 1980s and 1990s or for persistence of incidence.

Usefulness of BIA was also shown by exploring the relationship between benefit incidence on one hand and indicators of access to education and health and social outcomes on the other, using simple measures of association. To summarize, the empirical evidence showed that countries that tend to have a more propoor incidence of education spending also tend to have a more propoor incidence of health spending. A more propoor benefit incidence structure is associated, among other things, with better education and health outcomes, higher per capita income, better governance, wider availability of information, and closer location of health facilities to the poor. The small sample size and the range of competing explanations for the observed associations prevent us from further analysis of these correlations or deepening our understanding through multivariate regression analyses. More thorough analyses have to wait until additional data become available.

The above findings, although tentative at this stage, nevertheless provide some guidance to policy makers; namely, growth-enhancing policies and measures aimed at improving governance as well as locating public health facilities closer to the poor and providing information to the poor on government social programs have the potential to result in a more propoor incidence of education and health spending and ultimately better social outcomes.

Despite the many inherent limitations of BIA that were noted in the paper, it is clear that more BIA should be carried out for developing countries and transition economies and on a more frequent basis. Many poor countries do not even have a single BIA. Establishing a benchmark benefit incidence pattern is important for assessing past policies as well as

designing and implementing subsequent future policy interventions, with the understanding that better tools of incidence assessment should be applied when resources are available. The paper has shown that some regions, such as the Middle East and North Africa is under-researched, despite its rather large and dominant public sectors. Another important methodological lesson of this paper is that future BIA should pay more attention to recording incidence data and various breakdowns of the data (e.g., by region, gender, and ethnicity) and the necessary auxiliary identifiers that are essential for a proper analysis. They should also provide information on distribution of income or consumption so that the degree of progressivity of social spending can be easily ascertained. This task is not as daunting if we rely on poverty assessment surveys and on demographic and household surveys that are conducted routinely as part of PRSPs and assessment of progress towards Millennium Development Goals.

A Comparison of Data Sets

As noted in the main text, there have been three previous studies that also compiled large cross-country data sets on the benefit incidence of education and health spending. These are Filmer, Hammer, and Pritchett (1998), Li, Steele, and Glewwe (1999), and Yaqub (1999). The first two studies report data on the incidence of health and education spending, respectively, while the third reports on both types of benefit incidence.

Table 1 in the main text compares the data set compiled for this paper with these three studies, using four categories of education ("all" and its subcomponents: primary, secondary, and tertiary) and four categories of health ("all" and its subcomponents: primary heath care, health centers, and hospitals). Primary health care, health centers, and hospitals represent lower, middle, and higher levels of health care service delivery, respectively. There are only a few studies that report data on primary health care, basic health care, or preventive care. Unlike education, there is no uniform classification of health care service delivery. Therefore, to determine what may constitute primary health care, a proxy for the latter is defined to include one of the following: health centers, clinics, child health, and preventive care. Therefore, there is an overlap between primary health care and health centers. Other studies of benefit incidence data have made similar compromises. For example, Sahn and Younger (1999) use hospital and nonhospital categories and they report no combined health spending incidence data.

Some simple rules were used to classify the incidence of health and education spending and its subcomponents if a study did not provide a clear distinction of subcomponents that could be compared across countries and over time or did not provide an "all" category. For education, if a study reported data on "all education" as well as primary, secondary, and tertiary, then all four data points were recorded in the data set. When a study reported two or three out of four categories, then these data were reported and no "residual" categories were created. If subcomponents of a total within any education level were reported, but not the total, then a total was created as simple average of the reported subcomponents. For example, a simple average of upper secondary and lower secondary education is used as a proxy for secondary education if secondary education was not reported in a study. Similarly, for health spending, if a study reported the incidence of hospital outpatient and hospital inpatient spending, but not hospital spending, then a proxy for incidence of hospital spending is defined as a simple average of hospital inpatient and hospital outpatient. This procedure implicitly assumes that spending on each subcomponent represents an equal proportion of total spending. This procedure does not impart a systematic bias since cross-country averages are used to summarize the data.

