Endogeneity in the Environmental Kuznets Curve: An Instrumental Variables Approach

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APPENDIX A: Tables

TABLE 1a. Summary statistics for water pollutants

Variable	# obs	# countries	mean	s.d.	min	max
Biological Oxygen Demand (mg/l)	2422	55	3.96	12.01	0.00	240.16
Chemical Oxygen Demand (mg/l)	1883	51	24.37	57.19	0.00	948.39
Dissolved Oxygen (mg/l)	2890	67	8.42	2.97	0.00	84.67
Nitrate (mg/l)	1214	38	1.13	2.59	0.00	22.60
Total Arsenic (mg/l)	957	27	0.01	0.03	0.00	0.43
Total Cadmium (mg/l)	1248	39	0.02	0.09	0.00	1.00
Total Lead (mg/l)	1053	29	0.03	0.09	0.00	1.60
Total Mercury (μg/l)	1230	39	0.30	0.81	0.00	16.17
Total Nickel (mg/l)	661	18	0.01	0.03	0.00	0.22
Total Coliforms (mg/l)	2075	41	3.58E4	1.12E5	0.00	1.00E6
Fecal Coliform (count/100 ml)	2075	56	2.58E4	1.14E5	0.00	1.00E6

Note: The data span the years 1979 to 1999.

TABLE 1b. Summary statistics for explanatory, control and instrumental variables

Variable	# obs	mean	s.d.	min	max
Explanatory variables					
Political rights (1 = best to 7 = worst)	2674	2.58	2.04	1	7
Civil liberties (1 = best to 7 = worst)	2674	2.83	1.91	1	7
GDP per capita, PPP (1000 constant 2000 international $)	2724	12.50	9.18	0.50	40.17
Control variables					
Water temperature (degrees Celsius)	2838	16.77	8.15	0.00	44.67
Manufacturing, value added (% of GDP)	1896	18.95	4.96	4.28	40.48
Population density (people per sq km)					
Instruments					
Age dependency ratio (dependents to working-age population)	2851	0.61	0.15	0.42	1.12
Total debt service (% of GNI)	1290	4.83	3.61	0.05	18.37

Note: The data span the years 1979 to 1999.

Table 2. Graphical relationships and characteristics of pollutants

	Relationship with			Characteristics		
	Political Rights	**Civil Liberties**	**Per Capita GDP**	**Classification**	**Natural Occurrence**	**Source of Pollution**
	Decreasing					
Chemical Oxygen Demand	decreasing	inverted-U	decreasing/inverted-U	Organic Matter	N/A	Waste-water effluent
Total Arsenic	decreasing	decreasing	decreasing/inverted-U	Inorganic contaminants	Not uncommon	Industrial discharge or insecticide application
Dissolved Oxygen	decreasing	decreasing	decreasing	Organic Matter	From atmosphere eand photosynthetic activity	Measure of waste-treatment process and generally surface-water quality
Total Lead	decreasing	decreasing	decreasing	Inorganic contaminants	1 to 50 ug/l	Atmospheric input from use in leaded gasoline or smelting; industria and mine or smelte roperations; lead salts; printing and dyeing; explosives; lead pipes
Total Nickel	decreasing	decreasing	decreasing	Inorganic contaminants	Normally a few ug/l	Burning fossil fuels and mining
Fecal Coliform	decreasing	decreasing	decreasing	Microbial Pollution	Very low	Fecal matter
	Increasing					
Total Cadmium	increasing	increasing	increasing/inverted-U	Inorganic contaminants	Below 1 ug/l	Mining, smelting; wastes fro melectroplating plants, pigment works, textile and ehcmical industries; metal and plastic pipes
Nitrate	increasing	increasing	increasing	Nutrients	Minute amounts	Chemical fertilizers from cultivated land, drainage from livestock feed lots
	None					
Biological Oxygen Demand	none	none	none	Organic Matter	N/A	Waste-water effluent
Total Mercury	none	none	none	Inorganic contaminants	Generally low	Chlora-alkali plants using electrolytic cells; electronics and electrical, explosives, photography, pesticide and preservative, chemical and petrochemical catalysis, and ussers of the above indutrial products
Total Coliform	none	none	none	Microbial Pollution	Very low	Fecal matter, as well as other contaminants

