

Supplementary file 5. Variance inflation factors for multicollinearity

Variance inflation factor

	VIF	1/VIF
Life Expectancy at Birth (total years)	5.93	.169
People using at least basic drinking water services (% of population)	5.715	.175
People using at least basic sanitation services (% of population)	5.135	.195
Domestic general health expenditure per capita (current US\$)	4.835	.207
Population aged between 15 and 64 (% of total population)	3.539	.283
Primary completion rate, total (% of relevant age group)	3.099	.323
Population aged 65 and above (% of total population)	2.562	.39
Measles (number of reported cases)	1.235	.81
Mean VIF	4.006	.

Table S1. Random Effects Estimation Results: Impact of Health Expenditure on UHC and Income-Level Interaction

Variables	Hypothesis 1	Hypothesis 2	Nonlinearity
	Coefficient/Robust Standard Errors	Coefficient/Robust Standard Errors	Coefficient/Robust Standard Errors
DGG health expenditure per capita	0.0719*** (0.0125)	0.0778*** (0.0123)	0.1381*** (0.0340)
(DGG health expenditure per capita)^2			-0.0078** (0.0036)
Primary completion rate	0.0032*** (0.0007)	0.0029*** (0.0007)	0.0025*** (0.0007)
Population ages 65 and above (% of total population)	-0.0075** (0.0029)	-0.0013 (0.0026)	0.0011 (0.0025)

Population ages 15-64 (% of total population)	0.0014 (0.0028)	0.0017 (0.0028)	0.0028 (0.0028)
Basic drinking water services (% of population)	0.0026 (0.0019)	0.0029 (0.0018)	0.0022 (0.0019)
Basic sanitation services (% of population)	0.0009 (0.0012)	0.0006 (0.0012)	0.0005 (0.0012)
Measles (number of reported cases)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Life expectancy at birth, total (years)	0.0249*** (0.0041)	0.0242*** (0.0040)	0.0246*** (0.0039)
HigherIncome x Domestic Expenditure		-0.0000*** (0.0000)	-0.0000 (0.0000)
LowerMidIncome x Domestic Expenditure		0.0008** (0.0003)	0.0008** (0.0002)
LowerIncome x Domestic Expenditure		0.0087** (0.0043)	0.0072* (0.0040)
Constant	1.3284*** (0.2381)	1.3069*** (0.2243)	1.2012*** (0.2173)
Overall Rsquare	.8472	.8533	.8560
No. of Obs	696	696	696
No. of Groups	169	169	169

Reference Dummy is Middle income Country

* p<.1, ** p<.05, *** p<.001

The results from Equation 4a-c estimations using random effects models provide insights into the factors affecting UHC across different income levels of countries and test for non-linear effects of health expenditure on UHC.

Hypothesis 1 (Impact of Health Expenditure on UHC):

- **DGG health expenditure per capita** has a significant positive effect on UHC (Coefficient = 0.0719, $p < 0.001$), indicating that as health expenditure increases, UHC also tends to improve. This strong association suggests that higher per capita spending in health leads to better coverage outcomes.

Hypothesis 2 (Impact of Income Level on UHC):

- **DGG health expenditure per capita** continues to show a significant positive effect (Coefficient = 0.0778, $p < 0.001$), slightly stronger than in Hypothesis 1.
- Interactions between income levels and domestic expenditure show mixed results:
 - **HigherIncome x Domestic Expenditure:** The coefficient is negative and significant (Coefficient = -0.0000, $p < 0.001$), indicating that higher income countries may see diminishing returns from additional health spending.
 - **LowerMidIncome x Domestic Expenditure:** Shows a positive relationship (Coefficient = 0.0008, $p < 0.05$), suggesting that lower-middle-income countries benefit moderately from increases in health spending.
 - **LowerIncome x Domestic Expenditure:** Also positive (Coefficient = 0.0087, $p < 0.05$), implying that low-income countries benefit significantly from increased health expenditure, possibly because of the larger gaps in health coverage that need to be addressed.

Nonlinear Hypothesis (Non-linear Relationship between Health Expenditure and UHC):

- **DGG health expenditure per capita** shows a much stronger positive effect on UHC in the non-linear model (Coefficient = 0.1381, $p < 0.001$).
- The squared term of health expenditure (**(DGG health expenditure per capita)²**) is negative and significant (Coefficient = -0.0078, $p < 0.05$), indicating a diminishing return effect; as health spending increases, the incremental benefits on UHC decrease.