The data set compiled for this paper improves on previous attempts in at least five dimensions.

First, the compiled data set has more observations than each of the three previous studies. It has 2½ times as many observations on health or education than the next largest data set (Yaqub, 1999). This is due to longer time period (1960 through 2000) and broader country

coverage (OECD countries, middle income, transition economies and other developing economies) than in Yaqub (1999) and more disaggregate levels of benefit incidence.[44] The data set covers 56 and 50 countries for education and health, respectively, 2½ times as many countries as Filmer, Hammer and Pritchett (1998), or Li, Steele, and Glewwe (1999), respectively. In terms of the "all" categories of education and health, the data set has three and thirteen more countries, respectively, than Yaqub (1999).[45]

Second, the compiled data set represents benefit incidence data over time, in contrast to the three cited studies, thus allowing one to look at changes over time. This aspect of the data set has important policy implications, as shown in the next section.

Third, in comparison with the benefit incidence data in the 1990s, the explicit focus of Filmer, Hammer, and Pritchett (1998), and Li, Steele, and Glewwe (1999), the compiled data set has 15 and 18 more countries in the "all" education and "all" health categories, respectively. The difference on the primary education level is much larger (21 countries). Also, the compiled data set includes 10 countries from Li, Steele, and Glewwe (1999). However, even excluding these countries, the compiled data set still has 5 more countries in education than Li, Steele, and Glewwe (1999).[46]

Fourth, there is substantial heterogeneity in the secondary education category recorded in the data set, as many countries offer a variety of services at this education level. This is not the case in other studies. As a result, the number of observations for secondary education exceeds that of other categories and other studies by a wide margin. However, the empirical analysis only looks at what is termed as secondary education in the original source and not its subcomponents (e.g., lower secondary, upper secondary, and vocational training) and, when all subcomponents are available, a simple average of the components is taken to represent secondary education as stated earlier.

Finally, the fifth advantage of the compiled data set is that it reports the auxiliary identifiers of a BIA, which are important as discussed in the previous section (not shown in Table 1). Much like the approach of Deininger and Squire (1996), who compiled cross-country data on income distribution, every attempt was made to provide auxiliary identifiers for each observation in the data set. In retrospect, it turned out that many studies of BIA neglected to pay sufficient attention to recording these identifiers, even though such information is available to the authors of the studies in a majority of cases. Nevertheless, the data set in this paper records the auxiliary identifiers so long as they were available in the original study.

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[44] Yaqub (1999) does not make it clear whether the sample size in his paper refers to the number of countries in his study or the number of observations made (i.e., various countries observed at various times).

[45] More precise comparisons with Yaqub's data set are not possible, since unlike Filmer, Hammer, and Pritchett (1998), and Li, Steele, and Glewwe (1999), Yaqub does not present detailed country-level data.

[46] Our data set on the overlapping twelve countries coincided due to use of a common data source.

Table 9. Benefit Incidence of Public Spending on Education in the 1990s 1/
(Unweighted average; in percent of total spending)

