

Institutions

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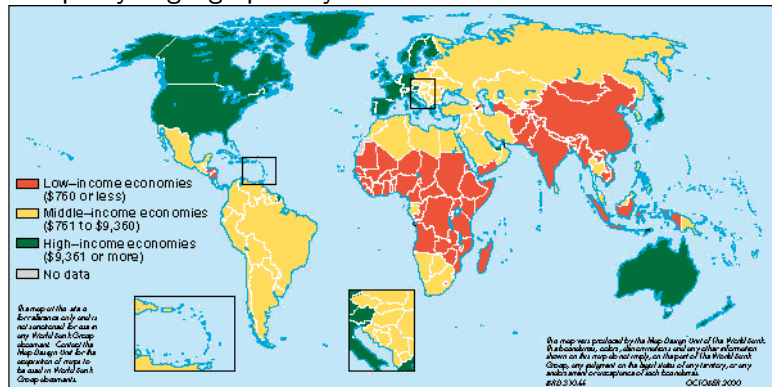
Econ520

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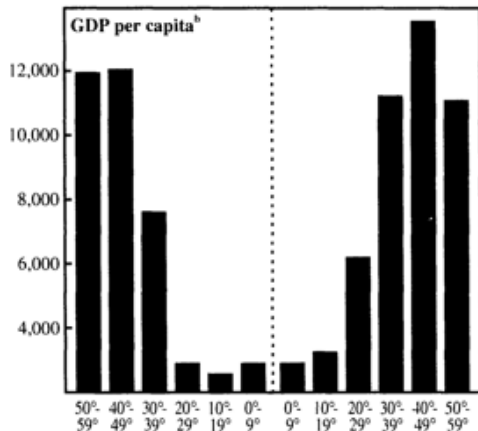
- TFP accounts for a large share of cross-country income gaps.
- What are the fundamental causes of TFP gaps?
- Candidates:
 - 1 Geography
 - 2 Culture
 - 3 Institutions
- We focus on institutions.

Geography

Prosperity is geographically concentrated.



International dollars



Geography is very strongly related to development.
Is this relationship **causal**?

Bloom and Sachs (2008)

Recent causal interpretations

① Jeffrey Sachs: "Disease burden"

- Many infectious diseases occur in tropical areas (malaria).
- The resource cost of fighting diseases reduces growth.

② Jared Diamond:

- "Guns, Germs, and Steel"
- Some regions are more suitable for agriculture / dense settlement.
- These regions get a head start in adopting / developing technologies.

Problems With the Geography Hypothesis

- Growth miracles
 - Some countries transformed themselves from poor to industrialized in a few decades
 - South Korea, Taiwan, Japan

What are institutions?

- Vaguely: "Humanly devised constraints that shape human interaction." (North 1990)

The key **questions**:

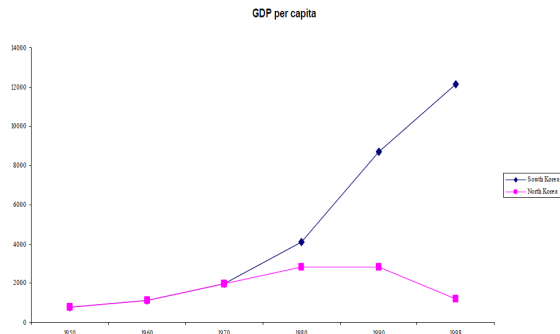
- 1 **How important are "institutions" for growth and cross-country income gaps?**
- 2 Which institutions cause poverty and how?
- 3 Why do countries choose poor institutions?

- Protection of property rights.
 - Russia: If a property burns down, the owner loses ownership of the land.
- Rule of law.
 - Peru: It takes 900 days to start a small business without paying bribes.
- Freedom of speech.
 - Galileo.

Natural experiments that almost prove the importance of (communist) institutions:

- East & West Germany
- South & North Korea
- Hong Kong and Taiwan vs. China

GDP per capita in North and South Korea, 1950-98

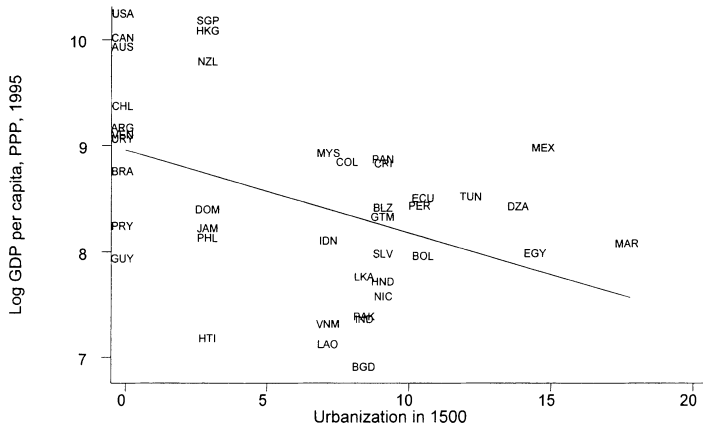


Source: Acemoglu et al.