Table 3: First stage regressions

Dependent variable is per capita GDP, PPP (constant 2000 international $ / 10E3)	(1)	(2)
age dependency ratio (dependents to working-age population)	-0.01	0.00
	(0.61)	(0.61)
total debt service (% of GNI)	0.17 ***	0.18 ***
	(0.02)	(0.02)
political rights (1 = best to 7 = worst)	0.09	
	(0.08)	
civil liberties (1 = best to 7 = worst)	-0.80 ***	
	(0.10)	
political rights lagged (1 = best to 7 = worst)		0.07
		(0.07)
civil liberties lagged (1 = best to 7 = worst)		-0.78 ***
		(0.10)
population density (people per sq km)	-0.004 ***	-0.003 ***
	(0.000)	(0.000)
temperature (degrees Celsius)	-0.07 ***	-0.07 ***
	(0.01)	(0.01)
year	0.03 *	0.03 **
	(0.01)	(0.01)
manufacturing, value added (% of GDP)	0.19 ***	0.19 ***
	(0.01)	(0.01)
constant	-52.08 *	-55.29*
	(22.78)	(22.82)
p-value (Pr > F)	0.00 ***	0.00 ***
Adjusted R^2	0.57	0.57
# observations	1107	1107
joint test of instruments		
F statistic	39.11	41.12
p-value	0.00 ***	0.00 ***

Note: Standard errors are in parentheses.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4a. Regression Results: Biological oxygen demand

Dependent variable is biological oxygen demand					
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	1.00	-12.51 ***	-12.52 ***	-16.24 ***	-2.75
	(1.06)	(2.39)	(2.40)	(4.36)	(20.93)
per capita GDP squared (/10E7)	-0.86	29.87 ***	29.89 ***	31.48 ***	15.70
	(0.70)	(5.48)	(5.50)	(8.33)	(50.58)
per capita GDP cubed (/10E11)	0.18	-17.85 ***	-17.76 ***	-17.55 ***	-8.98
	(0.13)	(3.31)	(0.46)	(4.42)	(30.45)
political rights	-0.55	-0.49		-0.27	0.02
(1 = best to 7 = worst)	(0.55)	(0.46)		(0.52)	(0.71)
civil liberties	0.81	1.32		0.54	-0.36
(1 = best to 7 = worst)	(0.86)	(0.79)		(0.77)	(2.53)
political rights lagged			-0.54		
(1 = best to 7 = worst)			(0.46)		
civil liberties lagged			1.43		
(1 = best to 7 = worst)			(0.80)		
p-value (Pr > F or Pr > χ^2)	0.19	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	1483	925	925	925	925
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.93				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.01 *	0.01 *		
Turning points					
Peak (constant 2000 international $)	7652	8362	8434	8194	10702
Trough (constant 2000 international $)	24199	2794	2786	3764	954

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4b. Regression Results: Chemical oxygen demand

Dependent variable is chemical oxygen demand					
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	13.57	-40.02 **	-38.55 **	1.31	89.14
	(8.13)	(14.83)	(14.73)	(14.70)	(81.39)
per capita GDP squared (/10E7)	-10.10	150.62 ***	147.42 ***	31.87	-226.43
	(5.68)	(32.94)	(32.71)	(25.14)	(135.59)
per capita GDP cubed (/10E11)	1.91	-113.37 ***	-111.30 ***	-26.66 *	123.82 *
	(1.01)	(21.49)	(21.31)	(12.78)	(59.38)
political rights	-0.82	-4.85		1.14	0.60
(1 = best to 7 = worst)	(3.19)	(2.67)		(2.16)	(2.88)
civil liberties	1.01	-1.81		-4.63	-9.42
(1 = best to 7 = worst)	(1.01)	(3.25)		(2.83)	(5.59)
political rights lagged			-5.79 *		
(1 = best to 7 = worst)			(2.88)		
civil liberties lagged			-0.35		
(1 = best to 7 = worst)			(3.38)		
p-value (Pr > F or Pr > χ^2)	0.01 **	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	1270	912	912	912	912
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.00 **				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.17	0.14		
Turning points					
Peak (constant 2000 international $)	9032	7228	7234	8170	2468
Trough (constant 2000 international $)	26221	1629	1596	-200	9723

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4c. Regression Results: Dissolved oxygen

