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Is GBS Still a Preferable Aid Modality?

Mitsuaki Furukawa* and Junichiro Takahata†

Abstract

This paper attempts to assess the effect of General Budget Support (GBS) in developing countries by using panel data on government revenue, expenditure, and social indicators for the 10-year period from 1997 to 2006. We focus on the health sector as a representative social sector. The results show that GBS in fact increases the budget allocation for the health sector more than tax revenue does. However, the effect of government health expenditure on health indicators is not necessarily improved by the introduction of GBS, which indicates that the introduction of GBS alone has limited impact. The paper suggests that the complementarity between GBS and projects/programs focusing on human and institutional capacity development should be seriously considered.

Keywords: General Budget Support, fungibility, intergovernmental transfer, aid modality, complementarity

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Introduction

In the late 1990s, a new type of aid modality emerged, known as General Budget Support (GBS). This aid modality has expanded rapidly, especially in Sub-Saharan Africa. GBS refers to donor funds that are disbursed through the recipient government's own financial management system rather than being earmarked for specific uses. GBS was introduced following a review of international aid after the end of the Cold War. The major donors in Africa such as the Nordic Plus countries (the four Nordic countries Norway, Sweden, Denmark, and Finland, plus the United Kingdom, the Netherlands, and Ireland) and the World Bank began to re-examine their own assistance and the traditional aid approach. The review sparked a "GBS versus project" debate between donors that excelled at project-based assistance and others that strongly favored GBS.

As a result of this reassessment, the aid paradigm generally shifted from an "individual aid approach" to the "collective aid approach." The latter approach emphasizes the recipient country's initiative for budget making. The recipient government, in cooperation with all stakeholders, draws up a national plan such as a Poverty Reduction Strategy Paper (PRSP)[1] and a budget plan such as a Mid-Term Expenditure Framework (MTEF). These plans are subsequently implemented, monitored, and evaluated jointly by the recipient government and its donors.

In this context, GBS was introduced as a new aid modality and was eventually mainstreamed in the Paris Declaration on Aid Effectiveness. GBS was expected to improve coordination and harmonization among donors, facilitate a donor's alignment with partner country systems and policies, lower transaction costs and improve the allocative efficiency of

1. Poverty Reduction Strategy Papers (PRSPs) are prepared by member countries through a participatory process involving domestic stakeholders and development partners, including the World Bank and the International Monetary Fund. Updated every three years with progress reports, PRSPs describe a country's macroeconomic, structural, and social policies and programs over a three-year horizon or longer, to promote broad-based growth and reduce poverty, while also covering associated external financing needs and major sources of financing. See: http://www.imf.org/external/np/prsp/prsp.aspx

public expenditure, and to enhance the predictability of external funding. It would also increase the effectiveness of the state and public administration, improve domestic accountability through a greater focus on the government's own accountability channels, and bring better outcomes for poverty reduction by enhancing the ownership of developing countries (IDD and Associates 2006).

In some African countries, such as Ghana, Tanzania, and Zambia, GBS is considered the preferred aid modality (Tanzania JAST 2006; Ghana GJAS 2006; Zambia JASZ 2007). In these countries, GBS accounts for more than 50% of their total external assistance.

In spite of the increasing importance of GBS in the international aid community, few studies have been conducted to assess the effectiveness of the modality. This paper aims to contribute to such an evaluation by examining how GBS has affected the budget allocation by the recipient governments for health services and the extent of the subsequent effect on various health indicators for the recipient countries.

The first section below will review the three kinds of distinct but inter-related studies on the relationship among aid, budget allocation, and health performance and then present specific questions that the authors will attempt to answer in this paper. Section 2 will clarify the model to be used in the analysis and Section 3 will specify the kind of data the authors use in this study. The results of the analysis will be spelled out in Section 4. The paper will conclude that GBS has indeed affected budget allocation to the health sector significantly but its impact on health indicators has been rather limited, which suggests that the budget allocation increase needs to be supplemented by other kinds of inputs to have a real impact on people's health conditions.

1. Literature review

The existing literature related to the subject of this paper can be categorized into three groups. The first group consists of literature that analyzes the effects of international transfers of aid money to the developing countries. The focus is how much of the money has been used for the intended purposes and how much of the money has been directly or indirectly used for other purposes (the fungibility problem). The second kind of literature more directly deals with the impact of aid money on actual health conditions. The third category is the direct precursor of our study. This literature attempts to evaluate the effects of GBS on budget allocation and service delivery.

1.1 Literature on international transfers

Funds transferred from donors to a recipient can be used for purposes that differ from what is initially intended by the donors. World Bank (1998) classifies the use of the transferred money into two types. The first is one in which the recipient does increase its spending, but by an amount less than what it has received from donors. Heller (1975) analyzes how government revenue and expenses in each sector are affected by international aid and concludes that governments increase their spending by only 30 to 60 percent of the amount received as aid. The recipient government must have used the difference for other purposes or simply reduced its efforts to collect tax domestically.

The diversion of aid money is related to the issue of fungibility, which is the second type of use of aid money mentioned by World Bank (1998). Here, earmarked monies are used to enable the recipient to divert its own revenues to sectors that are not originally intended to be beneficiaries.

There are a number of studies on aid fungibility, including: Pack and Pack (1990) on Indonesia; Pack and Pack (1993) on the Dominican Republic; and Van de Walle and Mu (2007) and Wagstaff (2011) on Vietnam. Khilji and Zampelli (1994), using data on military aid by the United States, show that aid monies for military purposes are substantially diverted to other sectors. Collier and Hoeffler (2007) similarly report shocking data that 11.4% of aid to developing countries is diverted to military expenses. Moreover, Feyzioglu et al. (1998) examine fungibility at the aggregate and sector levels by using panel data from developing countries. According to their study, aid fungibility cannot be found at the aggregate level but is prominent in three (out of five) individual sectors.

Lu et al. (2010) is probably the only work to analyze how government health expenditure based on domestic resources has been affected by development assistance (for health) in the context of fungibility. Their statistical analysis shows that development assistance for health has a significant negative effect on domestic revenue-based government spending for health. In contrast, they conclude, development assistance to the non-government sector has a significant positive effect on domestic government spending for health.

Why is the phenomenon of fungibility so prominent? Hefeker (2006) argues in his theoretical model that if the recipient countries do not share the donors' preferences, then aid will not be used to satisfy donors' expectations, either in project aid or in program aid. In other words, donors may be able to affect budget allocation only when donors and recipients have the same preferences. Cordella and Dell'Ariccia (2007) try to identify conditions under which budget support can be superior to project aid and conclude that budget support is preferable (i) when the total amount of aid shares only a small portion of overall revenue, and (ii) when the donors' preferences are similar to those of the recipients.

It should be noted that the authors of the two studies mentioned in the preceding paragraph do not take into account the policy dialogue and coordination that usually accompany GBS. Morrissey (2006) notes the possibility that developing countries may not be able to allocate budget-support money freely because donors provide budget support only when they and the recipient countries agree on a development plan in an advance policy dialogue.

In reality, how GBS affects budget allocation by recipient governments has yet to be studied empirically since GBS is still new and not enough data have been accumulated.[2]

1.2 Literature on the impact on health performance

Numerous studies have examined the impact of government expenditure on health indicators. Baldacci et al. (2003) employ social indicators as a proxy for health indicators and analyze them, using a covariance structure model. According to their study, government health expenditure has a positive impact on health indicators. Anyanwu and Erhijakpor (2009) analyze African countries in the same manner and conclude that health expenditure has a positive impact on health indicators.