- A large part of the world was colonized by Europeans after 1500.
- Today's institutions are strongly related to those imposed on the colonies hundreds of years ago.
- Colonies can be used to construct a **natural experiment**.
 - We need to look for "accidental" factors that shaped the institutions of colonies.
 - Differences in Y/L across former colonies then identifies the effects of institutions.

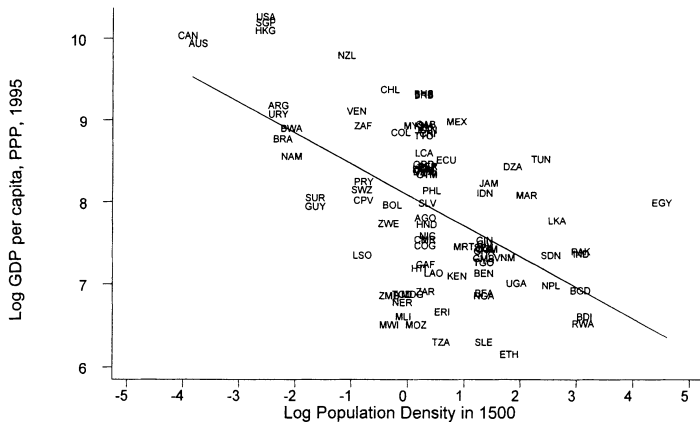
Reversal of Fortune

Regions that were relatively rich in 1500 became relatively poor after



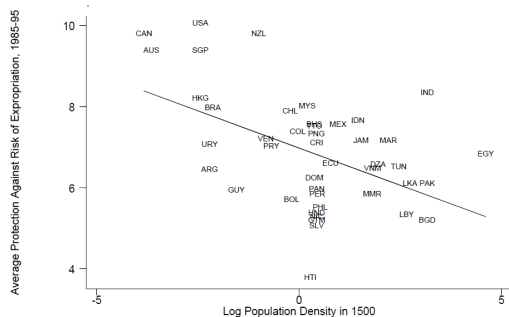
Source: Acemoglu et al.

Reversal of Fortune



Interpretation: Colonial Institutions

Log population density in 1500 and average protection against risk of expropriation 1985-95



For some reason, Colonists imposed worse institutions on richer colonies.

Colonies come in two types:

- 1 Poor: Few resources and few people.
- 2 Rich: Endowed with resources that can be extracted (including labor).

In poor colonies, the only way to exploit the land is to settle (North America).

- Settlers bring institutions which protect their own rights.
- Or settlers establish rights with force (USA).

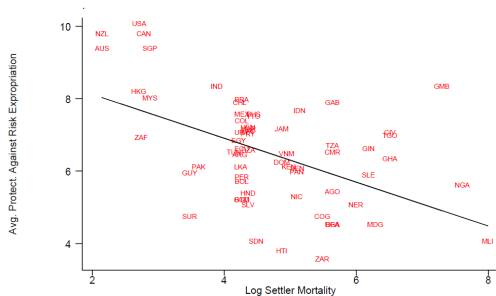
In rich colonies, the most profitable strategy is to expropriate locals.

- Institutions protect the colonial minority's rights / deny rights to the local majority.
- Forced labor (South America, Africa).

Institutions are highly persistent to this day.

Why does geography matter so much?

Log mortality of potential European settlers
and average protection against risk of expropriation 1985-95



In tropical colonies, settlement was not possible for Europeans (diseases).
Colonial powers installed expropriating institutions.

