

# **Introduction to the Economics of Development**

## **8. Are institutions key?**

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## This week

- Institutions: what are they?
- Institutions and development: Correlational evidence
- Institutions and development: Causal evidence Acemoglu et al. (2001)
  - Instrumental variables
  - Measurement error (Albouy, 2012)
  - An alternative story: Glaeser et al. (2004)

**Institutions: what are they?**

## The basic idea

- Institutions are the “rules of the game” in society (laws, rights, habits, cultural norms,...)
- They can be hard rules i.e. laws, or softer norms
- Just like good traffic laws are better at guiding traffic, good institutions are better at creating growth

## Institutions in low-income countries

- Monopoly and entry restriction
  - Many low-income countries have state monopolies, or complicated rules (licences, official permissions, stamps, etc.) to starting a new firm.
  - High barriers to entry.
- Incentives
  - Many low-income countries have high and arbitrary taxes, or the state can simply confiscate private property.
  - Little incentive to accrue wealth or own property
- Contracts and courts
  - Often difficult and expensive to enforce contracts, courts are slow, expensive and potentially corrupt
  - Little reason to follow the rules or contracts
- Laws, police, and courts to protect property
  - In many cases it is difficult to prove that you own something and the police/ courts may be corrupt
  - Little reason to follow the rules or contracts

## Bad institutions: Examples

### Starting a business

- Takes 1 procedure in New Zealand, 18 in Equatorial Guinea
- Takes half a day in New Zealand, 144 days in Venezuela
- Costs 0.1% of average income in the UK, 204% in the Central African Republic
- Minimum capital required: 0% of average income in many countries, 273% in Oman, 345% in Guinea-Bissau, 540% in the Central African Republic.

It can be very difficult, time-consuming, and expensive, to start a business in the official way

Citation: World Bank Ease of Doing Business Report 2016.

## Bad institutions: Examples

### Enforcing contracts

- If a contract is violated, how easy is it to have a court enforce it?
- Takes 150 days in Singapore, but 1420 days (almost 4 years) in India.
- Costs 9% of the claim in Iceland, but 119% in Mozambique.

So in India or Mozambique, you might not bother trying to enforce the contract, and therefore there is no point in writing it in the first place.

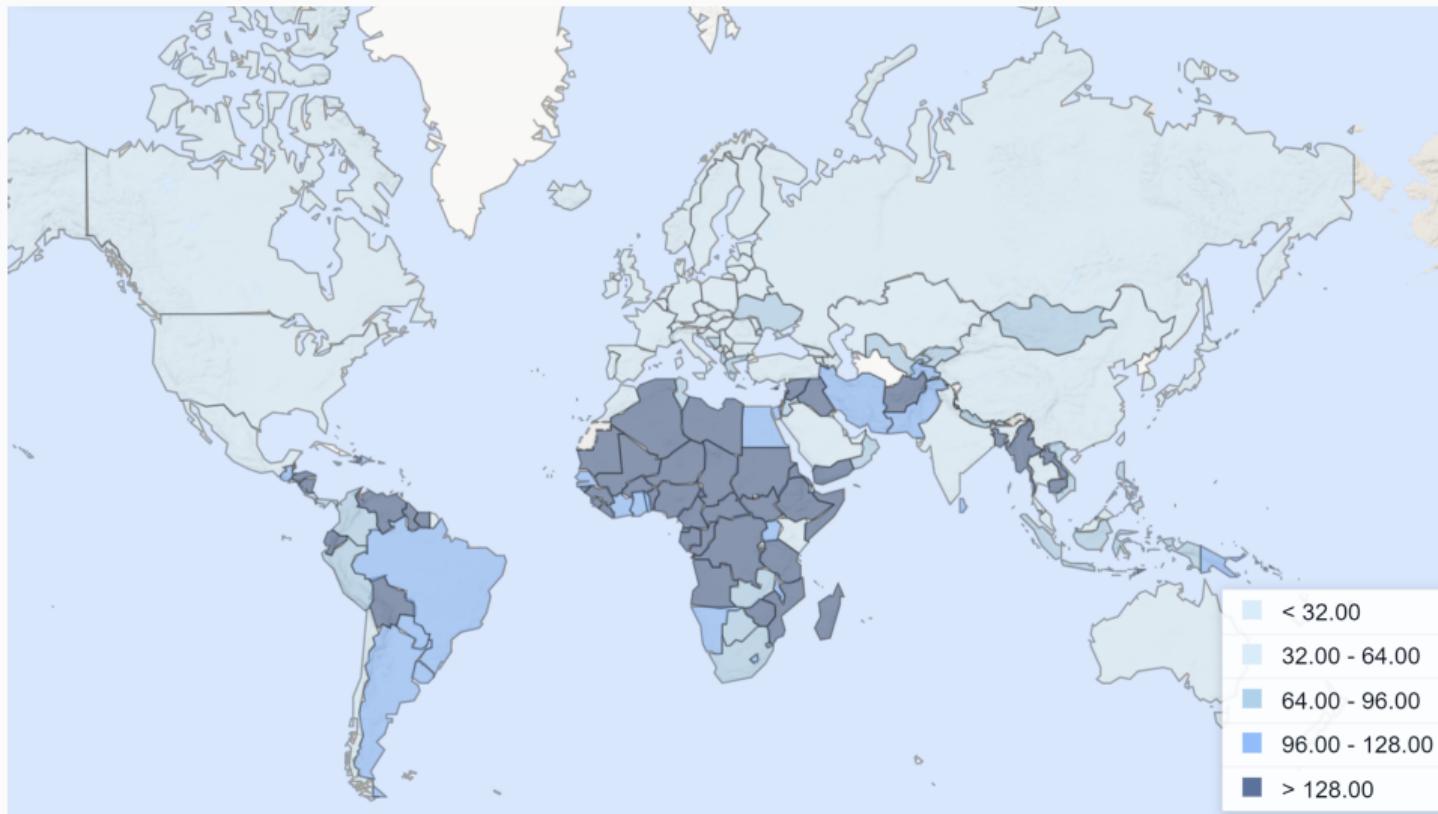
## Bad institutions: Examples

### Property rights

- If you buy a property how easy is it to have it registered?
- Takes 1 procedure in Norway, but 14 in Brazil.
- Takes 1 day in Portugal, but 244 days in Bangladesh.
- Costs < 1% if the property value in several countries, but 13.7% in Suriname, 15.1% in Tonga, and 18.9% in Cameroon

So in many countries, it is difficult and costly to get official proof that you own a property... so you may not bother to register it at all.

