

Has Foreign Aid Been Effective in the Water Supply and Sanitation Sector? Evidence from Panel Data

SASIDARAN GOPALAN^a and RAMKISHEN S. RAJAN^{a,b,*}

^a National University of Singapore, Singapore

^b ESSEC Business School, Singapore

Summary. — A voluminous academic literature exists on the effectiveness of foreign aid in general. However, relatively less work has been done on the impact of sector-specific foreign aid. This paper focuses on the impact of aid disbursements on outcomes in the Water Supply and Sanitation (WSS) Sector. Despite the considerable increase in aid flows to the WSS sector over the last few years, it is only recently that the literature has started to focus on assessing aid effectiveness in this sector. We contribute to the growing interest in sector-specific aid effectiveness literature by conducting an empirical analysis for a large panel of countries to assess the effectiveness of aid disbursements on improved access to WSS facilities. Our empirical results suggest that aid disbursements produce a strong, positive, and significant effect on improved access to WSS, and our results are robust to multiple specifications and estimation procedures. We also find strong evidence of non-linearities governing the relationship between aid flows and outcomes, in that aid disbursements are effective only in lower middle-income-countries rather than low-income-countries or upper middle-income countries. These results tend to suggest that a country needs to meet a certain development or income threshold before aid can prove to be effective and that aid flows tend to have diminishing returns. Finally, we also find that aid disbursements produce favorable effects in enhancing access to WSS facilities in rural as opposed to urban areas.

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1. INTRODUCTION

A voluminous academic literature exists on the effectiveness of foreign aid in general (See [Edwards, 2014](#); [Morrissey, 2015](#); [Tarp, 2015](#) for some recent reviews). A number of comprehensive literature reviews have tried to summarize the key empirical findings emanating from this literature.¹ A useful typology, for instance, comes from [Howes \(2011\)](#) who argues that the studies on the effectiveness of aid can be divided into four categories: “good and large”, i.e., those that tend to produce a “transformative effect” if delivered in ‘appropriate’ doses in an ‘appropriate’ way ([Sachs, 2005](#)); “bad and large” with large negative impacts ([Bauer and Yamey, 1982](#)); “good and small” with no significant effects on development, but can exert a positive marginal contribution ([Rodrik, Birdsall, & Subramaniam, 2005](#)); or “bad and small” with aid being minor and negative determinant of growth ([Easterly, 2006](#)).

The relatively more recent and careful macro studies have suggested that aid either has had no effect on growth, or if it has had positive impact, the effect is subject to rapid diminishing returns ([Easterly, 2003](#); [Edwards, 2014](#); [Rajan & Subramanian, 2008](#); [Tarp, 2015](#)). Studies such as [Mosley, Hudson, and Verschoor \(2004\)](#) and [Arndt, Jones, and Tarp \(2015\)](#) draw our attention to the classic “micro–macro” paradox in the relationship between foreign aid and growth, wherein the micro-econometric studies produce a relatively clearer positive and statistically significant impact on growth compared to the ambiguous results that macroeconomic studies generate.

While the debate on aid effectiveness continues, an important departure from macro level studies on aid-growth nexus comes from a growing number of papers examining the effectiveness of aid at a sector level. With the availability of relatively disaggregated data on aid flows to different social sectors, a handful of empirical studies have focused on the

impact of aid on various development indicators such as infant mortality, primary school enrolments, and overall human development. In contrast to the inconclusive aid-growth literature, these studies appear to suggest that targeted aid interventions work and tend to produce desirable impacts, reiterating the need to re-examine the impact of aid at the sector level. For example, [Mishra and Newhouse \(2009\)](#) find that aid helps to lower infant mortality in recipient countries, while [Michaelowa and Weber \(2006\)](#) and [Dreher, Nunnenkamp, and Thiele \(2008\)](#) find evidence that aid contributes to increasing primary school enrolments. [Gormanee, Morrissey, Mosley, and Verschoor \(2005\)](#) find that aid is associated with improvements in the overall Human Development Index (HDI). [Pickbourn and Ndikumana \(2013\)](#) attempts to assess whether the volume of aid and its sectoral allocation has an impact on human development outcomes and gender equity and find that the impact of aid is largely dependent on initial levels of human development and per capita income. While this gravitation toward focusing on different sectors is welcome, the literature is still at an embryonic stage.

Among the various social sectors of interest to developing countries such as education and health, of increasing importance over the last decade has been aid flows to the water supply and sanitation (WSS) sector. In general, data from the *OECD-DAC database* suggest that sector-allocable official

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development assistance (ODA)² has constituted a large and growing share of total aid worldwide³ and has accounted for over three-quarters of total ODA in 2012, up from three-fifths in 1990. In light of the increasing aid flows to different social sectors, the WSS sector has remained one of the key areas of focus of the Millennium Development Goals (MDG) which emphasizes multiple dimensions of economic development.⁴ In particular, the goal of MDG 7C was to halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015 (OECD-DAC, 2010).⁵ It is pertinent to note that the MDGs have now been subsumed under Sustainable Development Goals (SDGs) which expand the focus of MDGs on WSS. The SDGs now include a dedicated goal on water and sanitation (SDG 6) that sets out to “ensure availability and sustainable management of water and sanitation for all”.⁶