On the other hand, Filmer and Pritchett (1997) show that government health spending is not a major determinant of child mortality. Musgrove (1996) points out that since income distribution, women's education, and cultural factors are the major factors that explain child mortality, addressing these problems should take priority over increasing public health spending. Wilson (2011) uses the OECD/CRS dataset for 96 high mortality countries to determine whether or not development assistance for health (DAH) improves mortality rates. Focusing on infant and child mortality rates, he uses various techniques such as OLS, the fixed effects model, or GMM to obtain the coefficients of DAH. Since the coefficient is not always significantly positive, he concludes that DAH has little effect on mortality rates. Nixon and Ulmann (2006), meanwhile, argue that health indicators are difficult to measure. They obtained different results for different indicators.

In short, both positive and negative results are shown in existing studies of the effects of health expenditure. There must be factors that intermediate between government spending and actual health performance. Rajkumar and Swaroop (2008) took into account the government's

2. Beynon and Dusu (2010) is the only study that deals with statistics on the effects of GBS. They examine the correlation between the amount of GBS and Millennium Development Goal (MDG) outcomes.

governance capacity. According to their study, the efficiency of government spending differs greatly, depending on the quality of governance. In addition, access to specific health infrastructure also affects health indicators, as shown by Harttgen and Misselhorn's study (2006) on child mortality.

Furthermore, the existing studies seldom consider the effect of non-earmarked assistance such as GBS. We will expand the scope of our study to cover the effects of GBS.

1.3 Literature on effects of GBS

Research institutions, agencies, and, in particular, think tanks in the Nordic Plus countries have produced many reports on GBS in recent years. However, only a few have tried to examine GBS in respect to the whole chain of causality from inputs to outcomes. Among this small group of studies, two have had been particularly influential in the international aid community: International Development Department (IDD) and Associates (2006), *Evaluation of General Budget Support: Synthesis Report* (referred to as the "DAC seven country studies"), which was published by the British Department for International Development (DFID) on behalf of the Steering Group of the Joint Evaluation of General Budget Support of OECD-DAC; and National Audit Office (2008), *Department for International Development, Providing Budget Support to Developing Countries*, which was conducted for the purpose of auditing the DFID.

The DAC seven country studies, commissioned jointly by bilateral and multilateral donors,[3] examine to what extent and under what circumstances GBS is relevant, efficient, and effective for achieving sustainable impacts on poverty reduction and growth (IDD and Associates 2006, S1). These studies revealed that Partnership General Budget Support (PGBS), defined as GBS based on conditionality, dialogue, technical assistance, harmonization, and

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3. The study was contracted by DFID on behalf of a consortium of donors, comprising the governments of Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the USA, plus the EC and IADB, the IMF, JBIC, OECD DAC, and the World Bank. The evaluation was undertaken in collaboration with the governments of Burkina Faso, Malawi, Mozambique, Nicaragua, Rwanda, Uganda, and Vietnam (IDD and Associates 2006, ix).

alignment, has made some positive contributions to aid effectiveness. PGBS has contributed to better harmonization and greater policy alignment through donor coordination, to increases in pro-poor expenditures, and to the enhancement of the partner government's discretion by increasing the on-budget aid and reducing the scope of earmarked assistance.

However, the report points out that there has been little progress made in the predictability of aid flows. The extent of transaction-cost saving has also been small since other modalities have continued in parallel. As for effects on actual service delivery, the DAC seven country studies show that the expansion of basic services has often been accompanied by deterioration in quality in the education and health sectors. In short, the modality of PGBS could not show significant effects on the linkage between public expenditure and policy results. Neither could the study analyze the impact on poverty reduction as a whole, because the time-scale was too short to allow a meaningful evaluation and because adequate data are lacking.

According to the other major work, the report of the National Audit Office, GBS has enabled partner governments to increase expenditure for priority areas, to provide more services, particularly in health and education, and to strengthen the financial management system. However, there remain challenges such as low service quality, slow progress in the strengthening of the financial management system, and the lack of a clear method to measure transaction-cost saving. The report concludes, "Evidence on the extent to which budget support has yielded better value for money than other ways of delivering aid, or has had an impact on income poverty, is not conclusive."

1.4 Research questions in this paper

Given the inconclusiveness in the existing literature with regard to the effects of GBS on budget allocation and service delivery, further study is definitely needed on this theme. In pursuing our study, we mainly focus on GBS. Although GBS is not earmarked for any specific sector or use, it is expected to have positive effects on budget allocation and subsequent service delivery in a specific sector, since GBS is accompanied by policy dialogues in which donors and a recipient country discuss development plans and budgets.

In this paper, we will focus on the health sector. The reason for this choice is that there is a broad consensus in the international community on the importance of health (as well as education) for achieving the MDGs. Another reason is the data availability: data on public health expenditure are in general more comprehensive than data on other sectors.

More specifically, this paper aims to tackle three research questions. First, it will examine whether GBS, as compared to domestic tax revenues, has positive effects on government health expenditure. Since GBS is an un-earmarked transfer from donors to developing countries, there is presumably no difference between GBS and tax revenue in terms of their effects on health expenditure. However, GBS may bring about a larger budget allocation for health thanks to the policy dialogues.

Second, the paper will investigate whether the impact of government health spending on health indicators is greater when GBS is offered than when no GBS is involved.

Third, given the importance of the "complementarity" issue raised in the Paris Declaration on Aid Effectiveness,[4] this paper will also examine the impact of earmarked assistance for health on health expenditure and indicators. This examination will help to see if there is any aid fungibility effect and if there are any differences in the impact on health indicators among domestic revenue-based expenditure, earmarked assistance, and GBS.

4. http://www.adb.org/media/articles/2005/7033_international_community_aid/paris_declaration.pdf Complementarity: More Effective Division of Labour, paragraph 35.

2. Model

To evaluate the effect of GBS, it is necessary to examine how the government budget structure changes with an inflow of GBS, and, if it does actually change, how health indicators may be affected through actual service delivery. This section is divided into two parts: we first focus on the effect that GBS has on the government budget structure and show that GBS actually has an impact on health expenditure that is independent of the impact of domestic tax revenue. We then consider the effect of GBS on health indicators.

A government has the following utility function where it obtains utility from health expenditure *h* and other government expenditure *g*:

$$u = u(h, g). \tag{1}$$

The government maximizes its utility subject to the following budget constraint:

$$h + g = r + gbs + dah + dag , \tag{2}$$

where *r* is tax revenue, *gbs* is the amount of GBS received from donors, *dah* is aid earmarked for the health sector, and *dag* is the sum of aid earmarked to other sectors. The first order condition of this utility maximization problem is represented by the following equation:

$$u_h = u_g . \tag{3}$$

This implies that the marginal utility from health expenditure is equal to the marginal utility from other government expenditure. We divide *h*, *g*, *r*, *gbs, dah,* and *dag* by GDP and denote them using *H*, *G*, *R*, *GBS, DAH*, and *DAG*, respectively, so that we can compare the data across countries with the same criterion. Government health expenditure is expressed with the following equation:

$$H_{it} = \beta_0 + \beta_1 R_{it} + \beta_2 GBS_{it} + \sum_{j=3}^{n} \beta_j x_{jit} + v_{it}\,, \tag{4}$$

where $$v_{it} = \delta_i + \delta_t + \varepsilon_{it}\,.$$

Here, the subscript i denotes individual countries and t denotes year; thus δ_i and δ_t stand for individual specific effects and time dummies, respectively. x stands for control variables including development assistance for health to government and the number of GBS donors. Development assistance for health to government represents the total amount of ODA earmarked for health and disbursed to the government sector. The same data is used in the analysis of Lu et al. (2010) and we will follow them. The reasons we adopt these control variables are first that countries whose governments are receiving more development assistance for health are in general likely to reduce their self-funded government spending on health; this is a well-known phenomenon called aid fungibility. The number of GBS donors presumably affects the strength of the donor group in a policy dialogue with the recipient government.[5]

