

Institutions Do Not Rule: Reassessing the Driving Forces of Economic Development

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Introduction

- Rich vs Poor countries. How can we explain it?
- The Economic Growth Debate: Institutions vs Geography: Which one rules? Are these forces constant over the development stages?

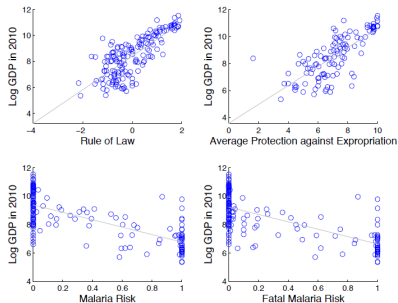


Figure 1. Full-sample scatterplot of institutions, geography, and log GDP per capita in 2010.

The top panels plot the bivariate relationship between institutional variables (rule of law (left) and protection against expropriation (right)) and log GDP per capita in 2010. The bottom panels plot the bivariate relationship between geographic variables (malaria risk (left) and fatal malaria risk (right)) and log GDP per capita in 2010. One circle represents a country observation.

Literature Review

- The Geographic School:
 - Diamond (1997).
 - Gallup and Sachs (2001), McCord and Sachs (2013).
- The Institutional School:
 - North (1981).
 - Acemoglu and Robinson (2001), Easterly and Levine (2003) and Rodrik et al. (2004).
- The importance of Culture, Economic Policy, Human Capital and Historical Events:
 - Glaeser et al. (2004), Becker and Woessmann (2009), Tabellini (2010).

The Key Assumption

- Both schools share an assumption: Forces are constant through development stages!
- Are institutions equally important for an agrarian society as for an advanced-industrialized economy?
- Is an agrarian society more affected by weather? What about insurance?
- Authors hypotheses: which force matters is stage-dependent!
- But then... What determines industrialization?

The Data

- Use same data as previous studies:
- Geography:
 - Risk of Malaria Transmission and Fatal Malaria Risk - Sachs (2003).
 - IV: Malaria Ecology and Share of Country Population in Temperate Ecozones.
- Institutions:
 - Protection Against Expropriation Risk, Institutional Index and Rule of Law - AJR (2001), Kaufmann et al. (2004).
 - IV: Settlement Mortality and Legal Origin (Civil vs Common Law).
- Target PPP-adjusted income per capita.
- Use Agricultural Value Added-to-GDP (AVA-to-GDP ratio), threshold of 10%. Also rural population.