## World Bank Ease of Doing Business Index



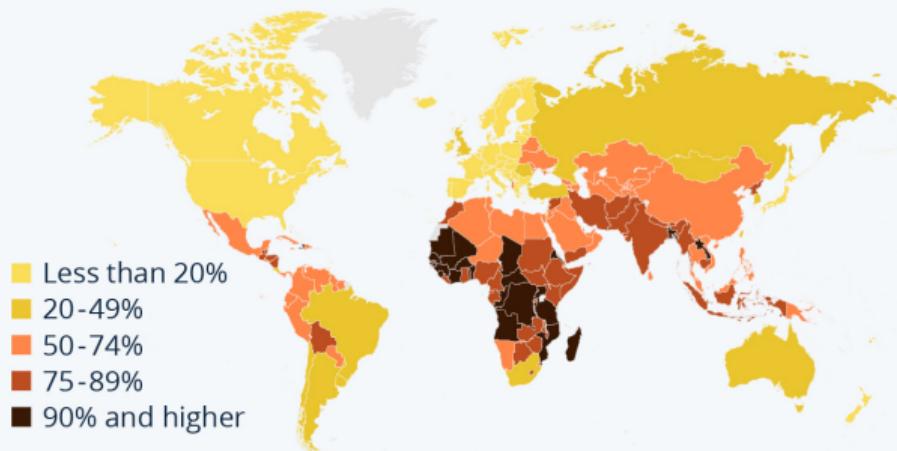
## **Bad institutions are bad for growth**

- It is clear that poor institutions hamper growth.
- They also encourage informality.
  - Informal economy is around 10% in USA, Switzerland etc. (not including unpaid home work).
  - More like 60% in many developing economies.
  - Informal employment is even higher.

**What are institutions to you?**

# Mapping the World's Informal Workforce

Share of informal employment in total employment,  
by country (in percent)\*



\* 2022 or latest available

Based on national household survey micro datasets from 147 countries.

Estimated values for countries with missing data

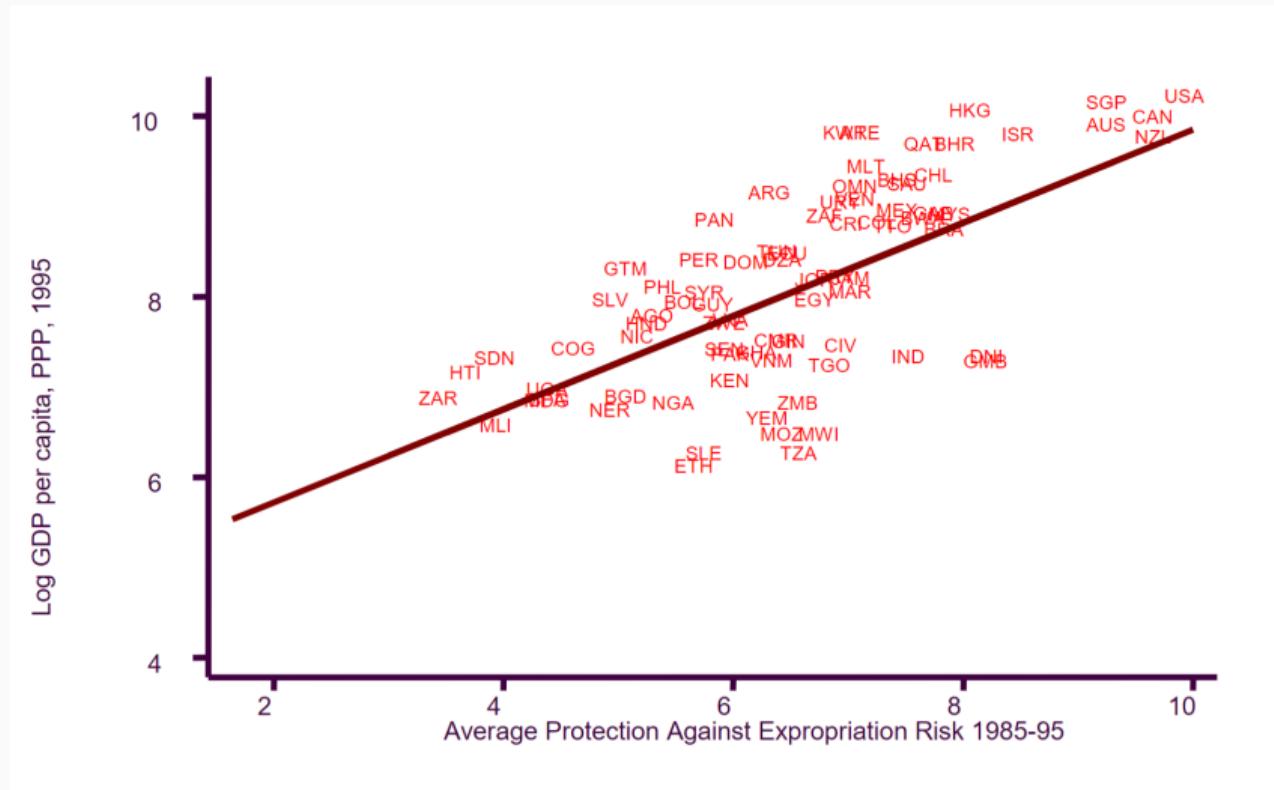
Source: International Labour Organization

## Consequences of informality

- Dead capital, millions of people own homes, land, business — but can't prove or enforce ownership.
  - Makes it very hard to sell, rent, or use as collateral for a loan.
- Hard to get a loan, lots of uncertainty, transactions often run on personal contacts and trust.
- Lower taxes implies lower government revenue implies governments cannot provide public goods such as roads and education.