When neither tax revenue nor GBS is earmarked, they have exactly the same effect on the health expenditure decision. However, when GBS is treated as being separate from domestic tax revenue, an increase in GBS may have a different impact on health expenditure compared with an increase in tax revenue. This can be examined by testing a hypothesis $\beta_2 \neq \beta_1$. For this test, we transform equation (4), as follows:

$$H_{it} = \beta_0 + \beta_1 (R_{it} + GBS_{it}) + (\beta_2 - \beta_1) GBS_{it} + \sum_{j=3}^{n} \beta_j x_{jit} + v_{it}\,. \tag{5}$$

If $\beta_2 - \beta_1$ is positive and statistically significant, it means that the effects are different. In contrast, if tax revenue and GBS have the same impact on health expenditure, their coefficients

5. Furthermore, it is likely that the probability of getting GBS may be related to the existing sector allocation of government spending. In this study, we assume that the possibility of getting GBS is independent of the ratio of revenue to GDP even though we admit that the fiscal soundness of a developing country may be checked in the actual process.

must be the same ($\beta_2 = \beta_1$). This is because, if the government can freely decide its budget allocation, it would not distinguish GBS from tax revenue. We refer to this examination as the "GBS test." In this analysis, we examine a case in which GBS is divided into Poverty Reduction Support Credit (PRSC) and PGBS, with PRSC defined as GBS managed by the World Bank and PGBS as all other GBS.

For this analysis, we adopt a dynamic panel model, since government health expenditure is likely to be affected by the amount in the previous year. We use the following equation:

$$H_{it} = \alpha H_{it-1} + \beta_0 + \beta_1 R_{it} + \beta_2 GBS_{it} + \sum_{j=3}^{n} \beta_j x_{jit} + v_{it}\,. \tag{6}$$

Subtracting the previous period equation from the original one, we obtain:

$$\Delta H_{it} = \alpha \Delta H_{it-1} + \beta_1 \Delta R_{it} + \beta_2 \Delta GBS_{it} + \sum_{j=3}^{n} \beta_j \Delta x_{jit} + \theta_t + \Delta\varepsilon_{it}\,, \tag{7}$$

where $\Delta H_{it} = H_{it} - H_{it-1}$, $\Delta R_{it} = R_{it} - R_{it-1}$, $\Delta GBS_{it} = GBS_{it} - GBS_{it-1}$, $\Delta x_{it} = x_{it} - x_{it-1}$, $\Delta\varepsilon_{it} = \varepsilon_{it} - \varepsilon_{it-1}$, and $\theta_t \equiv \delta_t - \delta_{t-1}$. To obtain GMM estimators from (7), we use the urban population rate for the instrumental variable. We show the results of GMM estimators as well as those of OLS estimators and fixed effects estimators in the next section.

As for health indicators, health expenditure is expected to be used effectively if the donor group is involved in the recipient government's planning through GBS policy dialogue. We therefore use the following model to examine the effect of health expenditure:

$$Y_{it} = \beta_0 + \beta_1 H_{it} + \beta_2 H_{it} \times \mathrm{I}\{1 \mid GBS > 0\} + \sum_{j=3}^{n} \beta_j x_{jit} + v_{it}\,. \tag{8}$$

In this equation, *Y* is a health indicator while *I* is an indicator function which takes 1 when GBS is positive (namely, the GBS dummy). The coefficient of health expenditure becomes

β_1 when GBS is not introduced and $\beta_1 + \beta_2$ when it is introduced. This formulation enables us to see the difference stemming from the introduction of GBS with regard to the effect of health expenditure on health indicators. When both β_1 and β_2 are positive and statistically significant, it means not only that the impact of health expenditure on the health indicator is positive but also that GBS is making health expenditure meaningful for health indicators. Since endogeneity needs to be taken into account, we will mainly focus on the results of different GMM estimators derived from the dynamic panel model, which is

$$Y_{it} = \sum_{j=1}^{m} \gamma_j Y_{it-j} + \beta_0 + \beta_1 H_{it} + \beta_2 H_{it} \times \mathrm{I}\{1 \mid GBS > 0\} + \sum_{j=3}^{n} \beta_j x_{jit} + v_{it}\,. \qquad (9)$$

We will use health indicators such as the immunization coverage rate (BCG and Measles), maternal mortality rate (MMR), and the mortality rate for children under 5 years old (Under5). In addition to the two variables noted in the previous paragraph, we take into account lags in health indicators for a couple of periods, depending on the variables. We also add to the model the development assistance for health to the government sector (DAH-G) and the product of DAH-G with the indicator function of GBS. The development assistance directed to health expectedly has an effect on health indicators. As the improvement of MMR and Under5 probably requires greater and broader efforts than does improvement of BCG and Measles, we introduce year dummies, the number of donors, and the employment rate as pre-determined variables for the analysis of MMR and Under5, while only year dummies are introduced for the analysis of immunization coverage.

3. Data

This section describes the data (GBS, health expenditure, and tax revenue) we will use in our regression analyses and the main properties of the dataset. In this study, we focus on developing countries whose gross national income (GNI) was less than 11,455 US dollars in 2007 based on the OECD/DAC classification. For the purposes of our analysis, we classified the countries into two groups: all targeted developing countries (all developing countries; “All” in the figures and tables) and lower income countries with incomes of less than $3,705 (the lower income countries; “Low” in the figures and tables). In the latter group, the rate of GBS to tax revenue is greater than it is in the former.

The dataset on GBS is constructed from the OECD/CRS data. The CRS dataset consists of a number of aid items reported by OECD/DAC countries. It includes data on program aid such as GBS or food security programs, as well as data on project aid for health, education, transportation, agriculture, and other sectors. It also contains information about other forms of aid, such as aid for refugees or emergencies. Each item has a code number based on its properties. For example, GBS is given the group classification number 51010. Among items with code number 51010, we have GBS, structural adjustment support, balance of payment support, and commodity aid. In this study, we follow the definition of GBS by IDD and Associates (2006). With this approach, we therefore construct our GBS data by excluding items that are outside our definition of GBS, such as structural adjustment support, balance of payment support, or commodity aid. Sector Budget Support (SBS) is also excluded because it is earmarked for a specific sector.

Since GBS is meant to be disbursed after a PRSP or interim PRSP is adopted, the items reported before such adoption is not considered to be GBS. Pre-PRSP data are counted as GBS only if IDD and Associates (2006) recognize it as such.[6] In this analysis, we will use the data for

6. Uganda received General Budget Support in 1998.

ten years (1997-2006) following the introduction of GBS in 1998. The period should not be too long in comparison with the number of observations. We also constructed data on the number of donors who contribute GBS to a developing country.

We classified the GBS data into Partnership GBS (PGBS) and Poverty Reduction Support Credit (PRSC). We assume that PRSC has a different impact on health expenditure given the size and year of commencement, and should be considered as a different kind of GBS.