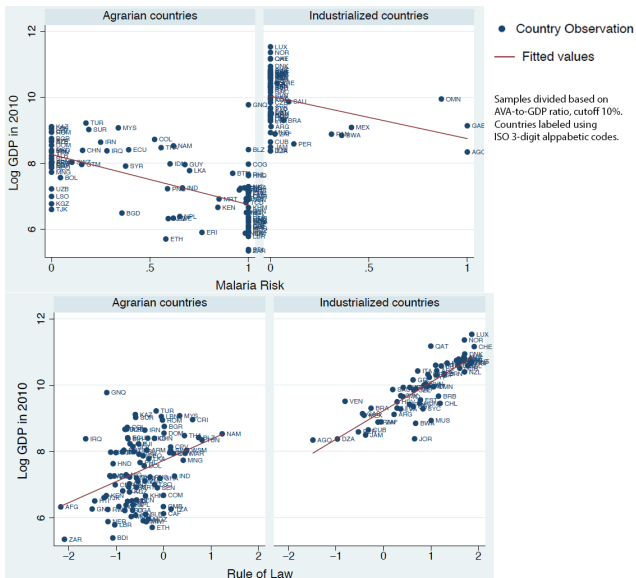
The Data

Table 1. Summary Statistics

	Full sample		Agrarian countries		Industrialized countries	
	Obs.	Mean/SD	Obs.	Mean/SD	Obs.	Mean/SD
Log GDP per capita (2010, PPP measured) (<i>loggdp10</i>)	184	8.507 (1.538)	100	7.433 (1.023)	66	9.922 (0.804)
AVA-to-GDP ratio (average of 1990 and 2000) (<i>agval</i>)	173	18.40 (15.27)	104	27.50 (13.22)	69	4.681 (2.639)
Protection against expropriation risk (average of 1990 and 2000) (<i>avexpr</i>)	117	7.104 (1.781)	62	6.047 (1.401)	53	8.295 (1.392)
Institutions index (<i>kk</i>)	72	-0.0905 (0.684)	48	-0.346 (0.445)	23	0.395 (0.802)
Rule of law (<i>rule</i>)	171	0.00804 (0.939)	98	-0.523 (0.590)	66	0.788 (0.812)
Malaria risk (<i>mal94p</i>)	165	0.361 (0.436)	94	0.576 (0.431)	61	0.0704 (0.219)
Fatal malaria risk (<i>malfa94</i>)	165	0.306 (0.420)	94	0.488 (0.441)	61	0.0572 (0.212)
Settlement mortality rate (<i>logmort</i>)	85	4.591 (1.302)	57	5.036 (1.091)	26	3.737 (1.266)
Legal origin (<i>leg_bri</i>)	201	0.303 (0.461)	102	0.304 (0.462)	69	0.290 (0.457)
Population ratio in temperate climate zone (<i>kgptemp</i>)	145	0.337 (0.434)	88	0.153 (0.326)	54	0.632 (0.428)
Malaria ecology (<i>ME</i>)	173	3.656 (6.416)	101	5.572 (7.559)	62	0.812 (2.448)

Notes: Data sources are as follows. GDP per capita and agriculture value added are from the World Bank database. The rule of law index and institutions index are from Kaufman et al. (2004). Protection against expropriation risk index and settlement mortality rate are from AJR (2001). Malaria risk, fatal malaria risk, and malaria ecology are from Sachs (2003) and Kiszewski et al. (2004). Legal origin is from La Porta et al. (1998).

The Data



Main Results

$$\log y_i = \nu + \alpha INS_i + \beta GEO_i + \gamma X_i + \epsilon_i \quad (1)$$

- Full sample regression: both Geography and Institutions are significant.
- If Geography is not taken into account: a lot of explanatory power is lost, R^2 from 0.27 to 0.7 -compared using AJR (2001).
- Why "Institutional school" has missed this? Wrong choices/ models/ considerations.

Main Results

Table 2. Results of Simple OLS regressions

	Full sample		Industrial countries			Agrarian countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable: Log GDP per capita in 2010 (PPP measured)									
<i>Rule</i>	0.916*** (0.0817)		0.969*** (0.0782)	0.879*** (0.0782)		0.877*** (0.0757)	0.361** (0.149)		0.369** (0.143)
<i>Avexpr</i>		0.420*** (0.0547)			0.509*** (0.0590)			0.0980 (0.0703)	
<i>mal94p</i>	-1.517*** (0.179)	-1.911*** (0.223)		0.0958 (0.291)	-0.215 (0.333)		-1.396*** (0.204)	-1.685*** (0.234)	
<i>malfa194</i>			-1.513*** (0.178)			0.0914 (0.291)			-1.436*** (0.190)
Constant	8.973*** (0.0920)	6.307*** (0.454)	8.887*** (0.0847)	9.219*** (0.0946)	5.751*** (0.513)	9.222*** (0.0904)	8.382*** (0.147)	7.830*** (0.500)	8.285*** (0.131)
Observations	155	110	155	60	49	60	90	59	90
R-squared	0.739	0.760	0.740	0.725	0.677	0.725	0.436	0.539	0.475

Notes: Standard errors in parenthesis. * indicates p-value < 0.1, ** indicates p-value < 0.5 and *** indicates p-value < 0.01.

Main Results

Table 3. Results of 2SLS regressions: Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Instrument variables are malaria ecology (ME) and population ratio in temperate zone (kgptemp)			Instrument variables are malaria ecology (ME), population ratio in temperate zone (kgptemp), settlement mortality rate (logmort) and legal origin (leg_bri)					
	Dependent Variable: Log GDP per capita in 2010 (PPP measured)								
<i>avexpr</i>	0.354** (0.144)			0.427*** (0.149)			0.591*** (0.125)		
<i>mal04p</i>	-2.287*** (0.530)	-1.850*** (0.399)	-1.868*** (0.598)	-1.921*** (0.463)	-2.064*** (0.433)	-1.970*** (0.507)			
<i>rule</i>		0.903*** (0.240)			0.667*** (0.224)			0.924*** (0.184)	
<i>kk</i>			0.904* (0.463)			0.790** (0.363)			1.117*** (0.308)
<i>malfal04</i>							-1.391*** (0.364)	-1.582*** (0.335)	-1.474*** (0.398)
Constant	6.878*** (1.216)	9.055*** (0.150)	8.991*** (0.271)	6.127*** (1.184)	9.152*** (0.21)	9.024*** (0.245)	4.665*** (0.944)	8.841*** (0.157)	8.703*** (0.181)
Observations	104	141	62	66	74	62	66	74	62
R-squared	0.744	0.750	0.634	0.726	0.687	0.637	0.716	0.694	0.637

