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The Impact of Foreign Aid Allocation on Access to Social Services in sub-Saharan Africa: The Case of Water and Sanitation

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Summary. — The Sustainable Development target of ensuring access to water and sanitation for all by 2030 has far-reaching implications for the achievement of the other SDGs. However, achieving this target remains a major challenge for sub-Saharan Africa, and the ability of governments in the region to expand access is constrained by limited financial resources. This paper investigates whether targeting foreign aid to the water and sanitation sector can help achieve the goal of expanding access to water and sanitation services in sub-Saharan Africa. The analysis is based on panel data estimation techniques controlling for country-specific effects and potential endogeneity of regressors. The econometric results suggest that increased aid targeted to the supply of water and sanitation is associated with increased access to these services, although the relationship is non-linear. The evidence in this study makes an important contribution to the scholarly debate on aid effectiveness. It also has important practical implications for aid policy: specifically, it suggests that in addition to scaling up aid disbursements to sub-Saharan African countries, donors need to increase aid allocation to water and sanitation as well as other areas where the region lags behind. There is also a need to identify structural constraints that may limit access to water and sanitation, and utilize foreign aid so as to alleviate these constraints.

Key words — water, sanitation, official development aid, sub-Saharan Africa, poverty

1. INTRODUCTION

Access to social services—education, health care, potable water, adequate sanitation—is vital to securing and sustaining human development, reducing poverty, and achieving other development goals (United Nations, 2013). However, while education and health care have received significant attention from governments and from bilateral and multilateral donors, less attention has been paid to the provision of water and sanitation in the allocation of aid, in policy debates, and in the scholarly literature. In sub-Saharan Africa (SSA), this is reflected in the uneven nature of progress made toward achieving the different United Nations' Millennium Development Goals (MDGs). While the region appears to have made progress in improving health and education outcomes, the provision of safe drinking water and basic sanitation remains a major challenge. When the term of the MDGs expired in 2015, only a handful of countries in the region had succeeded in halving the proportion of people without access to safe drinking water, and none had been able to meet the sanitation target (UNICEF and WHO, 2015). The WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation estimates that 32% of the population in sub-Saharan Africa—about 319 million people—do not have access to an improved drinking water source, while 70%—about 695 million people—lack access to improved sanitation facilities (UNICEF and WHO, 2015). There is also a significant rural–urban gap: only 56% of the rural population has access to improved water sources, compared to 87% of the urban population. Similarly, only 23% of the rural population has access to improved sanitation facilities, compared to 40% of the urban population (UNICEF and WHO, 2015). However, progress in increasing urban access also appears to have stagnated: during 1990–2015, urban access to sanitation went up by only 1% while urban access to water increased by only 4% (UNICEF and WHO). More worryingly, the proportion of urban dwellers with access to piped water in their homes declined from 43% to 34% (Hopewell & Graham, 2014). There are also significant disparities by income: 64% of the poorest quintile of urban residents have access to improved water supply compared with 94% of the wealthiest quintile, while 42% of the poorest quintile have access to improved sanitation facilities compared to 91% of the wealthiest quintile (Hopewell & Graham, 2014). With the adoption of the Sustainable Development Goals (SDGs) in 2015, it remains to be seen whether sub-Saharan Africa will be able to achieve Goal Six—to ensure access to water and sanitation for all by 2030.

Expanding access to water and sanitation is a goal that has far-reaching implications for the achievement of the other SDGs. Access to clean drinking water and sanitation is directly linked to health outcomes, especially for infants and children. Despite some gains in reducing child mortality, SSA still has the highest under-five mortality rate (at 98 deaths per 1000) and is the only region to have reduced the rate by less than half during 1990–2011 (World Bank, 2014). Worldwide, diarrheal diseases, most commonly caused by gastrointestinal infections and transmitted through the oral-fecal route are the most common cause of childhood deaths (Botting & *et al.*, 2010). Frequent occurrences of diarrhea and other diseases resulting from lack of access to water and sanitation undermine human capital formation and reduce the productivity of adults who fall sick or must care for the sick. Therefore, increasing access to water and sanitation can help to improve both health outcomes and human capital, thus contributing to greater overall productivity.

Inadequate access to clean water sources and sanitation also has implications for SDG five, i.e., achieving gender equality (especially in the areas of education and labor force participation) and empowering women and girls. In many SSA

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countries, women and girls are responsible for fetching water and caring for the sick (WHO and UNICEF, 2008). Inadequate supply of water and sanitation infrastructure not only increases the time it takes to fetch water, but by increasing the risk of illness, it also increases the time that women spend on unpaid care of family members. Furthermore, limited access to water and sanitation increases the likelihood that girls will be withdrawn from school to help fetch water, and reduces the time that women can allocate to paid market work. SSA continues to lag behind other regions in lowering the gap in male–female enrollment ratios at all levels of education, and girls remain at a significant disadvantage in access to primary and secondary education (United Nations, 2013). Efforts to narrow the gender gaps in education and paid employment, which tend to be significantly higher in rural areas, will continue to be hampered by the lack of access to potable water and improved sanitation.