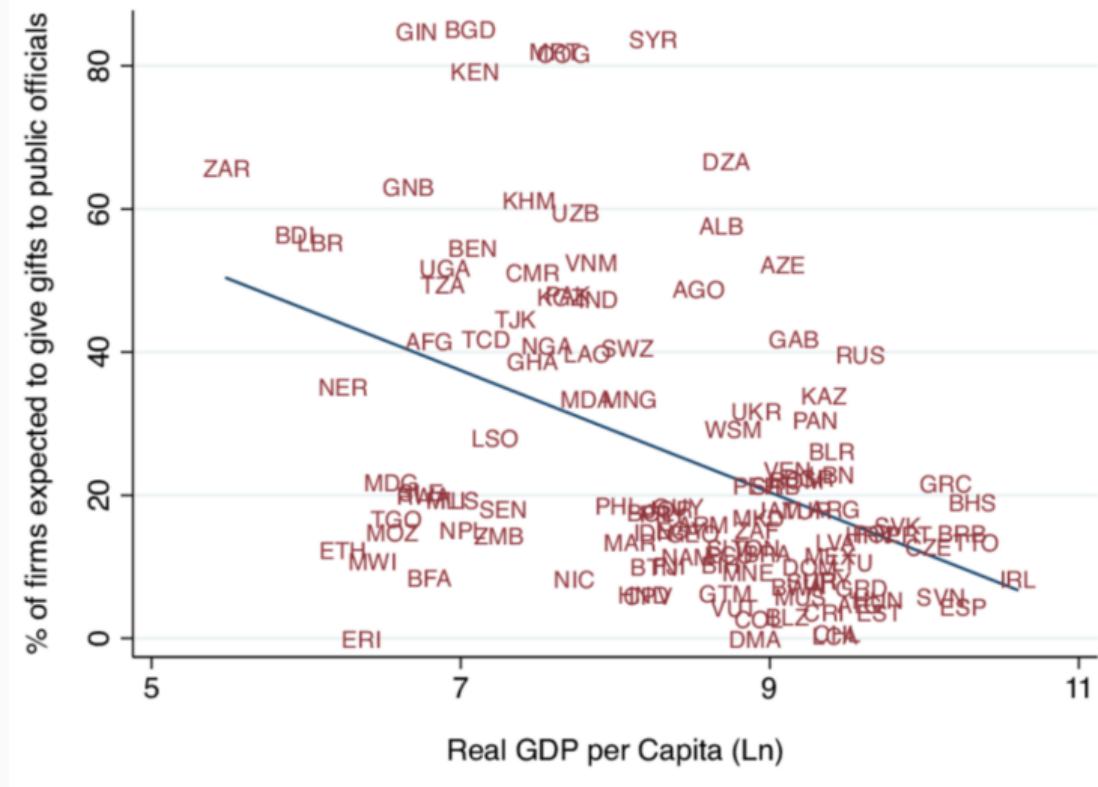
**Correlational evidence: Bad institutions and poor growth**

## Unsurprisingly bad institutions are correlated with lower GDP



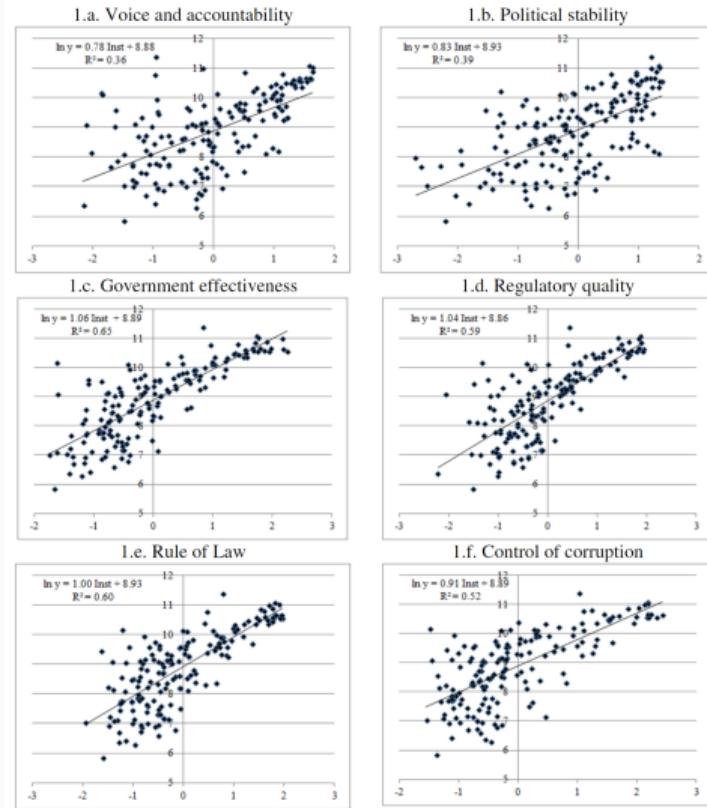
Acemoglu et al. (2001)

## Unsurprisingly bad institutions are correlated with lower GDP

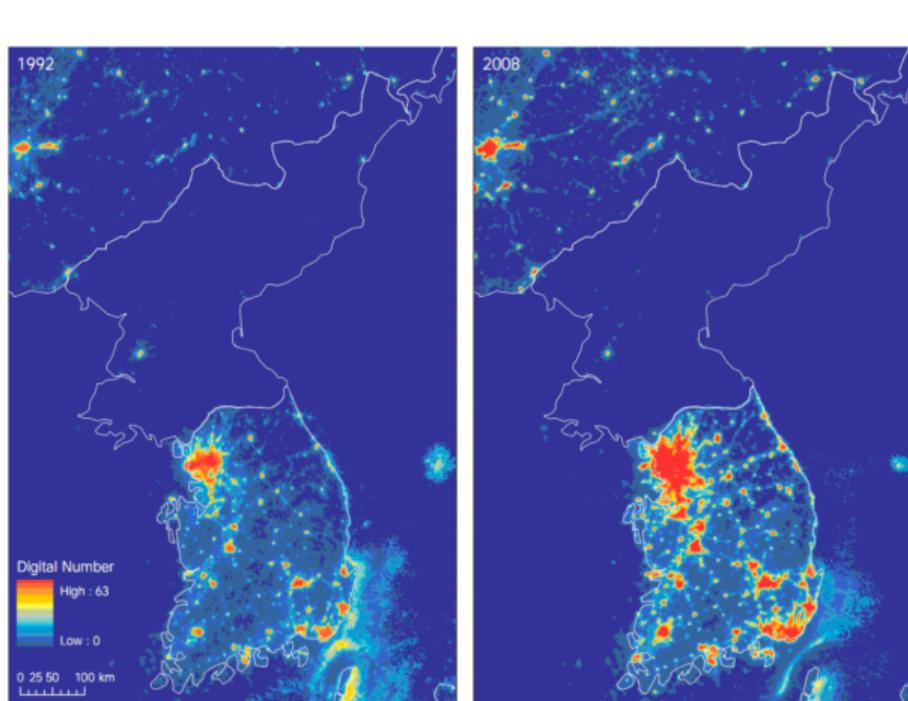
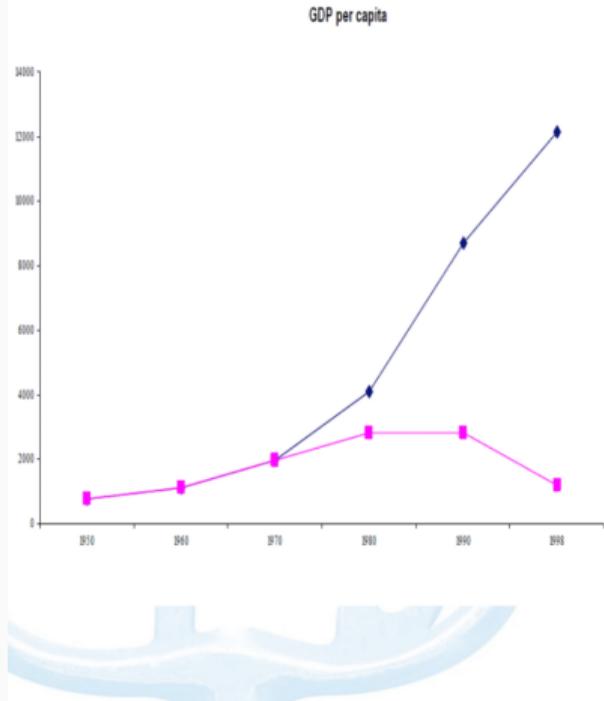