Tax revenue data are collected from the IMF's World Economic Outlook (WEO). Since the original revenue data include grants from external sources, we subtract grants from revenue to obtain national tax revenue. The grants data are also extracted from the CRS dataset. The original revenue data contains social security contributions as well, but no data are available on social contributions. Therefore, we simply use revenue less grants as our national tax revenue. This can be justified because the social security system is not well developed and social security contributions are not large, especially in many low-income developing countries.

Government health expenditure data comes from the dataset provided by the Institute for Health Metrics and Evaluation (IHME).[7] It covers government health expenditure data for 108 countries, recorded over decades. There are two kinds of data: government health expenditure as agent (GHE-A) and government health expenditure as source (GHE-S). GHE-A consists of GHE-S plus Development Assistance for Health to Government (DAH-G). GHE-S represents the amount of government health expenditure financed from its own resources, including tax revenue and GBS. Since we focus on changes in government budgeting behavior, it is better to adopt GHE-S, which is the amount that developing country governments allocate to the health sector from their own resources. We denote GHE-S simply by GHE below. DAH-G is useful for viewing the aid fungibility effect. DAH-G represents the total amount of ODA earmarked for the health sector and disbursed to the government sector. These data also come from the IHME dataset. This dataset is constructed by imputation since around 40% of the

7. www.healthmetricsandevaluation.org/

original data was missing. Lu et al. (2010) use this dataset and we follow them since no other dataset is available.

GDP is obtained from the World Development Indicators. In our analysis, all monetary units are expressed as ratios to GDP. The GDP, which is used to standardized GBS, tax revenue, and other items, is expressed in year 2000 US dollars. We take the urban population rate from the dataset of the World Development Indicators. We will refer to this indicator as Urban below.

BCG and Measles data are also taken from the World Development Indicators. MMR and Under 5 are taken from the IHME dataset. The MMR figure comprises a number of factors that are short-term outcomes compared to Under5, which are five-year historical data. We also add to the explanatory variables the percentage of those aged 15 years or older who are employed, which represents the extent to which a developing economy has matured from a labor-market perspective. The data come from the World Development Indicators.

We exclude observations for which data are deficient. Since the data are not complete, we only adopt those without any missing figures. The number of countries covered is 109, of which the number of lower income countries is 49. The total number of observations (country-year) for the analysis on budget allocation is 941, of which 490 are for lower income countries. For the analysis on health indicators, the numbers are 1,092 and 576, respectively. The descriptive statistics are shown in Table 1 and Table 2.

Table 1. Descriptive statistics (Government Health Expenditure)

	Variable	Obs.	Mean	S.D.	Min	Max
All	GHE	941	0.0227	0.0124	0.0012	0.0732
	Revenue	941	0.2049	0.1053	0.0073	0.6406
	GBS	941	0.0022	0.0086	0.0000	0.1007
	PRSC	941	0.0004	0.0024	0.0000	0.0262
	PGBS	941	0.0018	0.0074	0.0000	0.0863
	DAH-G	941	0.0040	0.0064	0.0000	0.0703
	Donor	941	0.3688	1.2059	0	10
	Urban	941	45.3647	21.6995	7.64	92.64
Low	GHE	490	0.0179	0.0106	0.0012	0.0732
	Revenue	490	0.1677	0.1095	0.0073	0.5538
	GBS	490	0.0040	0.0114	0.0000	0.1007
	PRSC	490	0.0007	0.0032	0.0000	0.0262
	PGBS	490	0.0033	0.0100	0.0000	0.0863
	DAH-G	490	0.0067	0.0077	0.0000	0.0703
	Donor	490	0.6306	1.5938	0	10
	Urban	490	32.3805	15.6030	7.64	86.50

Table 2. Descriptive statistics (indicators)

	Variable	Obs.	Mean	S.D.	Min	Max
All	BCG	1035	86.1382	13.9610	20.00	99.00
	Measles	1067	76.5192	18.3517	15.00	99.00
	MMR	1092	382.3711	377.5356	21.70	2106.10
	Under5	1092	75.5586	53.9831	6.59	250.06
	GBSD	1092	0.1355	0.3424	0	1
	GHE	1092	0.0223	0.0120	0.0000	0.0729
	GHExGBSD	1092	0.0026	0.0077	0.0000	0.0631
	DAH-G	1092	0.0042	0.0066	0.0000	0.0703
	DAH-GxGBSD	1092	0.0014	0.0052	0.0000	0.0703
	Donor	1092	0.3407	1.1430	0	10
	Urban	1092	44.4827	21.1621	7.64	92.64
	Employment	1092	59.8467	11.1875	36.40	86.00
Low	BCG	562	80.3007	15.5650	20.00	99.00
	Measles	555	66.7604	18.3639	15.00	99.00
	MMR	576	614.9672	365.2550	44.50	2106.10
	Under5	576	112.2303	48.6958	13.88	250.06
	GBSD	576	0.2101	0.4077	0	1
	GHE	576	0.0179	0.0103	0.0000	0.0729
	GHExGBSD	576	0.0037	0.0088	0.0000	0.0631
	DAH-G	576	0.0070	0.0078	0.0000	0.0703
	DAH-GxGBSD	576	0.0025	0.0070	0.0000	0.0703
	Donor	576	0.5799	1.5038	0	10
	Urban	576	32.3756	15.2057	7.64	86.50
	Employment	576	64.5792	10.5010	38.10	86.00

For all developing countries, the highest number for GHE is 7.3% of GDP, while the average is 2.2%. For government revenue, the highest is 64% of GDP and the average is around 20%. There are 15 cases where tax revenue is negative. These are not included in our observation since it suggests a deficiency in the data. There are also several cases (Burkina Faso, Burundi, Malawi, Mali, Mozambique, Niger, Rwanda, Tanzania, and Uganda) where tax revenue is lower than GBS income for a year or two. These are countries whose governments cannot consistently collect sufficient tax revenue.

Overall, GBS received by developing countries is 1% of their tax revenue and 0.2% of GDP. As for the development assistance for health, the highest figure is 7% of GDP, while the average is 0.4%. The GBS trend is shown in Figure 1. GBS was introduced in 1998, but it started to increase only after the "full PRSP" was introduced around 2002, on the basis of which PRSC began to be distributed. Consequently, we can discern that GBS became one of the main aid modalities after 2002. The recipient countries are shown in Figure 2, which reveals that Tanzania has received the greatest amount of GBS, followed by Indonesia, Mozambique, Uganda, and Ghana.