		All	Primary	Secondary	Tertiary
Sub-Saharan Africa	Q1	12.8	17.8	7.4	5.2
	Q2	15.8	20.8	12.9	8.4
	Q3	17.1	20.9	17.4	12.2
	Q4	21.5	22.0	23.5	19.0
	Q5	32.7	18.4	38.7	54.4
Asia and Pacific	Q1	12.4	20.3	8.3	2.5
	Q2	15.1	21.5	12.8	4.9
	Q3	17.1	21.4	17.7	6.2
	Q4	20.5	19.8	23.9	17.5
	Q5	34.8	16.9	37.3	69.0
Western Hemisphere	Q1	19.2	29.5	15.1	4.7
	Q2	19.2	24.6	20.1	9.2
	Q3	19.7	20.3	23.8	15.5
	Q4	21.0	16.3	23.1	28.9
	Q5	20.7	9.4	17.8	41.6
Middle East and North Africa	Q1	15.3	24.7	11.0	4.0
	Q2	17.6	22.3	17.8	7.3
	Q3	19.9	20.7	21.8	13.4
	Q4	23.1	19.8	25.1	26.9
	Q5	24.1	12.4	24.4	46.9
Transition	Q1	15.3	19.3	12.5	8.7
	Q2	18.9	20.4	18.6	14.7
	Q3	20.7	19.8	22.0	21.0
	Q4	21.3	20.7	22.3	23.0
	Q5	24.0	20.0	24.6	32.6
All countries	Q1	15.8	22.8	11.3	5.4
	Q2	17.7	22.2	16.7	9.6
	Q3	18.9	20.6	20.8	14.7
	Q4	21.3	19.4	23.3	23.9
	Q5	26.3	15.1	27.9	46.3

1/ The quintiles may not sum to 100. Some countries have missing observations for the middle quintiles. Q1 refers to the poorest quintile while Q5 refers to the richest quintile.

Table 10. Benefit Incidence of Public Spending on Education in the 1990s: PRGF vs non-PRGF 1/
(Unweighted average; in percent of total spending)

	Q1	Q2	Q3	Q4	Q5
All education					
PRGF-eligible	13.5	16.3	17.6	21.5	30.6
HIPC	13.2	15.6	17.1	21.6	31.6
Non-HIPC	14.8	18.7	19.2	21.2	26.1
Other countries	17.5	18.6	19.8	21.1	23.0
Primary education					
PRGF-eligible	19.7	21.1	20.7	21.2	17.3
HIPC	18.8	21.3	21.3	21.6	17.1
Non-HIPC	21.3	20.9	19.7	20.3	17.8
Other countries	25.6	23.1	20.4	17.8	13.1
Secondary education					
PRGF-eligible	8.9	14.5	18.9	23.2	34.5
HIPC	7.6	12.9	17.7	23.8	37.9
Non-HIPC	11.3	17.5	20.9	22.1	28.2
Other countries	13.5	18.6	22.4	23.3	22.2
Tertiary education					
PRGF-eligible	5.8	9.7	13.6	20.9	49.8
HIPC	4.3	7.4	11.8	20.3	55.6
Non-HIPC	9.9	15.1	17.9	22.2	34.9
Other countries	5.0	9.5	15.6	26.2	43.5

1/ The quintiles may not sum to 100. Some countries have missing observations for the middle quintiles.
Q1 refers to the poorest quintile while Q5 refers to the richest quintile.

Table 11. Benefit Incidence of Public Spending on Health in the 1990s 1/
(Unweighted average; in percent of total spending)

		All	Primary Health Care 2/	Health Center	Hospitals
Sub-Saharan Africa	Q1	12.9	15.3	14.5	12.2
	Q2	16.2	20.1	19.7	15.4
	Q3	18.8	19.4	19.2	19.7
	Q4	22.2	22.2	22.6	22.2
	Q5	28.6	22.7	23.7	30.9
Asia and Pacific	Q1	10.8	19.7	18.4	9.1
	Q2	14.7	21.1	21.2	11.6
	Q3	18.6	21.2	21.7	18.7
	Q4	25.0	21.1	22.0	22.8
	Q5	30.9	16.9	16.8	38.0
Western Hemisphere	Q1	23.1	20.4	19.1	17.0
	Q2	22.7	24.4	23.7	20.9
	Q3	20.3	19.3	19.6	19.0
	Q4	17.9	16.5	17.5	21.3
	Q5	15.2	19.1	19.9	22.2
Middle East and North Africa	Q1	16.4	.	.	.
	Q2	17.5	.	.	.
	Q3	19.1	.	.	.
	Q4	23.5	.	.	.
	Q5	23.6	.	.	.
Transition	Q1	13.6	14.9	14.5	11.4
	Q2	16.8	19.8	19.5	15.2
	Q3	19.9	21.0	21.5	19.6
	Q4	22.6	22.5	22.8	24.5
	Q5	27.0	21.5	21.3	29.4
All countries	Q1	16.9	17.3	16.4	13.3
	Q2	18.8	21.4	21.0	16.6
	Q3	19.6	19.9	20.0	19.4
	Q4	20.9	20.4	21.0	22.4
	Q5	23.2	20.8	21.4	28.7