Bai et al. (2017)

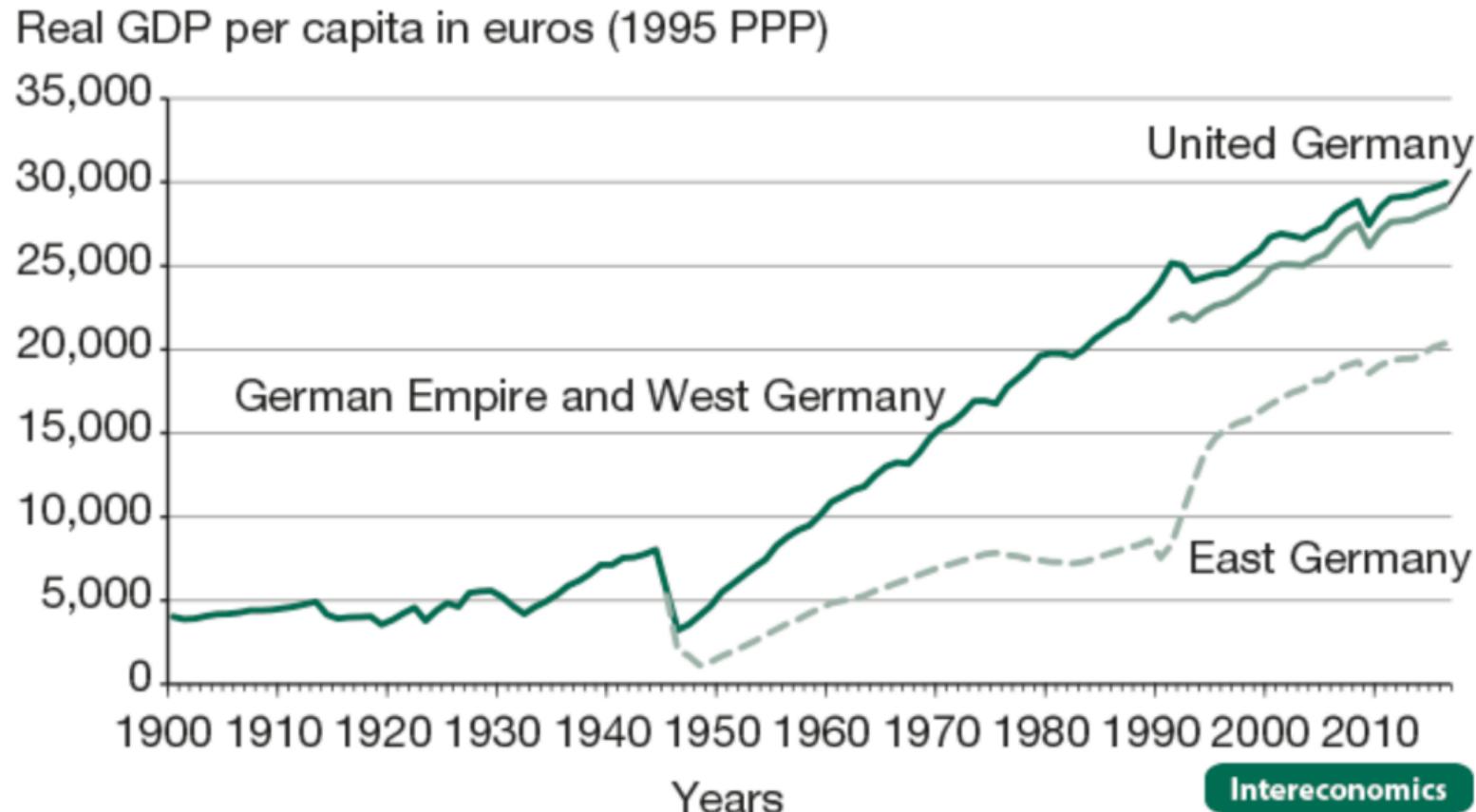
# Unsurprisingly bad institutions are correlated with lower GDP



## Case studies: Towards causality



## Case studies: Towards causality



**Is there a causal relationship between institutions and development?**

**Clearly a very important question... with a very influential contribution...**



# Acemoglu, Johnson, and Robinson (2001)

## The colonial origins of comparative development: An empirical investigation

Authors Daron Acemoglu, Simon Johnson, James A Robinson

Publication date 2001/12/1

Journal American economic review

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Publisher American Economic Association

Description We exploit differences in European mortality rates to estimate the effect of institutions on economic performance. Europeans adopted very different colonization policies in different colonies, with different associated institutions. In places where Europeans faced high mortality rates, they could not settle and were more likely to set up extractive institutions. These institutions persisted to the present. Exploiting differences in European mortality rates as an instrument for current institutions, we estimate large effects of institutions on income per capita. Once the effect of institutions is controlled for, countries in Africa or those closer to the equator do not have lower incomes. (JEL O11, P16, P51)

Total citations Cited by 18711



## The plan

- Setting and data in Acemoglu et al., (2001)
- Empirical strategy: Instrumental variables
- Results
- Critique: Alouy, (2012)
- An alternative story: Glaeser et al., (2004)

## The big (nobel worthy) idea

- Framing of the paper: What are the fundamental causes of the large differences in income per capita across countries?
- To estimate the causal impact of institutions on development we need to find some exogenous variation in institutions.
- Propose: Differences in mortality rates faced by European settlers at the time of colonization as a source of such variation.
- Logic: Settler disease environment  $\Rightarrow$  Colonial institutions  $\Rightarrow$  Current institutions  $\Rightarrow$  Current growth.
- European colonizers set up two types of institutions: (1) **extractive** transfer resources to the colonizing country, (2) **inclusive** create wealth in the colonized country and settle there.

# Data

## Settler mortality

- Data on the mortality rates of soldiers, bishops, and sailors between the 17th and 19th centuries. Mainly from the work of Philip Curtin.
- After 1815, and certainly by the 70s European powers started regularly publishing statistics on soldier mortality in an attempt to understand the extremely high death rates from disease (often well over 50% a year).
- Diseases: malaria, yellow fever, gastrointestinal diseases. There was little to no knowledge about the control, treatment, or prevention of these diseases.
- Latin American data comes from Vatican records of bishop mortality as soldier mortality was not recorded

## Institutions

- Focus on the “index of protection against expropriation” from the Political Risk Service. Use the average value from 1985 to 1995.
- Results are robust to using other measures of institutions.