Figure 1. GBS trend

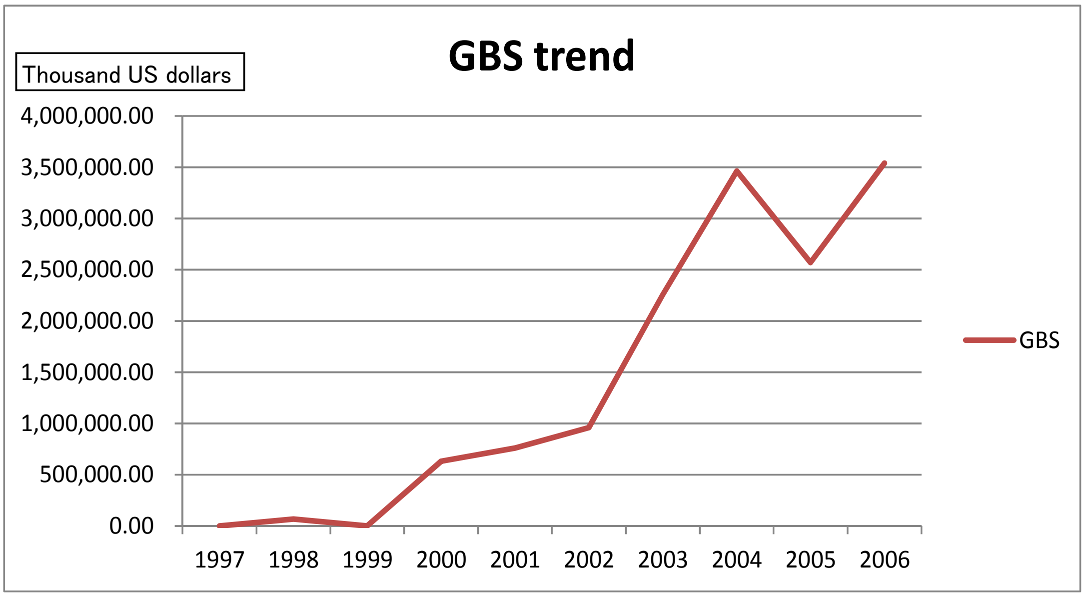
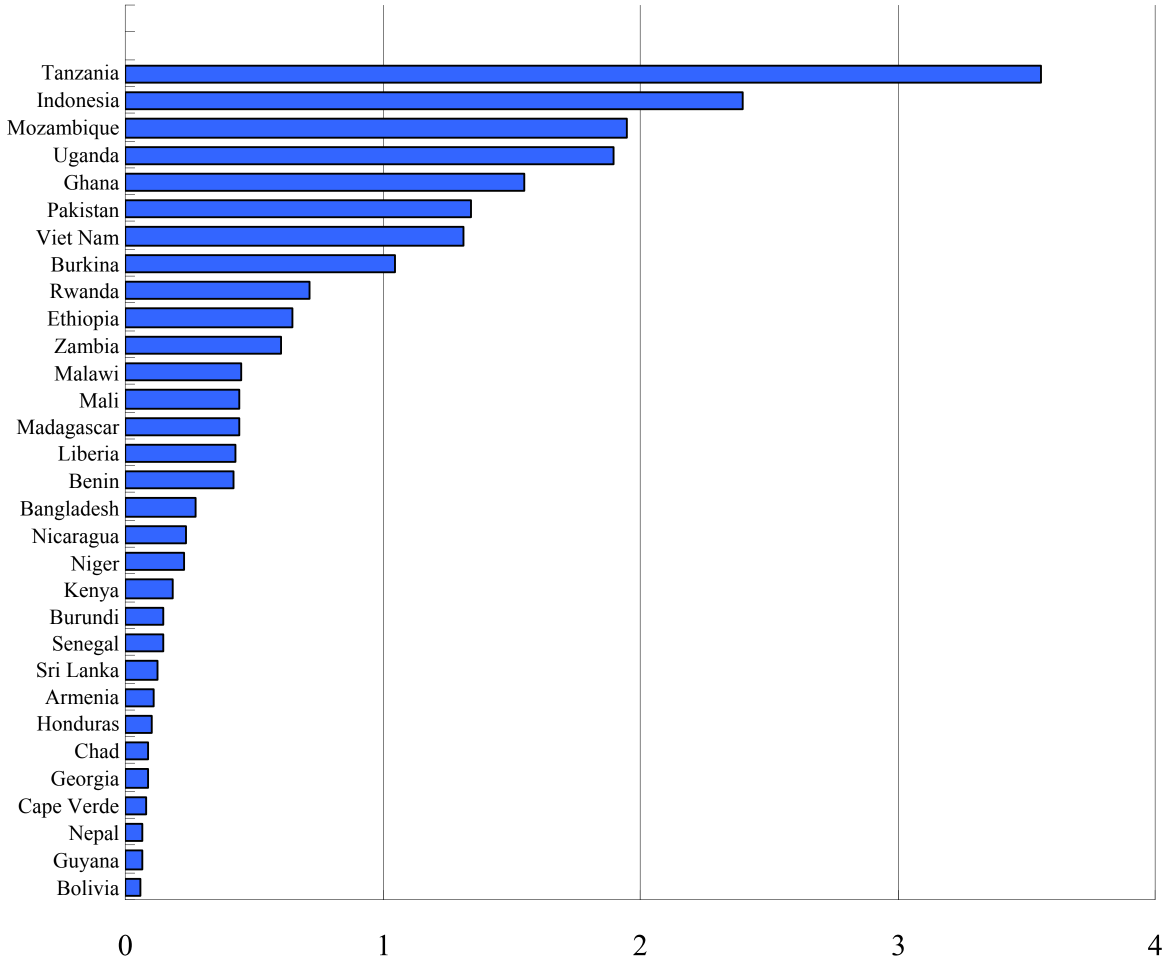


Figure 2. Total GBS received by individual countries (million US dollars)



Source: Constructed by the authors on the basis of OECD/DAC data.

As for health indicators, the highest coverage rates for BCG and Measles are both 99% of the population, while the averages are 86% and 76%, respectively. The highest maternal mortality ratio (MMR) is 2,106 per 100,000 pregnant women and the average is 382 while the highest Under-5 mortality rate is 250 per 1,000 infants and the average is 76. The trends for these data are shown in Figure 3-6. BCG improved between 1997-2000, then stagnated until 2002, and improved again after 2003. The Measles coverage rate rises gradually over the whole period. MMR, although stagnant until 2000, has since improved, while Under5 has improved over the whole period. The four figures in the sequence below show that the lower income countries have experienced superior improvement

Figure 3. BCG coverage rate (%)

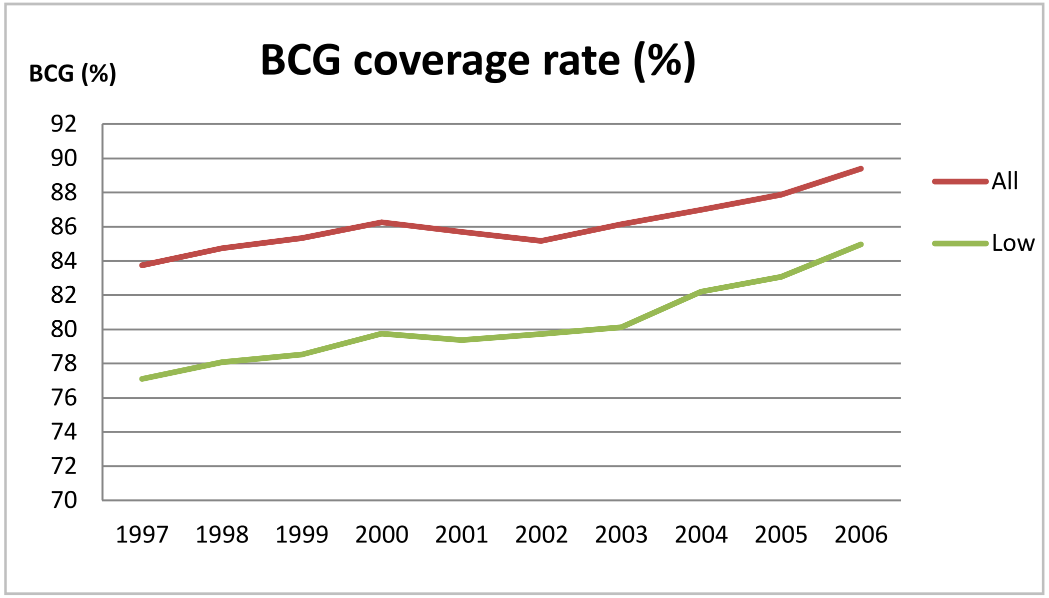


Figure 4. Measles coverage rate (%)