Bad institutions lead to low income

Log mortality of potential European settlers and log GDP per capita in 1995

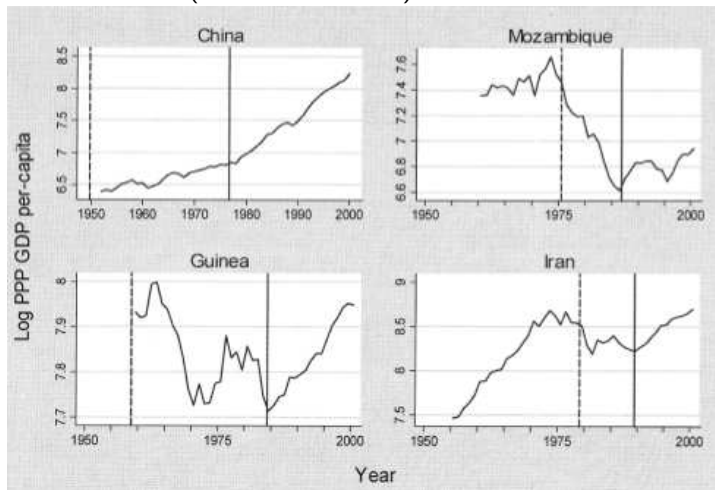


Evidence: Changes in Leadership

- Does a country's growth rate change when it's leader changes?
- One approach: Compare growth before / after a leadership change
 - What is the problem with this approach?

Leadership Changes: Natural Experiments

Jones and Olken (2005): examine changes in growth following a **random** death of a leader
due to disease (not assassination)



Why Do Bad Institutions Persist?

- We all agree that some (common) institutions are bad:
 - state monopolies (energy, telecom)
 - non-independent central banks
 - farm subsidies (?)
- Why is it so hard to get rid of obviously bad institutions?

Commitment Problems

- Change generates winners and losers.
- One could compensate the losers (transfers from the winners).
- The problem: the winners cannot **commit** to compensation.

Example: Government Monopolies

- Competition in telecom would improve welfare.
- Phone customers could compensate the monopolists.
- But: they cannot *commit* to compensation.
- One the monopoly has been given up, why should the public agree to pay the former monopolists?
- Closer to home:
 - cable providers have monopolies over content delivery
 - labor unions have monopolies over certain industries / occupations

This a a very general problem

It generates resistance against reforms.

Example: Holdup

- **Expropriation** is a common problem in poor countries.
- Secure property rights would raise investment and income.
- The problem: political power-holders cannot commit to respect property rights.
- Example: Russian oligarchs.

A vicious cycle:

- Concentration of political power \implies concentration of wealth.
- Wealth \implies political power.

Implications:

- Those in power benefit from general poverty.
- To maintain political power, rulers must oppose profitable innovation (or expropriate it ex post).
- Example: Czars in 19th century Russia suppressed industrialization to prevent challenge from a wealthy merchant class.

- Ample evidence that institutions are important for Y/L .
- Colonies provide a natural experiment that "randomly" assigns institutions to countries.
- Divided countries "prove" that communist institutions reduce incomes.
- Key open questions:
 - 1 Which institutions are important?
 - 2 How much do institutions contribute to Y/L gaps?

How Important Are Institutions?

How Important are Institutions?

- Read: Hall and Jones (1999).
- What fraction of Y/L gaps is due to institutions?
- Hall & Jones propose a regression method to measure this.
- Their finding: Institutions account for the majority of cross-country TFP gaps.

- Hall & Jones construct a measure of institutional quality, called "Social infrastructure" (SI).
- SI is defined (vaguely) as:

"the institutions and government policies that provide the incentives for individuals and firms in an economy."

- SI has 2 components:
 - 1 GADP: an institutional quality measure.
 - 2 Openness: a measure of openness to international trade.

- An index of government anti-diversion policies from Political Risk Services.
- Values between 0 (bad) and 1 (good).
- Measures government protection against corruption, theft, etc.

Measures of SI

Openness (Sachs & Warner)

- Measures the **fraction of years** during which a country has been "open."
- A country is open if
 - **tariffs** are below 40%;
 - nontariff **barriers** cover less than 40% of imports;
 - **black market** premium is less than 20%;
 - country is not **communist**;
 - government does not **monopolize** major exports.

SI and Development

SI indicators are strongly correlated with indicators of development:

- schooling
- I/Y
- productivity (A).