GDP per-capita in 1995 PPP terms from the World Bank

## Correlational regressions

Model:  $\ln(y_i) = \mu + \alpha R_i + \gamma X_i + \varepsilon_i$

$\ln(y_i)$  is log per-capita GDP

$R_i$  measures institutions (protection against expropriation)

$X_i$  are potential controls

$\varepsilon_i$  is some error term

# Correlational results

	Whole World (1)	Whole World (2)	Base Sample (3)	Base Sample (4)	Whole World (5)	Whole World (6)	Base Sample (7)	Base Sample (8)
Average Protection Against Expropriation Risk, 1985-1995	0.54 (0.04)		0.52 (0.06)		0.46 (0.06)	0.42 (0.05)	0.46 (0.07)	0.40 (0.06)
Dummy for anti-expropriation index in second quartile		0.27 (0.22)		0.52 (0.25)				
Dummy for anti-expropriation index in third quartile			1.50 (0.22)		1.50 (0.26)			
Dummy for anti-expropriation index in fourth quartile				2.20 (0.21)		2.00 (0.35)		
Latitude					1.00 (0.49)	0.50 (0.51)	1.80 (0.72)	1.10 (0.63)
Asia Dummy						-0.67 (0.19)		-0.66 (0.23)
Africa Dummy							-1.00 (0.16)	-0.90 (0.17)
"Other" Continent Dummy							-0.28 (0.21)	-0.04 (0.32)
Adjusted R-Squared	0.61	0.58	0.52	0.43	0.62	0.72	0.55	0.68
N	110	110	64	64	110	110	64	64

Dependent Variable: Log GDP per capita (PPP basis) in 1995, current prices, (from the World Bank's World Development Indicators 1999). Average protection against expropriation risk is measured on a scale from 0 to 10, where a higher score means more protection against expropriation, averaged over 1985 to 1995, from Political Risk Services. Standard errors are in parentheses. In regressions including dummies for the anti-expropriation index, the dummy for the first quartile –i.e., with highest risk of expropriation– is the omitted category. In regressions with continent dummies, the dummy for America is omitted. See Appendix, [Table A1](#) for more detailed variable definitions and sources.

## Are the results economically meaningful?

- Focus on column 3:  $\ln(y_i) = \mu + 0.52R_i + \gamma X_i + \varepsilon_i$
- What does this imply about the impact of institutions on GDP.
- Moving from the 25th percentile to the 75th percentile of institutional quality among ex-colonies is a movement from 5.6 to 7.4 i.e. a movement of 1.8
- So  $0.52 \times 1.8 = 0.94$  log GDP difference, this is equivalent to about 150% of the poorer countries GDP.
- The actual GDP difference between the 25th and 75th institutional-quality percentile countries are 540%
- So institutions explain  $150/540 = 0.28$  or 28% of GDP per capita differences across countries.

## Why might these results not be causal?

- Reverse causality. Rich countries can afford better institutions.
- Omitted variable bias. Some variable could cause bad institutions and bad growth such as natural resources, isolation from world markets, war and conflict, etc.
- Ex-post construction of the measure of institutions. The people making a measure of institutions might be pre-disposed to give high scores to wealthy countries as they reason that such countries must have good institutions.

## Overcoming endogeneity concerns: Instrumental variables

- The broad idea: We want to find some variation in institutions ( $R_i$ ) which is not related to GDP per capita today ( $\ln(y_i)$ ).
- The variable driving such variation, call it  $Z_i$  is an instrument.
- $Z_i$  causes changes in  $R_i$  but is not related to  $\ln(y_i)$ .
- Acemoglu et al. (2001) argue for settler mortality as such an instrument.
- High mortality implies no settlement implies bad colonial institutions implies bad modern institutions implies low GDP
- Low mortality implies lots of settlement implies good colonial institutions implies good modern institutions implies high GDP

NB: It's unclear if native Indians or aboriginal people etc. would agree that the institutions imposed were "good".

## Two key assumptions for a valid IV

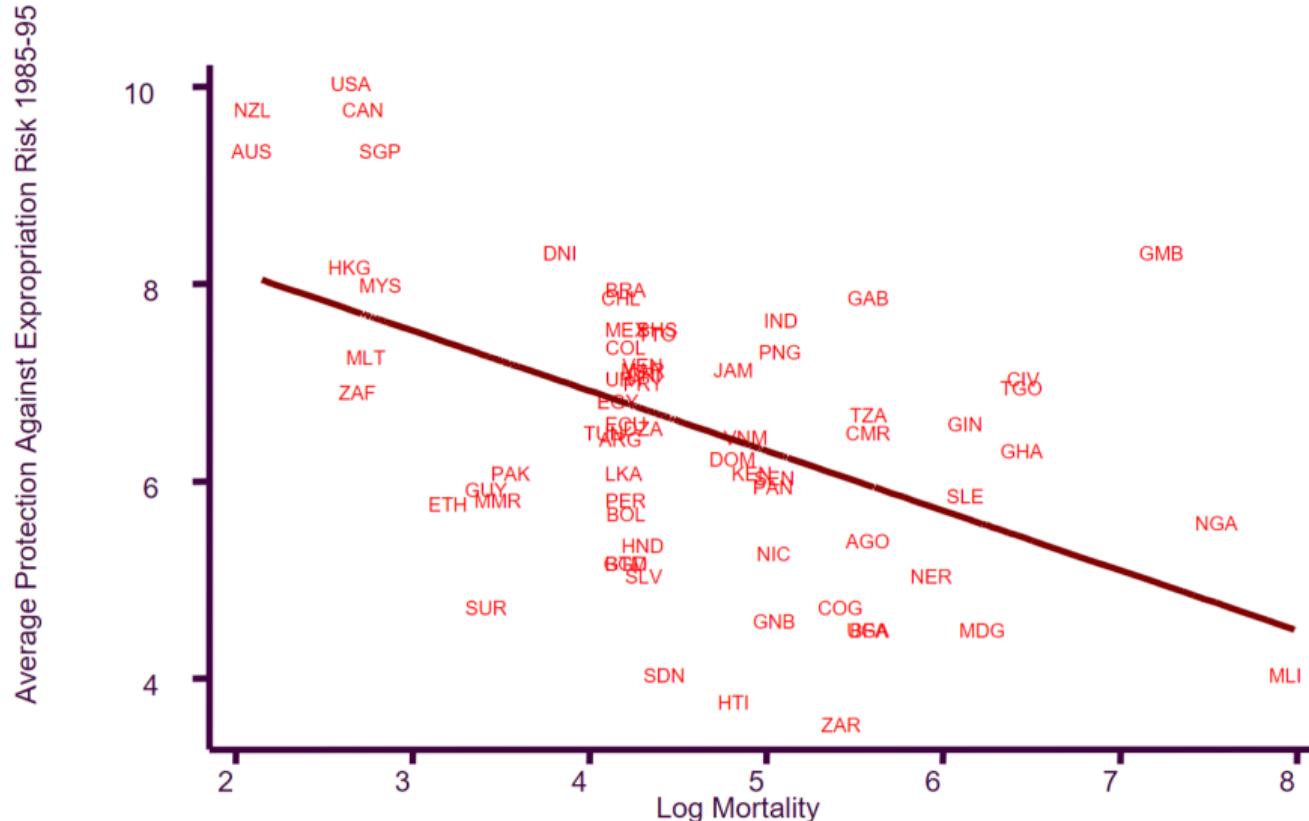
### 1. Relevance.