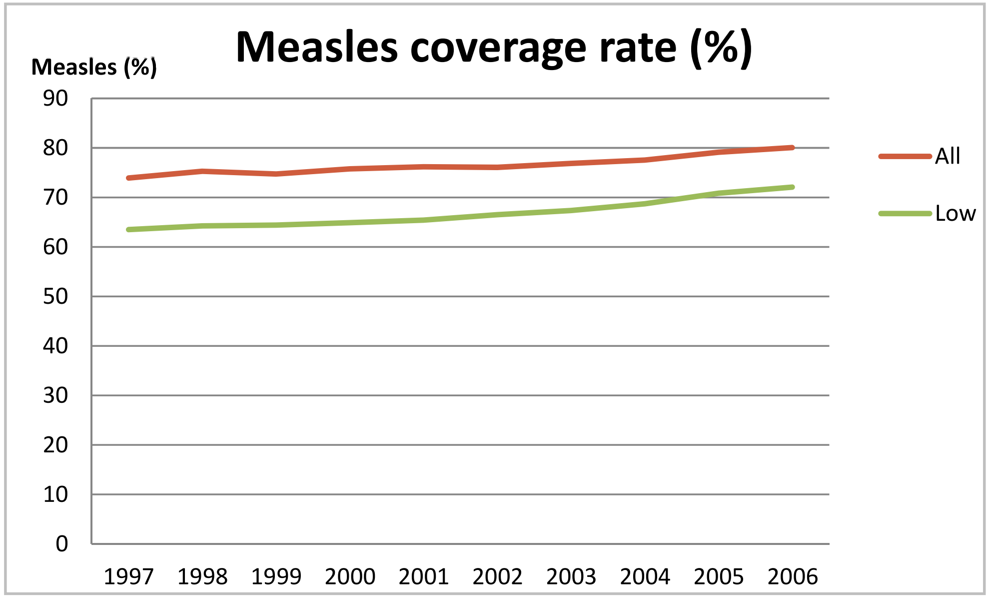


Figure 5. MMR trend

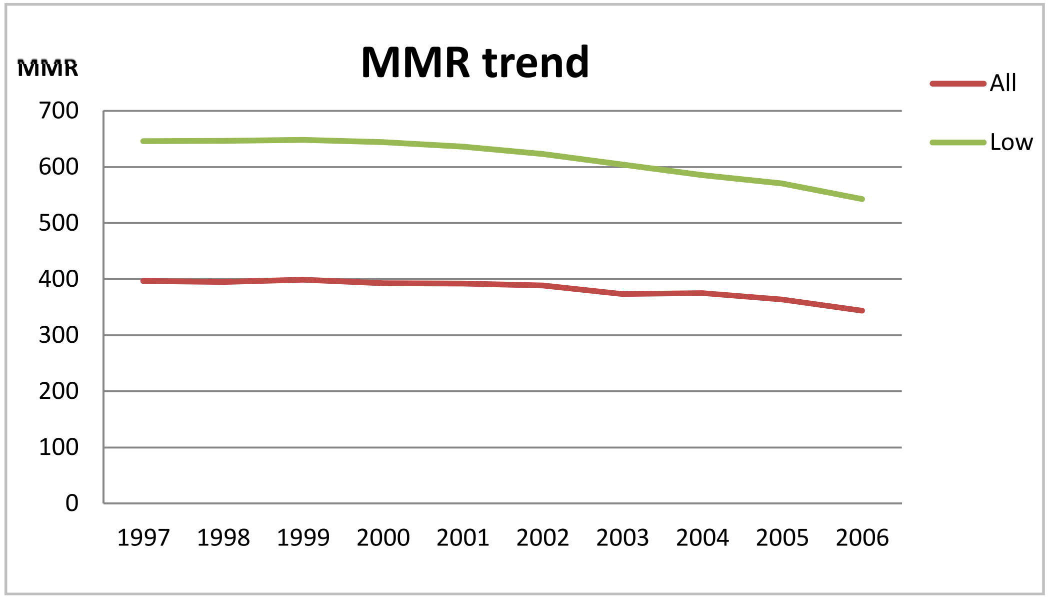
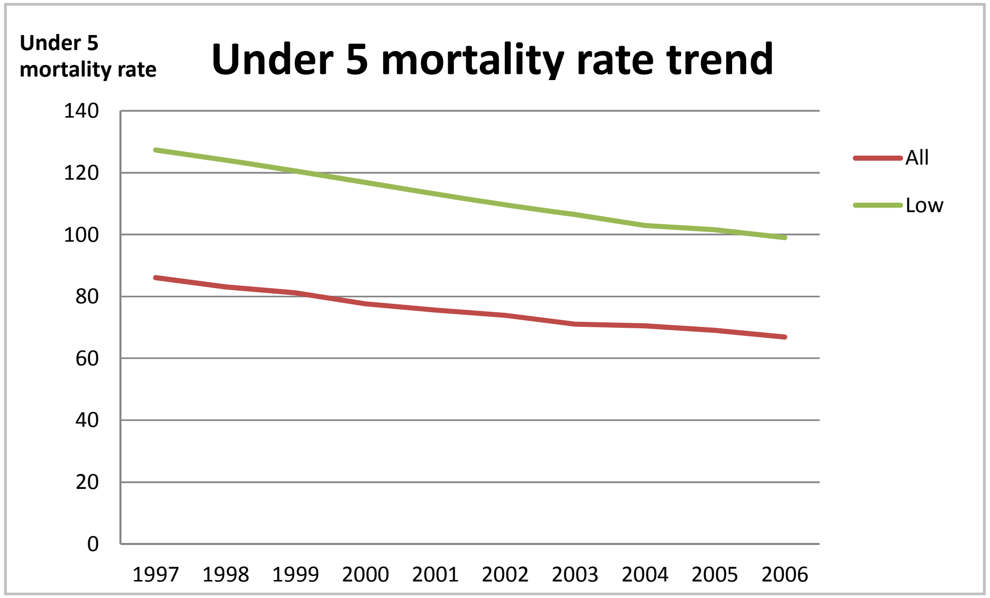


Figure 6. Under 5 mortality rate trend



4. Results

4.1 Impacts on budget allocation

We examine the model of GHE using the pooled OLS regression model, the fixed effects model, and the dynamic panel model. For each case, the results for all developing countries and for the lower income countries are shown in Table 3.

Table 3. Results for impact on GHE (Pooled OLS and Fixed Effects)

GHE	All				Low			
Variable	Pooled OLS		Fixed Effects		Pooled OLS		Fixed Effects	
GHE(t-1)								
Revenue	0.045*** (0.004)	0.045*** (0.004)	0.001 (0.006)	0.009 (0.006)	0.035*** (0.005)	0.035*** (0.005)	0.016** (0.008)	0.015** (0.001)
GBS	0.123** (0.057)		0.108** (0.046)		0.065 (0.059)		0.127*** (0.046)	
PRSC		0.046 (0.132)		0.164*** (0.055)		-0.031 (0.125)		0.189*** (0.056)
PGBS		0.134** (0.060)		0.102** (0.046)		0.077 (0.062)		0.121** (0.046)
DAH-G	-0.021 (0.114)	-0.023 (0.114)	-0.479*** (0.089)	-0.178*** (0.090)	0.209* (0.120)	0.206* (0.120)	-0.452*** (0.094)	-0.451*** (0.094)
Donor	-0.000** (0.001)	-0.001* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
constant	0.014*** (0.001)	0.014*** (0.001)	0.022*** (0.001)	0.022*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.018*** (0.001)	0.018*** (0.001)
GBS test	0.078		0.098**		0.030		0.111**	
PRSC test		0.002		0.155***		-0.066		0.173***
PGBS test		0.089		0.092**		0.042		0.105**

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

First, the results with pooled OLS and fixed effects estimators show that both tax revenue and GBS tend to raise health expenditure. In the case of all developing countries, the coefficients of tax revenue are positive in all cases. These coefficients are quite small but statistically significant in the pooled OLS model. The coefficients of GBS are even greater than those of tax revenue and are statistically significant in both the pooled OLS and the fixed effect models. The GBS test is statistically significant in the fixed effects model but not in the pooled OLS model. When GBS is divided into PRSC and PGBS, their coefficients are significantly positive for an increase in GHE in the fixed effect model. A 1% increase in PRSC and PGBS raises health expenditure by 0.164% and by 0.102%, respectively.

