

17TH NORDIC CONFERENCE ON DEVELOPMENT ECONOMICS  
AALTO UNIVERSITY, HELSINKI, 11-12 JUNE 2018

# The impact of foreign aid on access to water and sanitation: a demand perspective

Javier Abellán<sup>1</sup>

José Antonio Alonso<sup>1,2,3</sup>

<sup>1</sup> Complutense University of Madrid

<sup>2</sup> University of Oxford

<sup>3</sup> United Nations Committee for Development Policy



UNIVERSITY  
OF TAMPERE



UNITED NATIONS  
UNIVERSITY  
**UNU-WIDER**

# 1. Introduction

- In **1990**, **24 %** of world population did not have access to safe **water** and **46 %** did not have access to **sanitation**.
- The **Millenium Declaration** (2000) set the **target** of **halving** the **proportion** of world **population without access** to water and sanitation by **2015**.
- The target for **water** (12 %) has been **met** (9 %). The target for **sanitation** (23 %) has **not been met** (32 %).
- There are large **differences** among world **regions** and between **urban** and **rural** areas.

# 1. Introduction

- Now, the sixth **sustainable development goal** (2015) is to ensure “**water and sanitation for all**” by **2030**.
- Achieving this goal helps to achieve other important goals: promoting **good health** (3), equal opportunities for **women** (5), basic **education** for all (4), etc.



## 2. Aims

We try to answer the following questions:

- Does **aid** increase **access** to safe water supply and sanitation?
- What is the role of aid for water supply and sanitation **infrastructure**?
- What is the role of aid for health **education**?

### 3. Theoretical framework

We rely on **consumer theory**:

$U_{i,1}$  = utility  
of consuming  
the service

$U_{i,0}$  = utility of  
NOT consuming  
the service

$$\Delta U_i(B_{i,1}, B_{i,0}, C_{i,1}, C_{i,0}) = U_{i,1}(B_{i,1}, C_{i,1}) - U_{i,0}(B_{i,0}, C_{i,0})$$

### 3. Theoretical framework

We rely on **consumer theory**:

$U_{i,1}$  = utility  
of consuming  
the service

$U_{i,2}$  = utility of  
NOT consuming  
the service

$$\Delta U_i(B_{i,1}, B_{i,0}, C_{i,1}, C_{i,0}) = U_{i,1}(B_{i,1}, C_{i,1}) - U_{i,0}(B_{i,0}, C_{i,0})$$

Aid for **infrastructure** may  
reduce the **costs** of access  
(time and monetary costs)

Wolf (2009)

Bain et al. (2013). Wayland (2013)

Gopalan and Rajan (2016)

Ndikumana and Pickbourn (2017)

### 3. Theoretical framework

We rely on **consumer theory**:

$U_{i,1}$  = utility  
of consuming  
the service

$U_{i,2}$  = utility of  
NOT consuming  
the service

$$\Delta U_i(B_{i,1}, B_{i,0}, C_{i,1}, C_{i,0}) = U_{i,1}(B_{i,1}, C_{i,1}) - U_{i,0}(B_{i,0}, C_{i,0})$$

Aid for health **education** may increase the expected **benefits** of access to safe water and sanitation

Aid for **infrastructure** may reduce the **costs** of access (time and monetary costs)

Wolf (2009)

Bain et al. (2013). Wayland (2013)

Gopalan and Rajan (2016)

Ndikumana and Pickbourn (2017)

## 4. Empirical strategy

We estimate a **fixed effects model** that takes into account the possible existence of unobservable heterogeneity among countries:

$$\text{Acces rate}_{jt} = \delta_j + \boldsymbol{\beta} \mathbf{X}_{jt} + u_{jt}$$

$$\text{Acces rate}_{jt} = \delta_j$$

$$\begin{aligned} &+ \boldsymbol{\beta}_1 \log INF_{jt} + \boldsymbol{\beta}_2 \log EDU_{jt} + \boldsymbol{\beta}_3 (\log INF * \log EDU)_{jt} \\ &+ \beta_4 \log(\text{Local government expenditure on health})_{jt} \\ &\quad + \beta_5 (\text{Share of urban population})_{jt} \\ &\quad\quad + \beta_6 (\text{Literacy rate})_{jt} \\ &\quad\quad + \beta_7 (\text{Control of corruption})_{jt} \\ &\quad\quad\quad + u_{jt} \end{aligned}$$