- The instrument must be related to the endogenous variable of interest.
- In this case: Settler mortality must be related to present-day institutions.
- This is easy to test!

### 2. Excludable.

- The instrument must not cause changes in the outcome variable other than through changes in the endogenous variable.
- In this case: Settler mortality must not cause changes in GDP other than through present-day institutions.
- Impossible to test, must be argued for!

## Relevance



## Exclusion restriction

- Settler mortality must not cause changes in GDP other than through present-day institutions.
- Can never statistically prove this (just as we can't prove any causality) instead we argue for it.
- Intuitive potential issue: Disease environment in the past could be correlated with weather and/or disease environment today.
- Add a series of temperature and humidity variables and find they have no impact.
- Malaria: malaria is a major cause of settler deaths and could be impeding development today. However, Acemoglu et al. (2001) argue:
  - Malaria today is unlikely to have a large impact on development as it is far less dangerous to natives than settling Europeans.
  - Malaria prevalence today is highly endogenous. Only areas with bad institutions suffer significantly from malaria.
  - Controlling for malaria does not change the results.

**Are you satisfied with the exclusion restriction?**

**Are you satisfied with the exclusion restriction?**

What could threaten the exclusion restriction?

Can you think of an alternative instrumental variable?

# Results

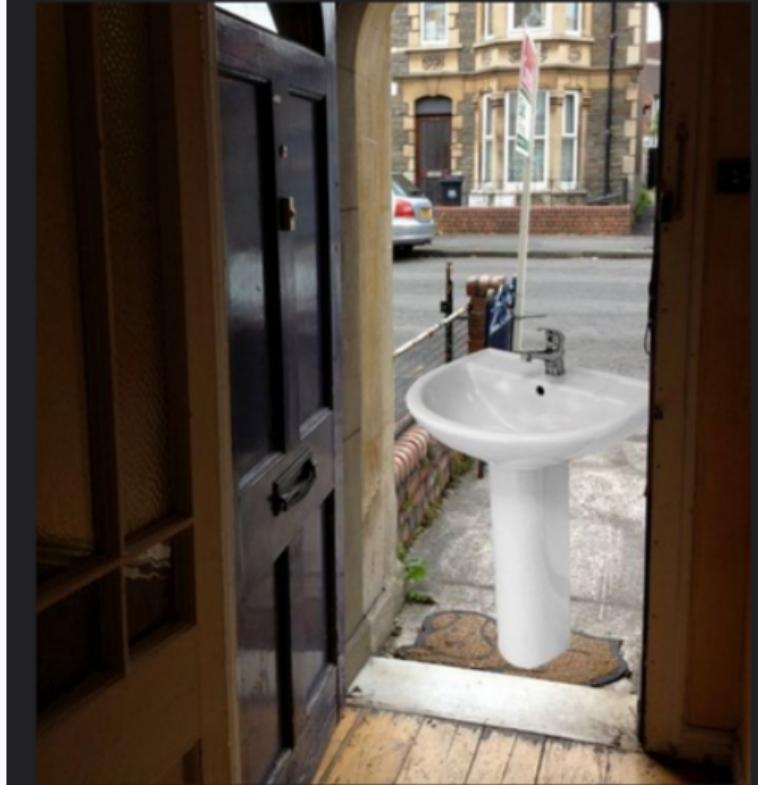
	Base Sample (1)	Base Sample (2)	Base Sample without neos- Europes (3)	Base Sample without neos- Europes (4)	Base Sample without Africa (5)	Base Sample without Africa (6)	Base Sample with Continent Dummies (7)	Base Sample with Continent Dummies (8)
<i>Panel A: Two Stage Least Squares</i>								
Average Protection Against Expropriation Risk 1985-1995	0.95 (0.16)	0.98 (0.22)	1.29 (0.37)	1.2 (0.35)	0.61 (0.11)	0.59 (0.12)	0.93 (0.24)	1.00 (0.3)
Latitude			-0.4 (1.30)		1.3 (1.50)		0.22 (0.89)	-0.77 (1.5)
Asia Dummy							-0.96 (0.37)	-1.00 (0.44)
Africa Dummy							-0.47 (0.33)	-0.45 (0.37)
"Other" Continent Dummy							-0.67 (0.6)	-0.68 (0.6)

## Magnitude of the results

- Again we compare the 25th to the 75th percentile of the distribution of institutions (protection from expropriation) among all ex-colonies.
- The baseline 2SLS estimate is 0.95 with a small standard error.
- So 1.8 interquartile range times 0.95 gives a 1.7 log-point difference in GDP per-capita between the 25th and 27th percentile of institution quality due to differences in institutions.
- This translates to a 450% difference
- Compared to a raw GDP per capita gap of 540%
- Implies that over 75% of the GDP per capita gap can be explained by differences in institutions

## Magnitude of the results

Let that sink in.



## Magnitude of the results

Acemoglu et al. (2001) are saying that 75% of the GDP difference among ex-colonies between those with good (US, Canada, Australia) and those with bad institutions is because of their institutional differences.

This leads very little room for other causes.

75%!!!

**Critique: Albouy (2012) — the importance of measurement**

- Main thrust of the argument: Settler mortality data is unreliable.
- Out of the 64 countries in the sample, only 28 have mortality rates taken from data within their own border.
- Mortality rates never come from actual settlers but rather soldiers, sometimes on campaign and sometimes in peacetime.
- Correcting for these measurement issues renders the relationship much weaker or even null.