Available data suggest that while the MDG targets have not been met in many areas, access to and improved drinking water source has risen sharply globally, and the goal of halving the share of people without access to an improved drinking water source was met in 2010. According to estimates, during 1990–2012 the number of people with better access to improved drinking water sources rose by over 2 billion people (OECD-DAC, 2013; WHO-UNICEF, 2014). However, results have been highly uneven across countries, with 45 countries in the world not on track to meet the MDG drinking water target and about 11% of the global population (over 780 million people) still remain without access to improved source of drinking water (OECD-DAC, 2013). Equally of concern is the fact that while many people may have had access to an improved drinking water source, it may not necessarily have been safe (i.e., completely free of contamination). In addition, the other dimension of the MDG relating to WSS sector—i.e., halving the number of people without access to improved sanitation—remains particularly elusive and relatively ignored, with estimates being that 2.5 billion people in the developing world still lack access to improved basic sanitation facilities (WHO-UNICEF, 2014). This obviously has implications for the attainment of other MDG goals as safe water and proper sanitation conditions are critical to overall health and well-being (Bosch, Hommann, Rubio, Sadoff, & Travers, 2001).

Awareness of the WSS sector was further raised when the UN General Assembly passed a resolution in July 2010 that explicitly recognized the need for universal coverage of clean and safe WSS as being critical to the realization of all human rights. The resolution called for member states and development organizations to enhance technical capacity and financial resources to developing countries in order to “provide safe, clean, accessible, and affordable drinking water and sanitation for all” (United Nations, 2010).

The Water Supply and Sanitation Collaborative Council (WSSCC) launched the Global Sanitation Fund (GSF) in 2008 to prioritize donor funding in this area to support existing national mechanisms and projects. As of 2012, ODA that flowed to the WSS sector globally was estimated at over US \$10 billion (constant 2012 US dollars), having grown sharply from about US\$3 billion in 2002 (Figure 1). This translates into an increase from 4.5% to about 7.5% of total sector allocable aid (OECD DAC database), with the largest bilateral providers in 2010–11 being Japan (23%) followed by World Bank’s International Development Association (17%), Germany (11%), EU institutions (7%), and the United States (6%).⁷

In terms of the geographical distribution of aid to the WSS sector, data from OECD-DAC (2013) suggest that Sub-Saharan Africa received about a quarter of total aid flows to

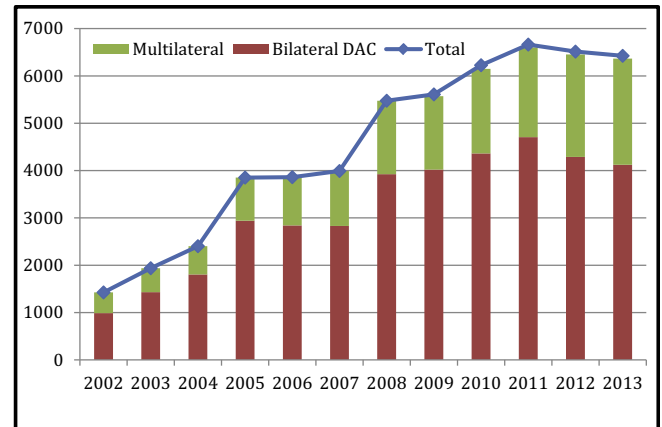


Figure 1. Trends in Aid Disbursements to WSS (US\$ millions): 2002–13.

the sector, followed by the South and Central Asian region which received another quarter of total WSS sector aid flows. The poorest countries mainly comprising the least developed countries and other low-income countries were host to just over one third of total aid to the WSS sector. However, most of these flows were heavily concentrated in a relatively smaller number of countries, with the top ten recipient countries representing a little less than 40% of total aid financing to the WSS sector (OECD-DAC, 2013, p. 4).⁸

Despite the considerable increase in aid flows to the WSS sector over the last few years, insufficient attention seems to have been paid to the notion of aid effectiveness of the existing flows to the WSS sector. The question of aid effectiveness in the WSS sector assumes priority because this sector is relatively more dependent on aid than other sectors (Mason & Rabinowitz, 2014). Indeed, while there have been some comprehensive studies on the other two sectors which receive foreign aid (see Lu, Schneider, Gubbins, Leach-Kamon, Jamison, and Murray, 2010 for health and Dreher *et al.* (2008) for education), the empirical literature examining the issue of aid effectiveness in the WSS sector for a panel of countries is relatively scant.

Only recently has there been a systematic attempt to empirically analyze whether aid is effective in the WSS sector (see Anand, 2006; Bain, Luyendijk, & Bartram, 2013; Botting, Porbeni, Joffres, Johnston, Black, & Mills, 2010). For instance, Anand (2006) uses cross-sectional regression data and finds no evidence of correlation between the aid volumes received by countries and their proportion of population with improved access to water and sanitation. The sample period covered by him was averaged during 1990–2004. In a paper dealing with similar questions, Botting *et al.* (2010) use correlation analysis and ordinary least squares (OLS) regressions to examine the effect of aid flows and the recipient country’s progress in the proportion of people using improved sources to water and sanitation. Their sample covered about 48 developing countries spanning the time period 2000–06. The most closely related paper to ours is Bain *et al.* (2013) which focuses on examining the impact of aid for infrastructure investments on improved access to water supply in a longitudinal framework for over 100 countries spanning 2000 and 2010. The paper also does not find any “detectable effect” of aid volumes on progress in access to improved water sources.

While our paper is in similar spirit to that of Bain *et al.* (2013), we not only make use of a wider panel to assess aid effectiveness in the WSS sector, but also go on to systematically explore non-linearities governing the relationship between aid

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