Dependent variable is dissolved oxygen					
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	0.13	-0.87	-0.88	-0.47	-2.21
	(0.26)	(0.77)	(0.77)	(0.72)	(4.31)
per capita GDP squared (/10E7)	0.06	0.84	0.84	0.97	12.13
	(0.18)	(1.69)	(1.69)	(1.38)	(8.78)
per capita GDP cubed (/10E11)	-0.02	0.66	0.67	-0.48	-9.89
	(0.03)	(1.04)	(1.04)	(0.72)	(5.20)
political rights	-0.05	-0.16		-0.08	0.20
(1 = best to 7 = worst)	(0.16)	(0.16)		(0.13)	(0.26)
civil liberties	-0.30 *	0.27		-0.22	0.83
(1 = best to 7 = worst)	(0.17)	(0.27)		(0.18)	(0.46)
political rights lagged			-0.16		
(1 = best to 7 = worst)			(0.17)		
civil liberties lagged			0.28		
(1 = best to 7 = worst)			(0.27)		
p-value (Pr > F or Pr > χ^2)	0.00 ***	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	1786	1089	1089	1089	1089
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.00 ***				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.16	0.16		
Turning points					
Peak (constant 2000 international $)	27795	-12112	-12005	10305	7132
Trough (constant 2000 international $)	-7795	3628	3647	3167	1044

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4d. Regression Results: Nitrate

	Dependent variable is nitrate				
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	-0.07	-3.84	-3.91	-0.30	-7.60 **
	(0.14)	(3.97)	(4.29)	(0.76)	(2.97)
per capita GDP squared (/10E7)	0.02	8.21	8.34	0.34	7.56
	(0.13)	(8.59)	(9.28)	(1.38)	(4.79)
per capita GDP cubed (/10E11)	-0.00	-4.38	-4.44	-0.23	-1.68
	(0.03)	(4.53)	(4.89)	(0.69)	(1.91)
political rights	-0.31	-0.57		-0.38 *	-1.44 **
(1 = best to 7 = worst)	(0.24)	(0.44)		(0.17)	(0.53)
civil liberties	0.34	1.01		0.49 *	0.07
(1 = best to 7 = worst)	(0.29)	(0.83)		(0.20)	(0.35)
political rights lagged			-0.52		
(1 = best to 7 = worst)			(0.46)		
civil liberties lagged			0.98		
(1 = best to 7 = worst)			(0.88)		
p-value (Pr > F or Pr > χ^2)	0.00 ***	0.08	0.10	0.00 ***	0.00 ***
# observations	671	297	297	297	297
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.12				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.21	0.26		
Turning points					
Peak (constant 2000 international $)		9381	9400		23614
Trough (constant 2000 international $)	17500	3115	3123		6386

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4e. Regression Results: Arsenic

	Dependent variable is arsenic				
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	-0.01	-0.04 **	-0.04 **	-0.31 ***	-0.17 *
	(0.02)	(0.02)	(0.02)	(0.05)	(0.07)
per capita GDP squared (/10E7)	0.01	0.09 **	0.10 **	0.42 ***	0.33 **
	(0.01)	(0.03)	(0.04)	(0.08)	(0.11)
per capita GDP cubed (/10E11)	-0.00	-0.05 **	-0.05 **	-0.20 ***	-0.14 ***
	(0.00)	(0.02)	(0.02)	(0.04)	(0.04)
political rights	0.01	0.00		-0.00	0.03 ***
(1 = best to 7 = worst)	(0.01)	(0.00)		(0.01)	(0.01)
civil liberties	-0.02	0.00		-0.02 *	-0.01
(1 = best to 7 = worst)	(0.02)	(0.00)		(0.01)	(0.01)
political rights lagged			0.01		
(1 = best to 7 = worst)			(0.01)		
civil liberties lagged			0.00		
(1 = best to 7 = worst)			(0.00)		
p-value (Pr > F or Pr > χ^2)	0.00 ***	0.00 ***	0.00 **	0.00 ***	0.00 ***
# observations	512	209	209	209	209
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.00 ***				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.08	0.12		
Turning points					
Peak (constant 2000 international $)		9055	10883		12468
Trough (constant 2000 international $)	5000	2945	2450		3246

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4f. Regression Results: Cadmium

	Dependent variable is cadmium				
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	0.02	-0.10 ***	-0.10 ***	-0.09 ***	-0.04 *
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
per capita GDP squared (/10E7)	-0.01	0.20 ***	0.19 ***	0.14 ***	0.04 *
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
per capita GDP cubed (/10E11)	0.00	-0.10 ***	-0.10 ***	-0.07 ***	-0.02 *
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
political rights	0.04 **	0.01 ***		0.01 ***	0.00
(1 = best to 7 = worst)	(0.01)	(0.00)		(0.00)	(0.00)
civil liberties	-0.05 *	-0.00		-0.01 ***	-0.01 **
(1 = best to 7 = worst)	(0.02)	(0.00)		(0.00)	(0.00)
political rights lagged			0.01 ***		
(1 = best to 7 = worst)			(0.00)		
civil liberties lagged			-0.00		
(1 = best to 7 = worst)			(0.00)		
p-value (Pr > F or Pr > χ^2)	0.29	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	610	261	261	261	261
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.10				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.00 ***	0.00 ***		
Turning points					
Peak (constant 2000 international $)	10000	10000	8937	7927	
Trough (constant 2000 international $)		3333	3730	5407	

