

Has Gavi Lived up to its Promise?

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What is Gavi?

- ▶ The Global Vaccine Alliance.
 - Global public-private partnership
 - Founded in 2000
 - Financed by donor governments and private foundations
 - Aim to supply new and underused vaccines to developing countries
 - Eligibility based on GNI per capita
 - It has worked with 70+ countries since its creation
- ▶ Specialization of global ODA, particularly in health.
- ▶ Two vertical health funds Gavi and Global Fund.

Scale of operations

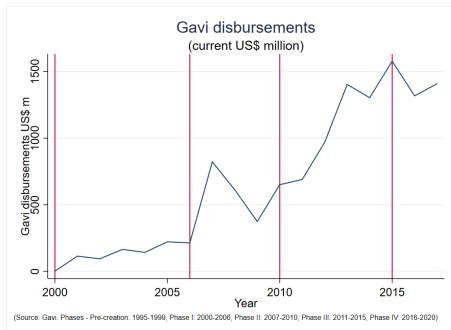


Figure 1: Annual disbursements (2000-2015)

- ▶ In 2015 Gavi's disbursements:
 - totalled US\$ 1.5bn
 - accounted for 19.5% of multilateral ODA for health
 - and 11.1 % of total ODA for health

Research question

- ▶ **Did the creation of Gavi improve immunization and health outcomes in eligible countries?**
- ▶ Large sums invested in the institution.
- ▶ Gavi could have also crowded out domestic health spending.
- ▶ Need of a counterfactual.
- ▶ Effectiveness of multilateral verticalization.
- ▶ Vaccination matters for health and productivity in short run, human capital accumulation and growth in long run.

Preview of main results

- ▶ Analysis based on a difference-in-differences model and country panel data.
- ▶ Gavi did improve immunization coverage:
 - 12.0 percentage points increase for DPT (up 17%)
 - 8.8 percentage points increase for measles (up 12%)
- ▶ Child mortality also reduced:
 - Infant mortality down 6.2 per 1,000 live births (down 9%)
 - Under-5 mortality down 12.2 per 1,000 live births (down 12%)

Related literature and contributions

- ▶ Other studies on Gavi's effectiveness.
 - Lu, et al. (*Lancet*, 2006)
 - Dykstra, et al. (*JDE*, 2019)
 - Gavi's own evaluations
- ▶ DAH effectiveness.
- ▶ Aid effectiveness more broadly.
- ▶ Transition and graduation.

Dataset and identification strategy

- ▶ Difference-in-differences ITT model using country panel data.

$$y_{c,t} = \alpha_c + \delta_t + \beta \cdot D_{c,t} + X'_{c,t} \cdot \gamma + \varepsilon_{c,t} \quad (1)$$

- ▶ Eligibility for support: GNI per capita based. In practice: all LICs and some LMICs.
- ▶ Sample: All LICs and LMICs in 2000 (excluding transition countries in main estimations). [map](#)
- ▶ Time periods: 1995-2016.
- ▶ Main data sources: Unicef/WHO, WDI.

Main results

	(1)	(2)	(3)	(4)
	Immunization - DPT (% 12-23 months old)		Immunization - measles (% 12-23 months old)	
Gavi eligibility	12.02*** (2.75)	11.03*** (2.62)	8.81*** (2.63)	11.11*** (2.62)
Observations	1,735	1,714	1,735	1,714
Number of countries	84	83	84	83
Adjusted R-squared	0.36	0.59	0.30	0.62
Birth cohort weighted	N	Y	N	Y
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Covariates	Y	Y	Y	Y

Robust standard errors clustered at country level in parentheses

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

Table 1: Baseline results

Parallel trends assumption

- ▶ Primary identification assumption: no time-varying differences in unobservables correlated with treatment.
- ▶ Granger type of causality test.

$$y_{c,t} = \alpha_c + \delta_t + \sum_{\tau=2}^5 \beta_{+\tau} \cdot D_{t+\tau} + \sum_{\tau=0}^{15} \beta_{-\tau} \cdot D_{t-\tau} + X'_{c,t} \cdot \gamma + \varepsilon_{c,t} \quad (2)$$