We can also discern the existence of aid fungibility by looking at the DAH-G, for which the correlations with GHE are significantly negative in the fixed effects model. This indicates aid fungibility.

As for the lower income countries, both tax revenue and GBS tend to increase GHE; the coefficient of GBS is statistically significant in the fixed effects model. Fixed effects estimators of PRSC and PGBS show that both increase GHE significantly, again in the fixed effect model. As for the GBS test, the coefficients of GBS, PRSC, and PGBS are all significantly positive for fixed effects estimators. A 1% increase in GBS raises GHE by 0.13%; when GBS is divided into PRSC and PGBS, GHE increases by 0.19% and 0.12%, respectively. The pooled OLS estimators show that DAH-G increases GHE significantly, whereas the fixed effects estimators show that it decreases GHE significantly. A reason for this apparent abnormality may be that pooled OLS estimators do not take individual effects into consideration.

The above analysis does not take into account the endogeneity of explanatory variables. However, since GHE may affect GBS, DAH-G, and tax revenue collection, we use the method of Arellano and Bond (1991) to derive GMM estimators.

Table 4 shows the results with difference GMM estimators. The Hansen test and Arellano-Bond test shows that the models are valid for both all developing countries and the lower income countries.

Table 4. Results for impact on GHE (Difference GMM)

GHE	All		Low	
GHE(t-1)	0.396*** (0.131)	0.376*** (0.134)	0.379** (0.174)	0.354** (0.176)
Revenue	-0.013 (0.014)	-0.015 (0.014)	0.005 (0.021)	0.001 (0.019)
GBS	0.055 (0.060)		0.104** (0.048)	
PRSC		0.115 (0.079)		0.129* (0.074)
PGBS		0.045 (0.052)		0.081* (0.045)
DAH-G	-0.570*** (0.116)	-0.577*** (0.120)	-0.463*** (0.124)	-0.455*** (0.118)
Donor	-0.001* (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.001* (0.000)
constant				
GBS test	0.069		0.099**	
PRSC test		0.130*		0.128*
PGBS test		0.060		0.080*
Hansen test	0.608	0.643	0.321	0.214
A-B test AR(1)	0.003	0.004	0.078	0.096
A-B test AR(2)	0.505	0.551	0.177	0.187

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

According to the results, for all developing countries, neither national revenue nor GBS has a significant impact on GHE. When DAH-G increases, GHE declines and the result is statistically significant. Specifically, when DAH-G increases by 1%, GHE decreases by 0.57%, and thus the total increase in GHE is only 0.43%. In the GBS test, the PRSC portion of GBS increases GHE much more than tax revenue does.

For the lower income countries, both tax revenue and GBS tend to increase GHE, but only GBS is statistically significant. We can tell that when GBS increases by 1%, GHE rises by 0.1%. When GBS is divided into PRSC and PGBS, each significantly increases GHE. The GBS test, meanwhile, reveals that GBS increases GHE by a tenth of a percentage point more than tax revenue does. In contrast to GBS, DAH-G correlates with GHE negatively, which suggests the existence of fungibility.

As a whole, we can conclude that GBS positively affects government health expenditure in developing countries. Next, we will examine if GHE has contributed to improving the actual health conditions of their people.

4.2 Impacts on health indicators

Immunization against BCG and Measles

In order to take endogeneity into account, we look at the results with difference GMM estimators calculated in the dynamic panel model, which are shown in Table 5. For all developing countries as well as the lower income countries, the model is judged to be valid by the Hansen test and the Arellano Bond test.

Table 5. Results for impact on BCG and Measles (Difference GMM)

	BCG			Measles	
	All	Low		All	Low
BCG(t-1)	0.008*** (0.001)	0.007*** (0.001)	Measles(t-1)	0.006*** (0.001)	0.006*** (0.001)
BCG(t-2)	0.000 (0.001)	0.000 (0.001)	Measles(t-2)	-0.001** (0.001)	-0.001** (0.001)
GHE	2.975** (1.449)	3.065* (1.787)	GHE	2.519 (1.676)	1.993 (1.925)
GHE×GBSD	0.779 (1.270)	0.437 (1.409)	GHE×GBSD	-0.354 (1.000)	-2.006 (1.972)
DAH-G	2.690* (1.422)	1.616 (1.405)	DAH-G	-0.764 (1.704)	-2.161 (2.080)
DAH-G×GBSD	1.211 (1.876)	1.140 (1.668)	DAH-G×GBSD	2.191 (2.538)	2.317 (2.377)
yr1999	0.001 (0.012)	-0.013 (0.020)	yr1999	-0.029*** (0.009)	-0.063*** (0.017)
yr2000	0.001 (0.009)	-0.008 (0.015)	yr2000	-0.017** (0.007)	-0.048*** (0.011)
yr2001	-0.016** (0.008)	-0.023* (0.013)	yr2001	-0.019** (0.008)	-0.045*** (0.012)
yr2002	-0.010 (0.007)	-0.018 (0.012)	yr2002	-0.023*** (0.007)	-0.042*** (0.012)
yr2003	-0.008 (0.007)	-0.015 (0.009)	yr2003	-0.011 (0.007)	-0.023*** (0.008)
yr2004	-0.007 (0.010)	-0.005 (0.011)	yr2004	-0.009 (0.007)	-0.020** (0.009)
yr2005	-0.003 (0.007)	-0.006 (0.008)	yr2005	0.001 (0.007)	-0.005 (0.010)
Hansen test	0.831	0.534	Hansen test	0.517	0.544
A-B test AR(1)	0	0	A-B test AR(1)	0	0
A-B test AR(2)	0.332	0.865	A-B test AR(2)	0.242	0.45
obs	706	387	obs	721	376

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The table shows that both GHE and DAH-G improve the BCG coverage for all developing countries. For example, a 1% increase in GHE improves the BCG coverage rate by 2.97% while a 1% increase in DAH-G improves the coverage rate by 2.69%. In the case of the lower income countries, GHE improves the BCG coverage rate significantly, but DAH-G does not, even though the sign is positive.

In contrast, no significant impact of GHE and DAH-G on the Measles coverage rate is discerned, either in all developing countries or in the lower income countries. In short, GHE and DAH-G affect service delivery to some extent, but the degree of impact depends on which indicator we focus on.