Notes: Standard errors in parenthesis. * indicates p-value < 0.1, ** indicates p-value < 0.5 and *** indicates p-value < 0.01.

Main Results

- Subsample regressions:
 - Agrarian countries
 - Geography is the only one significant, with stable coefficients through all specifications.
 - 1% \uparrow Malaria risk \rightarrow \downarrow 1.7-2% fall in per capita income.
 - Industrial countries
 - Institution is the only one consistently significant, with stable coefficients through all specifications.
 - Geography reduces the effect of institutions by as much as 50%, compared with AJR (2001).
 - 1 unit \uparrow Institutional quality \rightarrow \uparrow 0.7-1.2 units in log income ($\times 2$ - $\times 3$ in income).

Main Results

Table 4. Results of 2SLS regressions: agrarian country sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Instrument variables are malaria ecology (ME) and population ratio in temperate zone (kgptemp)			Instrument variables are malaria ecology (ME), population ratio in temperate zone (kgptemp), settlement mortality rate (logmort) and legal origin (leg_bri)					
	Dependent Variable: Log GDP per capita in 2010 (PPP measured)								
<i>avexpr</i>	-0.132 (0.483)			0.13 (0.244)			0.0853 (0.234)		
<i>mal94p</i>	-2.362*** (0.873)	-1.727*** (0.567)	-2.173** (0.915)	-1.692*** (0.445)	-1.702*** (0.428)	-1.809*** (0.579)			
<i>rule</i>		0.398 (1.276)			0.19 (0.375)			0.339 (0.33)	
<i>kk</i>			-0.94 (1.631)			-0.057 (0.795)			0.242 (0.658)
<i>malfal94</i>							-1.455*** (0.35)	-1.334*** (0.306)	-1.373*** (0.394)
Constant	9.643*** (3.451)	8.524*** (0.438)	8.292*** (0.372)	7.597*** (1.67)	8.441*** (0.269)	8.384*** (0.28)	7.553*** (1.544)	8.133*** (0.21)	8.065*** (0.214)
Observations	58	85	44	45	53	44	45	53	44
R-squared	0.422	0.515	0.295	0.532	0.51	0.49	0.585	0.569	0.57

Notes: Standard errors in parenthesis. * indicates p-value < 0.1, ** indicates p-value < 0.5 and *** indicates p-value < 0.01.

Main Results

Table 5. Results of 2SLS regressions: industrialized country sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Instrument variables are malaria ecology (ME) and population ratio in temperate zone (kgptemp)			Instrument variables are malaria ecology (ME), population ratio in temperate zone (kgptemp), settlement mortality ratio (logmort) and legal origin (leg_bri)					
	Dependent Variable: Log GDP per capita in 2010 (PPP measured)								
<i>avexpr</i>	0.345*** (0.0999)			0.516*** (0.0659)			0.530*** (0.0616)		
<i>mal94p</i>	-0.996* (0.523)	0.066 (0.558)	0.893 (0.664)	-0.368 (0.307)	0.394 (0.432)	0.821 (0.594)			
<i>rule</i>		0.878*** (0.198)			0.840*** (0.13)			0.805*** (0.112)	
<i>kk</i>			1.219*** (0.319)			1.174*** (0.244)			1.083*** (0.19)
<i>malfal94</i>							-0.344 (0.287)	0.282 (0.371)	0.625 (0.452)
Constant	7.141*** (0.868)	9.215*** (0.194)	8.930*** (0.212)	5.557*** (0.538)	9.186*** (0.127)	8.953*** (0.185)	5.431*** (0.494)	9.224*** (0.106)	9.035*** (0.137)
Observations	45	53	18	21	21	18	21	21	18
R-squared	0.638	0.762	0.687	0.865	0.809	0.708	0.864	0.814	0.756

Notes: Standard errors in parenthesis. * indicates p-value < 0.1, ** indicates p-value < 0.5 and *** indicates p-value < 0.01.