1/ The quintiles may not sum to 100. Some countries have missing observations for the middle quintiles. Q1 refers to the poorest quintile while Q5 refers to the richest quintile.
2/ Refers to one of the following categories: health centers, clinics, child health, and preventive care.

Table 12. Benefit Incidence of Public Spending on Health in the 1990s: PRGF vs non-PRGF 1/
(Unweighted average; in percent of total spending)

	Q1	Q2	Q3	Q4	Q5
All health					
PRGF-eligible	13.1	17.0	18.8	21.7	28.3
HIPC	13.0	17.1	18.9	21.4	28.2
Non-HIPC	14.0	16.7	18.3	22.5	28.5
Other countries	20.7	20.1	20.2	20.3	18.1
Primary health care 2/					
PRGF-eligible	18.6	21.0	19.5	19.7	20.7
HIPC	17.7	20.4	19.8	20.8	20.7
Non-HIPC	23.0	23.5	18.4	15.5	20.3
Other countries	15.2	21.9	20.4	21.5	20.9
Health centers					
PRGF-eligible	18.0	20.8	19.3	20.0	21.3
HIPC	17.0	20.1	19.6	21.1	21.5
Non-HIPC	23.0	23.5	18.4	15.5	20.3
Other countries	13.6	21.4	21.0	22.5	21.5
Hospitals					
PRGF-eligible	13.2	15.9	18.1	22.7	30.3
HIPC	12.6	15.5	18.0	22.9	31.1
Non-HIPC	15.1	17.0	18.5	22.1	27.4
Other countries	13.5	17.5	21.1	21.9	26.1

1/ The quintiles may not sum to 100. Some countries have missing observations for the middle quintiles. Q1 refers to the poorest quintile while Q5 refers to the richest quintile.
2/ Refers to one of the following categories: health centers, clinics, child health, and preventive care.

List of Countries and Areas in the Data Set

Education

Albania
Algeria
Argentina
Armenia M
Bangladesh
Bolivia
Brazil
Bulgaria
Cambodia
Canada
Chile
Colombia
Costa Rica
Cote d' Ivoire
Djibouti
Dominican Republic
Ecuador
Ghana
Guinea
Guyana
Honduras
India
Indonesia
Jamaica
Kazakhstan Un
Kenya
Kyrgyz Republic
Lao PDR
Macedonia
Madagascar
Malawi
alaysia
Mauritania
Mexico
Mongolia
Morocco Cote
Mozambique
Nepal Dj
Nicaragua
Pakistan
Panama
Peru
Philippines
Romania
South Africa
Spain
St. Lucia
Tanzania
Trinidad and Tobago
Tunisia
Uganda
United Kingdom
ited States
Uruguay
Venezuela
Vietnam

Health

Argentina
Bangladesh
Brazil
Bulgaria
Chile
Colombia
Costa Rica
d' Ivoire
Denmark
ibouti
Dominican Republic
Ecuador
Egypt
France
Ghana
Guinea
Guyana
Honduras
Hong Kong SAR
India
Indonesia
Iran, Islamic Republic of
Ireland
Italy
Jamaica
Kenya
Madagascar
Malawi
Malaysia
Mauritania
Mongolia
Mozambique
Netherlands
Nicaragua
Peru
Philippines
Portugal
Romania
South Africa
Spain
Sri Lanka
St. Lucia
Switzerland
Tanzania
Trinidad and Tobago
Uganda
United Kingdom
United States
Uruguay
Vietnam

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