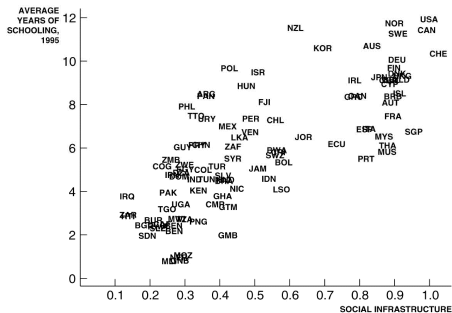
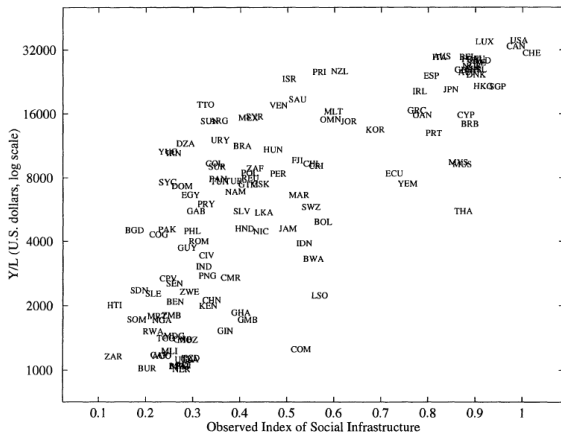


FIGURE 7.2 UNDERSTANDING DIFFERENCES IN SKILL ACCUMULATION

Economic Growth,
Copyright © 2004 W. W. Norton

SI and output per worker



The effect of SI on development

- How to estimate the **causal effect** of SI on development?
- **OLS approach:**
- Regress:

$$\ln Y/L_i = \beta_0 + \beta_1 S_i + \varepsilon_i \quad (1)$$

- What is the interpretation of β_1 ?

Instrumental Variables Approach

- IV is a common method for identifying causal effects.
- Idea:
 - OLS would work in experimental data.
 - Randomly assign S_i to the observations and run OLS.
 - The coefficient β_1 measures the causal effect of varying S on Y/L .
- Why does OLS work on experimental data?

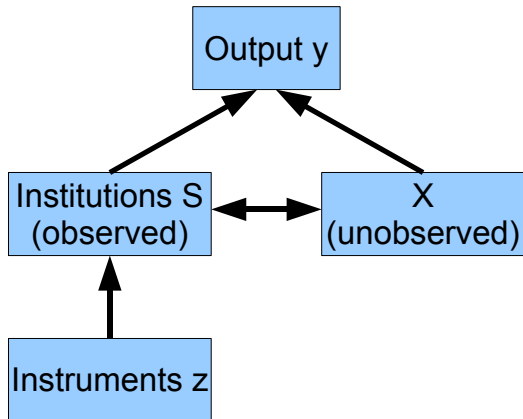
- The problem:
 - Some variation in S is correlated with omitted variables (V).
 - OLS mixes the effect of S and V .
- Example:
 - Regress wage on schooling.
 - Mixes the effects of schooling and ability on the wage.
- IV isolates variation in S that is not correlated with omitted variables.
- The it runs OLS on that variation in S only.

IV: The Mechanics

- Find variables (z_i) that affect S_i , but have no direct effect on y_i .
 - The z_i are called **instruments**.
- Regress S_i on z_i and get the predicted \hat{S}_i .
- Regress via OLS

$$\ln Y/L_i = \beta_0 + \beta_1 \hat{S}_i + \varepsilon_i \quad (2)$$

- Interpret the coefficient β_1 as the causal effect of S_i on y_i .



A model of instrumental variables

- Here is why (and when) IV works.
- The **true model** is

$$\ln y_i = \beta S_i + \gamma x_i + \varepsilon_i \quad (3)$$

- β is the parameter we are interested in: the causal effect of S_i on y_i .
- x_i is another variable affecting output
 - We don't know what it is / cannot measure it.
 - E.g., schooling, investment, ...
- ε_i is an error term.

The problem with OLS

- S_i is probably correlated with x_i .
 - Countries with better SI have more schooling, more investment, ...
- Now OLS suffers from **omitted variable bias**.
 - Some of the variation in S_i is correlated with x_i .
 - The OLS estimate $\hat{\beta}$ picks up a mixture of β and γ .

The IV solution

Run a 2 stage regression:

- 1 Regress S_i on z_i .
 - Estimate $\hat{\rho}$.
 - Calculate the predicted SI:

$$\hat{S}_i = \hat{\rho} z_i \quad (4)$$

- 2 Regress y_i on \hat{S}_i to estimate $\hat{\beta}$.

This yields a consistent estimate $\hat{\beta}$ if the instruments are not correlated with any omitted variables.