Robustness

- Use different cutoff for AVA-to-GDP ratio instead of 10%: 15%, and other measure: rural population of 30% → similar results.
- Africa-Specific effects? Control for it through Africa dummy → not significant.
- Additional controls: International trade, colony countries, natural resources, human capital, religion (protestants).
- Instrumental Variables validity through the use of alternatives such as country's legal origin.

Industrialization

- What about industrialization? Why UK?
- History does not support institutions as the key. Problems with:
 - Region with similar level of development - Yangtze Delta, see Allen (2009).
 - Presence of good quality coal and Atlantic Trade - Pomeranz (2000).
- Use full sample and full IV scheme. Regress using Probit-IV industrialization proxy with institutions and geography.

$$R_i = \nu + \alpha INS_i + \beta GEO_i + \gamma X_i + \epsilon_i \quad (2)$$

- 1% ↑ Malaria risk → ↓ 0.5-0.8% Probability of Industrialization. Institutions not significant. Geography is what matters!
- Geography → Development → Institutions → Development.

Industrialization

Table 12. Regressions of institutions on geography-explained industrialization level

	(1)	(3)		(4)	(5)		(6)	(7)	(8)
	<u>Panel A: Geography-explained AVA-to-GDP ratio as independent variables</u>								
	<i>rule</i>	<i>rule</i>	<i>avexpr</i>	<i>avexpr</i>	<i>rule</i>	<i>rule</i>	<i>avexpr</i>	<i>avexpr</i>	
<i>agval_mal94p_hat</i>	-0.0634*** (0.00963)		-0.0981*** (0.0157)		-0.0369** (0.0149)		-0.0748*** (0.0253)		
<i>agval_malfal94_hat</i>		-0.0656*** (0.0128)		-0.125*** (0.0236)		-0.0392* (0.0213)			-0.0947** (0.0421)
<i>mal94p</i>					-0.630** (0.274)			-0.643 (0.546)	
<i>malfal94</i>						-0.481 (0.311)			-0.557 (0.638)
Constant	0.499*** (0.149)	0.230 (0.139)	8.000*** (0.274)	7.606*** (0.252)	0.499*** (0.145)	0.230* (0.137)	7.987*** (0.274)	7.591*** (0.253)	
Observations	75	75	67	67	75	75	67	67	
R-squared	0.372	0.265	0.374	0.302	0.415	0.289	0.387	0.310	
	<u>Panel B: Geography-explained rural population ratio as independent variable</u>								
	<i>rule</i>	<i>avexpr</i>	<i>avexpr</i>	<i>avexpr</i>	<i>rule</i>	<i>rule</i>	<i>avexpr</i>	<i>avexpr</i>	
<i>agpop_mal94p_hat</i>	-0.0450*** (0.00684)		-0.0689*** (0.0110)		-0.0262** (0.0105)		-0.0525*** (0.0177)		
<i>agpop_malfal94_hat</i>		-0.0512*** (0.00998)		-0.0977*** (0.0184)		-0.0306* (0.0166)			-0.0739** (0.0329)
<i>mal94p</i>					-0.630** (0.274)			-0.643 (0.546)	
<i>malfal94</i>						-0.481 (0.311)			-0.557 (0.638)
Constant	0.499*** (0.149)	0.230 (0.139)	8.000*** (0.274)	7.606*** (0.252)	0.499*** (0.145)	0.230* (0.137)	7.987*** (0.274)	7.591*** (0.253)	
Observations	75	75	67	67	75	75	67	67	
R-squared	0.372	0.265	0.374	0.302	0.415	0.289	0.387	0.310	

Notes: Standard errors in parenthesis. * indicates p-value < 0.1, ** indicates p-value < 0.5 and *** indicates p-value < 0.01.

Conclusions

- Rich vs Poor countries: the unsolved debate between Institutions and Geography...
- Unless it has missed the point. What if the force of each depends on development stages?
- Contribution of the paper: differentiate between agrarian vs industrialized countries.
- Agrarian countries → Geography is the one that matters.
- Industrialized countries → Institutions is what matters.
- What about industrialization? Evidence favors Geography as key! Once industrialization takes place, institutions feed back development.