## How the data is constructed

Four step procedure

1. Average mortality rates from soldiers in peacetime taken from Curtin (1989)
2. Data from military campaigns is added from Curtin (1998)
3. Incorporate rates from African laborers who were moved to a foreign disease environment
4. Mortality rates from Latin American bishops from Gutierrez (1986) are added

## Matching mortality rates to countries without their own data

- 36 countries don't have their own data.
- These countries are assigned a mortality rate of a neighboring country if it "has the same disease environment".
- Hard to tell how this is done, and for many neighboring countries with data the rates can differ a lot.
- Example: Latin American rates from Bishop data. Rates are based on 4,5 and, 10 deaths from populations of 24, 28.5, and 30.5 Bishops over 10 years.
  - Rates are not statistically significantly different
  - Rates are similar to those from Europe
  - ACR multiply the rates by 4.25 to benchmark them to a Mexican rate calculated from French soldiers campaigning there.
  - 16 Latin American countries are given rates following this procedure

## Using soldier mortality rates as a proxy for settler mortality

- Living conditions can affect mortality rates from disease.
- ACR combine information from soldiers in barracks with those on campaign without adjustment.
- Soldiers on campaign would be expected to have much higher mortality rates
- This affects the analysis as countries with low GDP and/or bad institutions are more often assigned rates from campaigns.
  - Eg. Canada and US are given rates from peacetime of 16.1 and 15 which are much lower than rates during for example the war of independence.

# Do the main takeaways survive corrections? First stage

Control variables	No controls	Latitude control	Without Neo-Europes	Continent indicators	Continent indicators and latitude	Percent European in 1975	Malaria in 1994
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Panel A. Original data (64 countries, 36 mortality rates)</i>							
Log mortality ( $\beta$ )	-0.61	-0.52	-0.40	-0.44	-0.35	-0.42	-0.52
{homoscedastic standard error}	{0.13}	{0.14}	{0.13}	{0.17}	{0.18}	{0.14}	{0.18}
(heteroscedastic-clustered SE)	(0.17)	(0.19)	(0.17)	(0.20)	(0.21)	(0.19)	(0.22)
p-value of log mortality	0.001	0.01	0.03	0.04	0.11	0.03	0.02
p-value of controls	—	0.17	—	0.40	0.34	0.02	0.40
<i>Panel B. Removing conjectured mortality rates (28 countries and mortality rates)</i>							
Log mortality ( $\beta$ )	-0.59	-0.42	-0.32	-0.31	-0.22	-0.29	-0.38
(heteroscedastic standard error)	(0.19)	(0.22)	(0.19)	(0.20)	(0.23)	(0.21)	(0.24)
p-value of log mortality	0.01	0.07	0.10	0.13	0.35	0.19	0.12
p-value of controls	—	0.05	—	0.01	0.002	0.015	0.10
<i>Panel C. Original data, adding campaign and laborer indicators (64 countries, 36 mortality rates)</i>							
Log mortality ( $\beta$ )	-0.45	-0.39	-0.31	-0.37	-0.30	-0.27	-0.36
(heteroscedastic-clustered SE)	(0.18)	(0.20)	(0.17)	(0.22)	(0.23)	(0.19)	(0.21)
p-value of log mortality	0.020	0.06	0.09	0.09	0.20	0.17	0.10
p-value of indicators	0.16	0.22	0.31	0.26	0.35	0.19	0.21
p-value of controls	—	0.27	—	0.75	0.66	0.02	0.41
<i>Panel D. Removing conjectured mortality and adding campaign and laborer indicators (28 countries and mortality rates)</i>							
Log mortality ( $\beta$ )	-0.35	-0.21	-0.18	-0.25	-0.14	-0.20	-0.22
(heteroscedastic standard error)	(0.22)	(0.25)	(0.22)	(0.23)	(0.26)	(0.23)	(0.26)
p-value of log mortality	0.12	0.42	0.42	0.28	0.60	0.39	0.40
p-value of indicators	0.03	0.06	0.08	0.34	0.44	0.14	0.07
p-value of controls	—	0.07	—	0.03	0.01	0.05	0.28
<i>Panel E. Removing conjectured rates, adding campaign and laborer indicators, and revising with new data (34 countries and rates)</i>							
Log mortality ( $\beta$ )	-0.41	-0.30	-0.19	-0.31	-0.19	-0.24	-0.30
(heteroscedastic standard error)	(0.20)	(0.21)	(0.21)	(0.21)	(0.22)	(0.22)	(0.23)
p-value of log mortality	0.05	0.17	0.36	0.16	0.39	0.28	0.20
p-value of indicators	0.02	0.04	0.04	0.30	0.41	0.07	0.06
p-value of controls	—	0.13	—	0.20	0.22	0.05	0.33

## Do the main takeaways survive corrections? Second stage

- When the first stage is null, the second stage becomes problematic.
- We won't go into the details around "weak instruments" as it gets a bit complicated...
- But the bottom line is that the estimates become unreliable in the most extreme scenarios
- Although in baseline specifications they hold up fairly well to either removing conjectured mortality rates or including dummies for data origin (campaign, laborers, peacetime), but not both.

**An alternative story: Glaeser et al. (2004)**

- Advance an alternative hypothesis: Human capital causes good institutions and growth.
- Argue that Acemoglu et al. (2001) pick up human capital changes and not institutions.
- Argue that institutional development follows growth and human capital development, not the other way around.
- Paper also has an interesting discussion about “what is an institution” which we will skip, but I recommend :)