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4g. Regression Results: Lead

	Dependent variable is lead				
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	0.03	-0.19	-0.24 **	-0.55 ***	-0.17
	(0.06)	(0.10)	(0.09)	(0.08)	(0.14)
per capita GDP squared (/10E7)	-0.02	0.56 ***	0.61 ***	0.89 ***	0.24
	(0.03)	(0.16)	(0.16)	(0.14)	(0.20)
per capita GDP cubed (/10E11)	0.00	-0.37 ***	-0.38 ***	-0.45 ***	-0.09
	(0.00)	(0.09)	(0.08)	(0.07)	(0.08)
political rights	0.06	0.04 *		0.04	-0.01
(1 = best to 7 = worst)	(0.04)	(0.02)		(0.02)	(0.02)
civil liberties	-0.03	-0.00		0.02	-0.03
(1 = best to 7 = worst)	(0.04)	(0.03)		(0.03)	(0.02)
political rights lagged			0.04 *		
(1 = best to 7 = worst)			(0.02)		
civil liberties lagged			-0.01		
(1 = best to 7 = worst)			(0.02)		
p-value (Pr > F or Pr > χ^2)	0.02 *	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	500	247	247	247	247
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.13				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.00 ***	0.00 ***		
Turning points					
Peak (constant 2000 international $)	7500	7932	8104	8242	12895
Trough (constant 2000 international $)		2158	2598	4943	4883

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4h. Regression Results: Mercury

	Dependent variable is mercury				
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	0.22	0.02	0.08	-0.21	-1.46
	(0.15)	(0.47)	(0.47)	(1.44)	(0.90)
per capita GDP squared (/10E7)	-0.13	-0.63	-0.79	0.50	1.49
	(0.10)	(0.89)	(0.88)	(1.55)	(1.21)
per capita GDP cubed (/10E11)	0.02	0.48	0.59	-0.12	-0.46
	(0.02)	(0.52)	(0.50)	(0.75)	(0.49)
political rights	0.11	-0.02		0.19	-0.37 ***
(1 = best to 7 = worst)	(0.12)	(0.18)		(0.10)	(0.12)
civil liberties	-0.10	-0.34		-0.28 **	-0.24 **
(1 = best to 7 = worst)	(0.14)	(0.19)		(0.10)	(0.10)
political rights lagged			0.07		
(1 = best to 7 = worst)			(0.16)		
civil liberties lagged			-0.44 *		
(1 = best to 7 = worst)			(0.17)		
p-value (Pr > F or Pr > χ^2)	0.24	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	597	255	255	255	255
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.44				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.88	0.97		
Turning points					
Peak (constant 2000 international $)	11529	162	539	25489	14080
Trough (constant 2000 international $)	31805	8588	8388	2289	7514

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4i. Regression Results: Nickel

	Dependent variable is nickel				
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	0.01 *	0.04	0.07	0.16 ***	---
	(0.006)	(0.05)	(0.05)	(0.06)	
per capita GDP squared (/10E7)	-0.01	-0.14	-0.18	-0.22 *	0.27 ***
	(0.00)	(0.15)	(0.15)	(0.09)	(0.03)
per capita GDP cubed (/10E11)	0.00	0.10	0.12	0.10 *	-0.20 ***
	(0.00)	(0.09)	(0.08)	(0.05)	(0.02)
political rights	0.01 *	0.01		0.00	0.02
(1 = best to 7 = worst)	(0.005)	(0.01)		(0.01)	(0.01)
civil liberties	-0.00	-0.01		0.01	0.00
(1 = best to 7 = worst)	(0.01)	(0.02)		(0.01)	(0.01)
political rights lagged			0.00		
(1 = best to 7 = worst)			(0.02)		
civil liberties lagged			-0.01		
(1 = best to 7 = worst)			(0.02)		
p-value (Pr > F or Pr > χ^2)	0.00 ***	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	323	111	111	111	111
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.32				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.00 ***	0.00 ***		
Turning points					
Peak (constant 2000 international $)	5000	1761	2643	6667	9000
Trough (constant 2000 international $)		7573	7357	8000	0