Improving access to water and sanitation should therefore be a top priority in the SSA region. However, the lack of financing remains an important constraint on the ability of governments to expand and maintain water and sanitation infrastructure, and efforts to expand access to water and sanitation have focused on mobilizing more financial resources, both domestically and through increased aid inflows to bridge the financing gaps in the provision of water and sanitation services. In recognition of this, donors at the G-8 summit of 2005 committed to doubling aid to the continent to improve the delivery of public services and build infrastructure for health, education, water and sanitation (Wolf, 2007). However, despite having increased from a low of 2.8% in 2002 to 4.1% in 2008, the share of total aid going to the water and sanitation sector in sub-Saharan Africa remains low relative to other regions and in comparison with aid to other sectors such as education (Salami, Stampini, Kamara, Sullivan, & Namara, 2011; Wolf, 2007). Moreover, simply increasing the volume of total aid to the region without targeting the water and sanitation sectors may not lead to expanded access to these services, since water and sanitation compete with other public services for funding, and physical infrastructure such as roads tend to be higher on governments' priority lists.

In this paper, we use an unbalanced panel data set from a sample of 29 sub-Saharan African countries over the 1990–2010 period to investigate whether targeting foreign aid to the water and sanitation sector can help achieve the goal of expanding access to water and sanitation services. Specifically, we use OECD/DAC data on aid disbursements to examine the impact of foreign aid targeted to water and sanitation on the share of the rural and urban populations with access to these social services. Because of the wide rural–urban inequalities in access to water and sanitation in sub-Saharan Africa, we also examine the impact of aid to the sector on the urban–rural gap in access to these services. The rural–urban gap is measured by the ratio of the percentage of the rural population with access to water and sanitation to the percentage of the urban population with access to these services.

In the remainder of the paper, we provide a literature review in the next section. Section 3 is devoted to the empirical analysis, with a description of the data and the empirical model, and a discussion of the regression results. Section 4 concludes.

2. LITERATURE REVIEW

Efforts to expand access to social services such as water and sanitation in Africa have typically focused primarily on mobilizing additional financial resources and much less on how the allocation of resources across various uses helps achieve development goals. This is an important part of the fundamental problem encountered in the assessment of the effectiveness of foreign aid, which has largely relied on aggregate data to identify the linkages between foreign aid and economic outcomes, with conflicting results (Doucouliagos & Paldam, 2009; McGillivray, Feeny, Hermes, & Lensink, 2006). The difficulty of documenting the impact of foreign aid at the macro level has led to a growing body of work that highlights the importance of focusing analysis of aid effectiveness at the sectoral level (Lee & Izama, 2015; Michaelowa & Weber, 2006; Ndikumana, 2012; Nunnenkamp & Öhler, 2011; Williamson, 2008; Wilson, 2011). Evidence from a number of studies that focus on the impact of aid on sector-specific outcomes suggests that targeted aid interventions can achieve positive results at the micro level (Dreher, Nunnenkamp, & Thiele, 2008; Gyimah-Brempong, 2015; Mishra & Newhouse, 2009; Pickbourn & Ndikumana, 2016; Yogo & Mallaye, 2015).

To the best of our knowledge, only a handful of other studies have examined the impact of aid disbursements to the water and sanitation sector on access to these services in developing countries, with conflicting results. Using OLS regression analysis of cross-sectional data to model public service production functions in 110 developing countries for a single year, Wolf (2007) finds that the share of total aid committed to the water and sanitation sector in 2000 has no impact on access to sanitation, and a negative impact on access to water in 2002. [1] In contrast, using Spearman's rank correlation coefficients for a group of 48 countries, Botting *et al.* (2010) find that low-income countries receiving the most aid to the water and sanitation sector are 4–18 times more likely than countries in the lowest tercile of foreign aid to achieve greater gains in population access to water over the period 2002–06. However, this effect disappears when they control for GDP, public health expenditure and land area. Using OLS on data from 31 cities in sub-Saharan Africa, Hopewell and Graham (2014) find no significant association between ODA allocated to water supply and sanitation (large systems) over 2000–10 and access to water and sanitation, although they do find a negative and significant association between their measure of aid and the prevalence of open defecation. The methods used in these studies preclude any consideration of the effect of possible endogeneity of the regressors and time-invariant country-specific variables. These limitations are to some extent addressed by Wayland (2013) who, using fixed-effects regressions on panel data covering 50 years and 133 countries, finds that increased aid commitments to the water and sanitation sector are associated with increased access to improved water sources. The study does not explore the impact of aid on access to improved sanitation facilities. More recently, using fixed-effects regressions on panel data covering 20 years and 114 countries, Bain, Luyendijk, and Bartram (2013) do not find any significant effect of aid disbursements to water and sanitation on improved water and sanitation coverage over the period 2000–10. Like the previous studies, Bain *et al.* (2015) specify a linear relationship between aid to the water and sanitation sector and access to these services.

This paper adds to the growing empirical literature on aid effectiveness at the sectoral level by extending and deepening the coverage of existing studies on aid and access to water and sanitation by focusing specifically on access to water and sanitation in sub-Saharan Africa. Using both fixed effects regressions and the generalized method of moments (system GMM) regressions, we are able to take into account the effects of omitted country-specific time-invariant variables as well as potential endogeneity of regressors. Furthermore, our

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