Parallel trends assumption

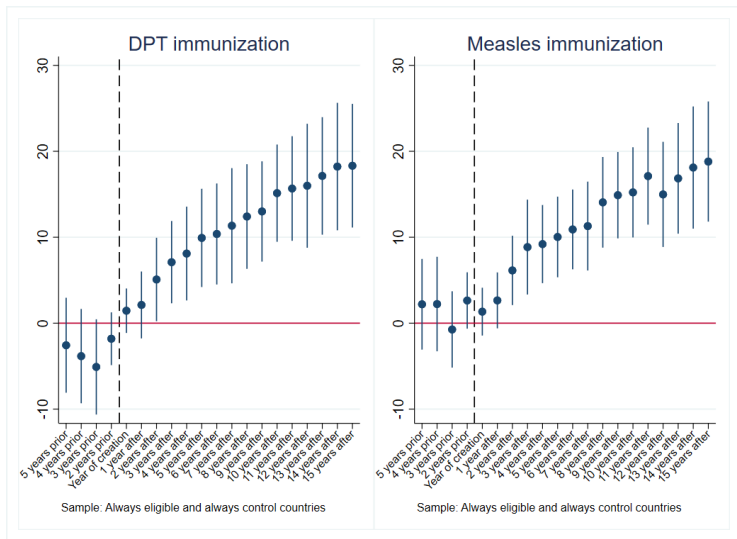


Figure 2: Leads and lags

Economic development disparity

	(1)	(2)	(3)	(4)
Sample:	Richer treatment & poorer control		1 log point around cut-off	
	Immunization - DPT	Immunization - measles	Immunization - DPT	Immunization - measles
Gavi eligibility	13.88*** (4.03)	9.76** (4.01)	5.24*** (1.84)	4.59*** (1.67)
Observations	650	650	1,979	1,979
# of countries	31	31	95	95
Adj. R-squared	0.30	0.19	0.27	0.23
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Covariates	Y	Y	Y	Y

Robust standard errors in parentheses clustered at country level

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Alternative samples (1)

Convergence and ceiling effects

	(1)	(2)	(3)	(4)
Sample:	Higher baseline vaccination rate		Baseline vaccination below 90%	
	Immunization - DPT	Immunization - measles	Immunization - DPT	Immunization - measles
Gavi eligibility	7.21*** (2.40)	7.31*** (2.42)	11.47*** (3.18)	8.81** (3.34)
Observations	1,224	1,493	1,363	1,342
# of countries	59	72	66	65
Adj. R-squared	0.17	0.20	0.43	0.36
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Covariates	Y	Y	Y	Y

Robust standard errors in parentheses clustered at country level

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Table 3: Alternative samples (2)

Other robustness tests

- ▶ Possible confounders
 - Additional covariates
 - DAH from other donors
- ▶ Alternative outcome variables
 - Hepatitis B
 - DHS data
- ▶ Falsification tests
 - Non-targeted diseases
 - Placebo treatment on control countries →
- ▶ Sample countries
 - Include early and/or late graduate/transition countries

Mortality rates

	(1)	(2)	(3)	(4)
	Infant mortality rate (per 1000 births)		Under-5 mortality rate (per 1000 births)	
Gavi eligibility	-6.22*** (2.14)	-11.24*** (2.54)	-12.23*** (3.74)	-23.64*** (5.07)
Observations	1,096	1,086	1,096	1,086
Number of countries	82	81	82	81
Adjusted R-squared	0.79	0.91	0.78	0.86
Birth cohort weighted	N	Y	N	Y
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Covariates (full)	Y	Y	Y	Y

Robust standard errors clustered at country level in parentheses

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

Table 4: Mortality results (1)

Mortality rates

	(1)	(2)
	Infant mortality rate	Under-5 mortality rate
Gavi disbursements (US\$ m)	-0.08** (0.04)	-0.14* (0.08)
Observations	1,823	1,823
Number of countries	84	84
Adjusted R-squared	0.77	0.74
Country FE	Y	Y
Year FE	Y	Y
Covariates	Y	Y

Robust standard errors in parentheses clustered at country level

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

Table 5: Mortality results (2)

- ▶ Back-of-the-envelope calculations: saving 1 life costs \$118.
- ▶ SVL more than 500 times $>$ cost (most conservative).