## 5. Data

We have **macro panel data** (115 countries, 14 years, period 2002-2015) for the following variables:

**D.** Access rate: **WDI (World Bank)**

**I.1.** Aid for water supply and sanitation: **CRS (OECD)**

**I.2.** Aid for education for health: **CRS (OECD)**

**I.3.** Local government expenditure on health: **WHO**

**I.4.** Share of urban population: **WDI (World Bank)**

**I.5.** Literacy rate: **WDI (World Bank)**

**I.6.** Control of corruption: **WGI (World Bank)**

## 6. Results

	National		Urban		Rural	
	Water	Sanitation	Water	Sanitation	Water	Sanitation
INFrastruct. <sub>t-1</sub>	0.081 (0.087)	<b>0.204*</b> (0.113)	<b>0.157*</b> (0.083)	<b>0.334***</b> (0.109)	<b>0.325**</b> (0.144)	<b>0.337*</b> (0.179)
EDUcation <sub>t-1</sub>	<b>0.043**</b> (0.017)	0.016 (0.020)	<b>0.041*</b> (0.022)	<b>0.052**</b> (0.021)	<b>0.105***</b> (0.026)	0.055 (0.034)
INF*EDU	0.007 (0.005)	<b>0.014*</b> (0.007)	<b>0.012**</b> (0.005)	<b>0.019***</b> (0.007)	<b>0.016**</b> (0.008)	<b>0.022*</b> (0.011)
Observations	1101	1108	1108	1108	1101	1108
Countries	115	1115	115	115	115	115
R <sup>2</sup> (within)	0.44	0.52	0.07	0.20	0.30	0.31

Note: Robust standard errors clustered for countries in parenthesis.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## 6. Results

	National		Urban		Rural	
	Water	Sanitation	Water	Sanitation	Water	Sanitation
INFrastruct. $t-1$	0.081 (0.087)	<b>0.204*</b> (0.113)	<b>0.157*</b> (0.083)	<b>0.334***</b> (0.109)	<b>0.325**</b> (0.144)	<b>0.337*</b> (0.179)
EDUcation $t-1$	<b>0.043**</b> (0.017)	0.016 (0.020)	<b>0.041*</b> (0.022)	<b>0.092**</b> (0.021)	<b>0.105***</b> (0.026)	0.055 (0.034)
INF*EDU	0.007 (0.005)	<b>0.014*</b> (0.007)	<b>0.012**</b> (0.005)	<b>0.019***</b> (0.007)	<b>0.016**</b> (0.008)	<b>0.022*</b> (0.011)
Observations	1101	1108	1108	1108	1101	1108
Countries	115	1115	115	115	115	115
R <sup>2</sup> (within)	0.44	0.52	0.07	0.20	0.30	0.31

Note: Robust standard errors clustered for countries in parenthesis.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## 6. Results

	National		Urban		Rural	
	Water	Sanitation	Water	Sanitation	Water	Sanitation
INFrastruct. $t-1$	0.081 (0.087)	<b>0.204*</b> (0.113)	<b>0.157*</b> (0.083)	<b>0.334***</b> (0.109)	<b>0.325**</b> (0.144)	<b>0.337*</b> (0.179)
EDUcation $t-1$	<b>0.043**</b> (0.017)	0.016 (0.020)	<b>0.041*</b> (0.022)	<b>0.052**</b> (0.021)	<b>0.152***</b> (0.026)	0.055 (0.034)
INF*EDU	0.007 (0.005)	<b>0.014*</b> (0.007)	<b>0.012**</b> (0.005)	<b>0.019***</b> (0.007)	<b>0.016**</b> (0.008)	<b>0.022*</b> (0.011)
Observations	1101	1108	1108	1108	1101	1108
Countries	115	1115	115	115	115	115
R <sup>2</sup> (within)	0.44	0.52	0.07	0.20	0.30	0.31

Note: Robust standard errors clustered for countries in parenthesis.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## 7. Conclusions

- **Aid for infrastructure** seems to have a **positive impact** on access to water supply and sanitation services.
- **Aid for health education** also seems to have a **positive impact**, especially in **rural** areas.
- **BUT** it is **difficult** to evaluate the **effectiveness** of aid in **urban** and **rural** areas.
- We need better **quality data**.

Thank  
you