An IV example

- How much does one year of schooling raise wages?
- OLS approach: Regress wages (y_i) on schooling (S_i).
- The problem:
 - More able individuals (x_i) choose more schooling.
 - Higher wages are partly due to selection.
- The OLS $\hat{\beta}$ is a mixture of
 - β : the effect of schooling on wages
 - the effect of ability on wages.

An IV example

Instrumental variable approach

- Find a variable (z_i) that is correlated with schooling, but not directly with wages.
- Examples:
 - Date of birth, if mandatory schooling ends at a fixed age.
 - Distance to the nearest school.
- Stage 1 regression identifies variation of schooling due to date of birth (presumably not correlated with ability z_i).
- Stage 2 regression estimates correlation with this exogenous variation in S_i and y_i .
- Because \hat{S}_i is not correlated with ability, $\hat{\beta}$ is consistent.

Hall and Jones use:

- 1 Influence of Western Europe:
 - Distance from equator.
 - Extent to which European languages are spoken.
 - This measures the degree to which Europe imposed its institutions.
- 2 Predicted trade share from a "gravity model"
 - This depends only on population size and geography.

TABLE II
 BASIC RESULTS FOR OUTPUT PER WORKER
 $\log Y/L = \alpha + \beta \tilde{S} + \tilde{\epsilon}$

Specification	Social infrastructure	OverID test <i>p</i> -value test result	Coeff test <i>p</i> -value test result	$\hat{\sigma}_{\tilde{\epsilon}}$
1. Main specification	5.1432 (.508)	.256 Accept	.812 Accept	.840
<i>Alternative specifications to check robustness</i>				
2. Instruments: Distance, Frankel-Romer	4.998 (.567)	.208 Accept	.155 Accept	.821
3. No imputed data 79 countries	5.323 (.607)	.243 Accept	.905 Accept	.889
4. OLS	3.289 (.212)	—	.002 Reject	.700

Coefficients on S_i are always statistically significant.

What fraction of Y/L differences is due to SI?

- SI varies by 0.89:
 - from 0.11 (Zaire) to 1 (Switzerland).
- The IV coefficient is $\hat{\beta} = 5.14$.
- The implied output gap is

$$\exp(0.89 \cdot 5.14) = 97$$

- This is implausibly large.
- Likely reason: Measurement error overstates the true variation in SI.
- After adjusting for measurement error: SI accounts for output gaps between **25** and **38**.

- A large fraction of y differences is not due to factor accumulation (K, h) .
- TFP is highly correlated with measures of "social infrastructure."
- **IV** can be used to measure the fraction of output gaps that is due to SI.
 - This makes IV an important method (with important problems).
- If one believes the instruments, SI accounts for **nearly all** of cross-country variation in y .

Are the instruments valid?

Some of the instruments are clearly exogenous (geography).

- Reverse causality $y \rightarrow z$ is not an issue.

How about **omitted variables**?

- Most of the instruments are geography variables.
- The data are consistent with the following story:
 - For some reason (x_i) there is a geographic pattern of poverty.
 - y_i affects S_i .
- This works for any x_i that has a geographic pattern.

Some doubts about IV

IV always has this problem:

- Whether the instruments are valid is a matter of judgement.
- Only theory can tell what instruments are valid.

Fact

Even IV regressions by themselves do not say anything about causality. One needs a theory for that.

- We have good evidence suggesting that institutions are an important cause of poverty.
 - Colonies - the Reversal of Fortune
- We have suggestive evidence that institutions accounts for a large chunk of cross-country income variation.
- Bad institutions are hard to change.
 - It is difficult to compensate those who give up political power or monopoly rents.
 - Resistance to change.

- Jones, *Introduction to Economic Growth*, ch. 7.
- Romer, David (2005). *Advanced Macroeconomics*. 3rd ed., McGraw Hill, ch. 3.10.

Advanced Reading:

- Acemoglu, Daron; Simon Johnson; James Robinson (2004). "Institutions as the fundamental cause of long-run growth." *Handbook of Economic Growth*. [Download from Acemoglu's web page, best found through google.]
- Hall, Robert E.; Charles I. Jones (1999). "Why do some countries produce so much more output per worker than others?" *Quarterly Journal of Economics*, 114: 83-116.
- Jones, B. F., & Olken, B. A. (2005). Do leaders matter? National leadership and growth since world war II. *The Quarterly Journal of Economics*, 120(3), 835-864. doi:10.1093/qje/120.3.835