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4j. Regression Results: Total coliforms

Dependent variable is total coliforms					
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	1.86E4 *	9.19E4 *	8.52E4	-3.03E4	-3.05E5
	(0.83E4)	(4.26E4)	(4.66E4)	(3.52E4)	(1.60E5)
per capita GDP squared (/10E7)	-9.74E3	-1.40E5	-1.21E5	1.09E5	5.79E5 *
	(4.85E3)	(0.90E5)	(0.96E5)	(0.66E5)	(2.61E5)
per capita GDP cubed (/10E11)	1.48E3	5.57E4	4.35E4	-7.13E4 *	-2.48E5 *
	(0.78E3)	(4.47E4)	(4.64E4)	(3.40E4)	(1.02E5)
political rights	3.23E3	-1.25E4		-3.73E3	-1.43E3
(1 = best to 7 = worst)	(12.16E3)	(0.90E4)		(7.30E3)	(13.34E3)
civil liberties	7.87E3	1.40E4		1.88E4	-3.19E3
(1 = best to 7 = worst)	(14.66E3)	(1.97E4)		(1.05E4)	(14.67E3)
political rights lagged			-1.55E4		
(1 = best to 7 = worst)			(0.93E4)		
civil liberties lagged			1.77E4		
(1 = best to 7 = worst)			(2.00E4)		
p-value (Pr > F or Pr > χ^2)	0.11	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	856	665	665	665	665
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.08				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.05 *	0.11		
Turning points					
Peak (constant 2000 international $)	14043	4480	4724	8531	12861
Trough (constant 2000 international $)	29831	12277	13820	1660	3188

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.

Table 4k. Regression Results: Fecal coliform

Dependent variable is fecal coliform					
	OLS	IV GMM	IV GMM	COND IV	IV FE
	(1)	(2)	(3)	(4)	(5)
per capita GDP (/ 10E3)	5.34E3	1.43E5 ***	1.43E5 ***	1.47E5 **	-2.57E5 *
	(9.51E3)	(0.31E5)	(0.30E5)	(0.49E5)	(1.21E5)
per capita GDP squared (/10E7)	-1.36E3	-2.28E5 ***	-2.30E5 ***	-2.40E5 **	3.49E5
	(8.05E3)	(0.61E5)	(0.61E5)	(0.87E5)	(2.34E5)
per capita GDP cubed (/10E11)	72.83	9.56E4 *	9.70E4 *	1.12E5 *	-1.26E5
	(1610.78)	(3.85E4)	(3.80E4)	(0.45E5)	(1.45E5)
political rights	2.33E3	484.79		-870.68	1.22E4
(1 = best to 7 = worst)	(13.10E3)	(8512.03)		(7132.25)	(0.98E4)
civil liberties	1.47E4	360.52		1.22E4	-1.27E3
(1 = best to 7 = worst)	(1.31E4)	(15942.28)		(1.04E4)	(18.23E3)
political rights lagged			734.75		
(1 = best to 7 = worst)			(8013.30)		
civil liberties lagged			530.22		
(1 = best to 7 = worst)			(15279.77)		
p-value (Pr > F or Pr > χ^2)	0.00 **	0.00 ***	0.00 ***	0.00 ***	0.00 ***
# observations	1383	906	906	906	906
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity before clustering (H0: constant variance)					
p-value	0.00 ***				
Durbin-Wu-Hausman test of endogeneity of per capita GDP (H0: per capita GDP is exogenous)					
p-value	0.02 *				
Hansen overidentification test (H0: instruments are uncorrelated with error term)					
p-value		0.07	0.07		
Turning points					
Peak (constant 2000 international $)	24424	4298	4253	4446	13387
Trough (constant 2000 international $)	100067	11602	11555	9839	5079

Notes: Standard errors are in parentheses. Controls include population density, water temperature, year and manufacturing. For the OLS specification, standard errors are clustered by country. For the IV GMM and IV FE specifications, per capita GDP, per capita GDP squared and per capita GDP cubed are instrumented with age dependency ratio, total debt service, age dependency ratio squared, total debt service squared, age dependency ratio cubed and total debt service cubed. For the IV GMM specifications, a robust weighting matrix that is optimal when the error term is heteroskedastic is used. For the COND IV specification, per capita GDP is instrumented with age dependency ratio and total debt service, the LIML estimate and a coverage-corrected standard error is reported for the coefficient on per capita GDP. For the IV FE specification, country-level fixed effects are included.
Significance codes: * 5% level, ** 1% level, and *** 0.1% level.