GHE×GBSD (GBS dummy) and DAH-G×GBSD, which show the effect of GBS introduction on the efficient use of GHE or DAH-G, are not significant in any of the analyses of immunization coverage rates of BCG and Measles for all developing countries and for the lower income countries. In other words, the effects of GHE and DAH-G on the immunization rates are not improved by the introduction of GBS. The policy dialogue accompanying GBS has apparently contributed little to improving the efficiency of GHE or DAH-G for immunization coverage.

<u>MMR and Under 5</u>

As for MMR and Under5, Table 6 shows that GHE and DAH-G improve the MMR indicator (statistically) significantly. A 1% increase in GHE and DAH-G improves MMR by 26 and 34 pregnant women out of 100,000, respectively, in all developing countries. If we focus on the lower income countries, only GHE significantly improves MMR. As for Under5, neither GHE nor DAH-G has a significant impact on the indicator.

Table 6. Results for impact on MMR and Under5 (Difference GMM)

	MMR			Under 5	
	All	Low		All	Low
MMR(t-1)	0.01*** (0.001)	0.013*** (0.001)	Under5(t-1)	0.008*** (0.003)	0.007*** (0.003)
GHE	-26.575*** (5.853)	-23.709*** (7.808)	Under5(t-2)	0.001 (0.003)	0.001 (0.003)
GHE×GBSD	-4.982 (7.301)	3.133 (6.865)	GHE	0.869 (0.896)	0.198 (0.552)
DAH-G	-34.860** (13.712)	-16.762 (10.438)	GHE×GBSD	-0.310 (0.393)	-0.585 (0.706)
DAH-G×GBSD	-8.560 (7.803)	1.358 (5.362)	DAH-G	-0.162 (0.548)	-0.283 (0.541)
Donor	0.031 (-0.041)	0.022 (0.058)	DAH-G×GBSD	0.371 (0.346)	0.183 (0.237)
Employment Rate	0.016*** (0.006)	0.001 (0.005)	Donor	0.001 (0.002)	0.004 (0.004)
yr1998	0.067 (0.047)	0.041 (0.131)	Employment Rate	-0.000 (0.000)	-0.000 (0.000)
yr1999	0.068 (0.045)	0.028 (0.132)	yr1999	0.012*** (0.003)	0.024**** (0.006)
yr2000	0.068* (0.038)	-0.048 (0.114)	yr2000	0.008*** (0.003)	0.016*** (0.005)
yr2001	0.082* (0.045)	-0.058 (0.111)	yr2001	0.007*** (0.002)	0.013**** (0.004)
yr2002	0.039 (0.028)	-0.057 (0.087)	yr2002	0.004** (0.002)	0.008*** (0.003)
yr2003	0.056* (0.030)	-0.078 (0.071)	yr2003	0.004*** (0.001)	0.005* (0.003)
yr2004	0.042 (0.032)	-0.073 (0.061)	yr2004	0.001 (0.002)	-0.000 (0.004)
yr2005	0.010 (0.019)	-0.036 (0.038)	yr2005	0.002 (0.001)	0.002 (0.003)
Hansen test	0.469	0.529	Hansen test	0.354	0.343
A-B test AR(1)	0.024	0.07	A-B test AR(1)	0.01	0.052
A-B test AR(2)	0.185	0.116	A-B test AR(2)	0.91	0.781
obs	858	457	obs	744	398

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

These results probably suggest that it is relatively easy to improve some mortality rates (like MMR) just by increasing physical inputs while factors beyond simple physical inputs are involved in the improvement of other mortality rates (like Under 5).

On the other hand, as in the case of immunization, the introduction of GBS does not have a significant impact on the efficient use of GHE or DAH-G in either all developing countries or the lower income countries.

5. Conclusion

In this paper, we first derived pooled OLS estimators, fixed effects estimators, and GMM estimators to determine the impact of GBS on GHE and health indicators. With endogeneity and autocorrelation taken into account, all the difference GMM models pass the Hansen test and Arellano-Bond test, which implies that our modeling is valid. Therefore, we mainly focus on the results with the GMM estimators.

Looking at the impact of GHE on all developing countries, DAH-G reduces the amount of GHE, which is a phenomenon known as aid fungibility. This result is consistent with existing studies such as Lu et al. (2010). The GBS test also indicates that PRSC increases GHE more than tax revenue does.

For the lower income countries, GBS increases GHE significantly. The GBS test meanwhile shows that GBS, PRSC, and PGBS all increase GHE significantly more than tax revenue does. For all developing countries, however, only PRSC was significant. This result implies that GBS may have a stronger impact on government budget allocation in the lower income countries than in all developing countries. Within GBS, the impact of PRSC was greater than that of PGBS.

At the same time, the impact of government expenditure on health indicators varies from one subsector to another. For all developing countries, the BCG coverage rate improves if GHE or DAH-G increases, while for the lower income countries the BCG coverage rate improves only when GHE increases. In contrast, no significant result is obtained from the analysis of Measles. In addition, we cannot observe any significant effect of the introduction of GBS on immunization rates.

The MMR for all developing countries, similar to the BCG coverage rate, improves when GHE or DAH-G increases, while for the lower income countries, the results show that an increase in GHE, but not in DAH-G, leads to an improvement. In contrast, we could not obtain any significant result for Under5. In addition, the effect of the introduction of GBS could not be identified.

As policy implications of our analysis, we can first suggest that GBS can be an effective tool for policy dialogue to enhance health expenditure. In lower income countries, both PRSC and PGBS can have a greater effect on government health expenditure in comparison to that of national revenue. In higher income countries, PRSC has a greater impact on government health expenditure.

Moreover, our empirical study shows that GBS can have a certain degree of impact on some health indicators. However, our study has made it clear that GBS alone is not sufficient to improve people's health conditions on the ground. We probably need to supplement it by offering more targeted assistance for building human and institutional capacity and infrastructure on the basis of which GBS can be used more effectively.

In this paper, comprehensive empirical research was undertaken to examine the impact of GBS on health expenditure and health indicators at a macro level. However, actual channels connecting GBS with service delivery and service delivery with people's health conditions are still a black box. To open the box, further research on what is happening on the ground is required.

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Abbreviation list

CRS	Creditor Reporting System
DAH	Development Assistance for Health
DAH-G	Development Assistance for Health to Government
GBS	General Budget Support
GBSD	GBS Dummy
GHE	Government Health Expenditure (based on tax revenue and GBS)
GMM	Generalized Method of Moments
IHME	Institute for Health Metrics and Evaluation
MMR	Maternal Mortality Ratio
PGBS	Partnership General Budget Support
PRSC	Poverty Reduction Support Credit
PRSP	Poverty Reduction Strategy Paper

Abstract (in Japanese)

要約

途上国における一般財政支援の効果を評価するために、109 か国を対象に 1997 年から 2006 年までの 10 年分の政府歳入、支出、社会指標等のパネルデータを用いて分析を行った。本論文では、使途を限定しない税収と同じく使途を限定せず途上国の予算化がなされる一般財政支援との間で、途上国の予算編成行動に差異があるのか、また、一般財政支援の導入が成果にどのようなインパクトを与えているかを検証するものであり、MDGs で重要視されている社会分野のうち保健セクターに焦点を絞った研究を行った。その結果、税収による保健分野での予算配分よりも、一般財政支援による予算配分の方が統計的に有意に大きいという結果を得たが、保健指標に対する政府の保健支出の効果については、一般財政支援の導入により必ずしも改善されるわけではないとの結果となった。本論文からは、一般財政支援のみでは開発効果達成には限度があることから、人的・制度的能力開発に焦点を当てたプロジェクト/プログラムとの補完性をさらに慎重に考慮することが必要であるとの結論に至った。

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