## Some correlational evidence

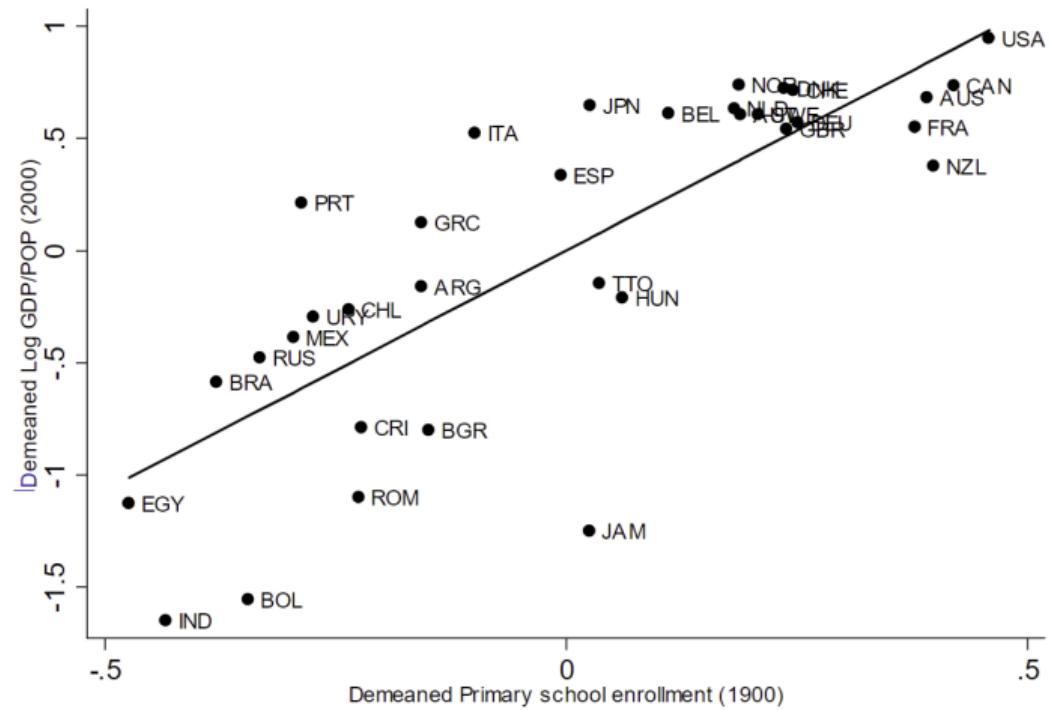
	<i>Panel C: Dependent variables are the growth rates of GDP per capita for each decade between 1960 and 2000 and for the whole period</i>				
	1960-70	1970-80	1980-90	1990-2000	1960-2000
Share of population living in temperate zone (1995)	0.0270 <sup>a</sup> (0.0085)	0.0191 <sup>a</sup> (0.0070)	0.0218 <sup>a</sup> (0.0082)	0.0135 <sup>c</sup> (0.0077)	0.0255 <sup>a</sup> (0.0048)
Log initial GDP per capita	-0.0141 <sup>a</sup> (0.0048)	-0.0130 <sup>b</sup> (0.0057)	-0.0146 <sup>a</sup> (0.0045)	-0.0073 (0.0055)	-0.0189 <sup>a</sup> (0.0034)
Initial executive constraints	-0.0004 (0.0012)	-0.0017 (0.0016)	0.0031 <sup>b</sup> (0.0013)	0.0014 (0.0015)	0.0008 (0.0008)
Log initial years of schooling	0.0116 <sup>a</sup> (0.0035)	0.0140 <sup>a</sup> (0.0035)	0.0105 <sup>b</sup> (0.0043)	0.0104 <sup>c</sup> (0.0060)	0.0096 <sup>a</sup> (0.0028)
Observations	61	80	86	81	57
R <sup>2</sup>	33%	20%	20%	9%	55%

## Debate with Acemoglu et al. (2001)

- Acemoglu et al. 2001: Low disease implies colonizers settle implies they bring their institutions with them.
- Glaeser et al. 2004: Yes, but they brought other stuff with them too, including their human capital.
- So, settler mortality might impact modern GDP through initial human capital rather than/ as well as institutions.
- Implies the IV is invalid

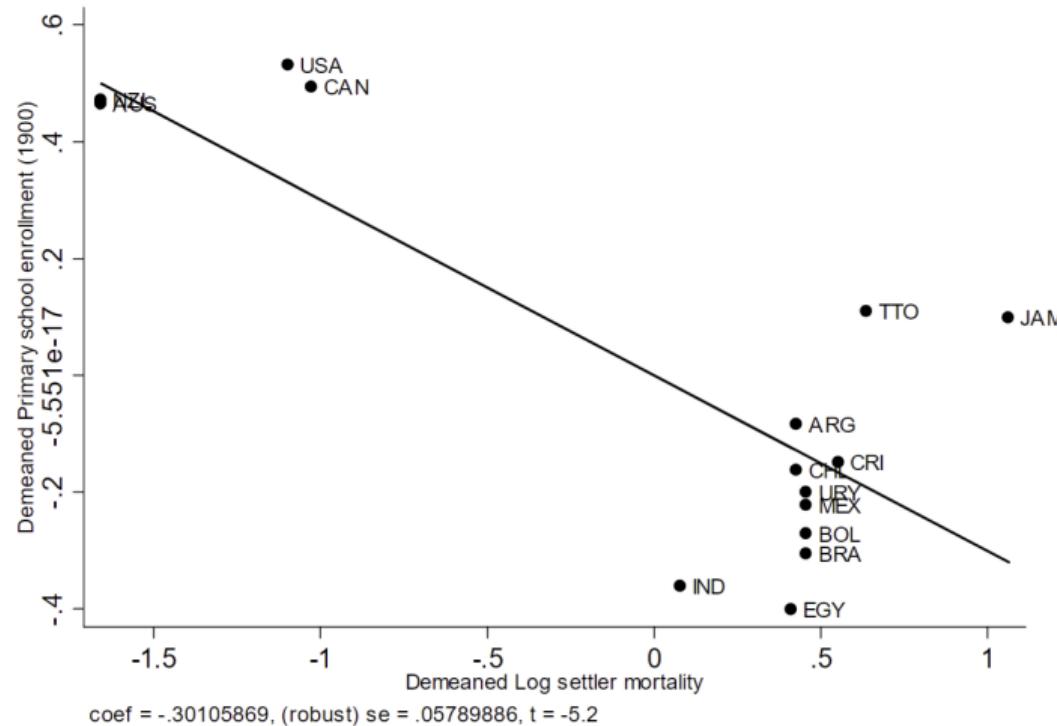
## Evidence for their argument

Primary school enrollment is correlated with GDP



## Evidence for their argument

Settler mortality is correlated with primary school enrollment (first stage)



## Instrumental variables

<i>Panel A: Second-stage regressions</i>		
	Dependent variable is log GDP per capita in 2000	
	(1)	(2)
Years of schooling (1960-2000)	0.7894 <sup>a</sup> (0.2753)	0.4836 <sup>b</sup> (0.1875)
Executive constraints (1960-2000)	-0.3432 (0.2577)	-0.2965 (0.2410)
Share of population living in temperate zone (1995)	-1.6969 (1.2053)	-0.0863 (0.7714)
Observations	47	55
R <sup>2</sup>	0.31	0.5

## Discussion

- Maybe human capital/ education is an institution? However, if institutions are a catch-all term we learn very little.
- By their own logic Glaeser et al 2004 are not saying that human capital (solely) causes growth.
- Perhaps all we can conclude is that the more repressive the imposed regime the worse the growth trajectory for decades after.
- All analysis is within-colonised countries, and says nothing about the counterfactual of no colonisation.
- Acemoglu, Robinson, and Johnson won the noble for this paper and 25 years of subsequent work. They sparked a debate that continues today and established the central importance of institutions in development.

## The question

- Do you buy the main argument of Acemoglu et al. (2001)?
- Human capital or institutions?
- Are institutions key?

## Summary

- Institutions “facts” and some answer to “what are institutions” .
- Correlations between institutions and growth.
- Towards causation: Instrumental variables.
- Discussed Acemoglu, Johnson, and Robinson (2001) in detail.
- Considered critiques of Alouy (2012) and Glaeser et al. (2004) focusing on the importance of measurement and human capital as an alternative story.

## Next week

Are credit constraints constraining development?