Conclusions

- ▶ Creation of Gavi had positive impacts on immunization rates and child health outcomes.
- ▶ Tangible intervention, with immediate, measurable benefits and a global public good aspect.
- ▶ Cannot say that aid specialization would necessarily work in other areas, e.g. education.
- ▶ More evidence needed on transition out of Gavi support.

Thank you for your attention!

All comments welcome

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Sample countries

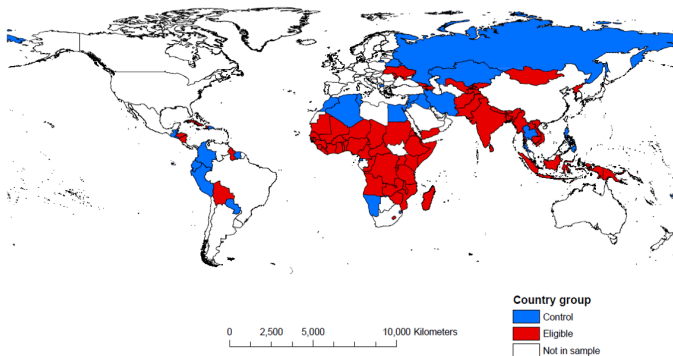


Figure 3: Treatment and control country groups

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Placebo treatment on control group

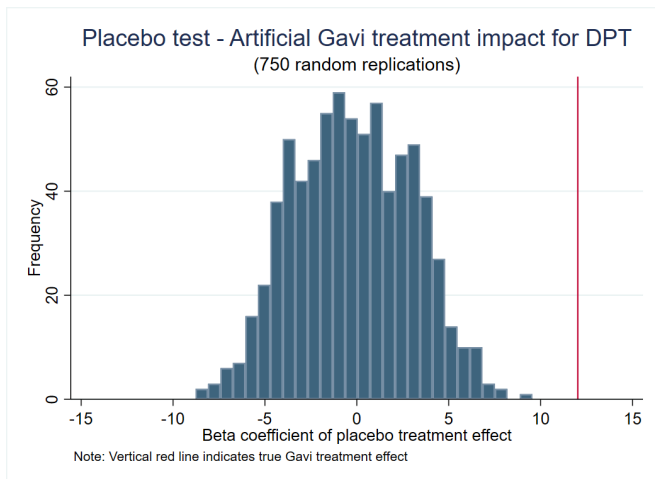


Figure 4: Estimated placebo coefficient distribution

Test of parallel trends assumption

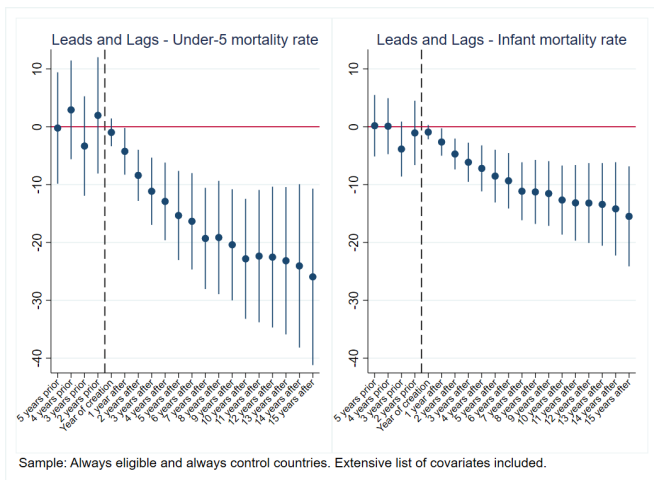


Figure 5: Mortality rates trends