14.74 Foundations of Development Policy
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# 14.74 Colonial history, institutions and economic development

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The paper "The Colonial Origins of Comparative development: An Empirical Investigation," by Daron Acemoglu, Simon Johnson and James A. Robinson seeks to answer a very important question: do good institutions matter for development? Through the course, we have seen several channels where institutions should matter:

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This paper tries to answer a more "reduced form" question: without getting into all these details, if we give Zaire the same institutions as the US, how much richer would Zaire be?

## 1   The question and the identification problem

If we think of the quality of institution as our "treatment" (as in the quality of schooling), we are trying to measure the effect of the treatment on an outcome: $\log GDP$ of the country. Mathematically, we could write it in the following way:

$$\log y_i = \mu + \alpha Ri + X_i\gamma + \epsilon i$$

where:

$\log y_i = \log(GDP)$ of country $i$ in year 1995

$Ri$ = quality of institutions, measured by the "expropriation risk" which we discussed last time.

$X_i$= control variables (e.g. latitude)

If we run the OLS regression, corresponding to this regression, we find

$$\alpha = 0.52 \quad \text{standard error} \quad 0.06$$

Look at the graph $\rightarrow$ very strong correlation

- What does it indicate?

- What are the problems with this interpretation?

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    $\rightarrow$ All these problems create a correlation between $R_i$ and $\epsilon_i$ which biases OLS.

# 2  Using instrumental variables to solve the identification problem

We cannot randomly assign institutions! $\rightarrow$ look for a variable which *predicts current institutions* but *does not predict directly current GDP per capita.* Call this variable $Z$. How is $Z$ called?

Refresher: method to recover an unbiased estimate of $\alpha$ using $Z$:

1. Run the regression:
$$Ri = \lambda_R + \beta_R Z_i + X_i \gamma_R + V_{Ri}$$

    if $Z_i$ affects $R_i$, we expect $\beta_R$ to be significant (otherwise, this is not a good instrument!)

    What is the name of this regression?

    Form the variable:
$$\hat{R}_i = \hat{\lambda}_R + \hat{\beta}_R Z_i + X_i \hat{\gamma}_R$$

2. Run the regression:

$$\log(y_i) = \mu + \alpha \hat{R}_i + X_{i\gamma} + \epsilon_i$$

What is the name of this regression

Is $\hat{R}_i$ correlated with $\epsilon_i$?

To see this, replace $\hat{R}_i$:

$$\log(y_i) = \mu + \alpha[\hat{\lambda}_R + \hat{\beta}_R Z_i + X_i \hat{\gamma}_R] + X_i \gamma + \epsilon_i$$

By assumption,

- $Z_i$ and $\epsilon_i$ are not correlated.

- $X_i$ and $\epsilon_i$ are not correlated.

The main idea is that we are using *only the part of the variation in $R_i$* which is close to $Z_i$, and therefore is not correlated with the error term. The method is called *2 stage least squares* because we are running the regression in two stages (1 and 2).

Alternatively, we could run the *reduced form* equation

$$\log(y_i) = \eta_0 + \eta_1 Z_i + X_i \eta_2 + U_I$$

$\eta_0 =$

$\eta_1 =$

$\eta_2 =$

How can we obtain an estimate of $\alpha$ if we have only one instrument?

# 3 Using early settlers' mortality as an instrument for the quality of institutions

1. In former colonies, current institutions are better in places where early institutions were better.

2. In colonies, institutions were of better quality when European settlers decided to stay in the country and establish themselves there, instead of just using the country to make money.

   Examples of countries where Europeans settled:

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Examples of countries where Europeans did not settle but just set up an extractive state:

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3. The mortality of early settlers was an important determinant in the decision of Europeans to establish themselves in the place.

This is summarized in the following expressions:

$$\log y_i = \mu + \alpha R_i + X_{i\gamma} + \epsilon_i \tag{1}$$

$$R_i = \lambda_R + \beta_R C_i + X_i \gamma_R + V_{Ri} \tag{2}$$

$$C_i = \lambda_c + \beta_c S_i + X_i \gamma_c + V_{ci} \tag{3}$$

$$S_i = \lambda_s + \beta_s \log(M_i) + X_i \gamma_s + V_{si} \tag{4}$$

$\rightarrow$ use $\log(M_i)$ as an instrument for $R_i$ in equation (1).

We can also check the intermediate steps by using $\log(M_i)$ as an instrument for $S_i$ in equation (3), and $C_i$ in equation (2).

# 4 Data and results

– Data on early mortality, from a historian who used military records.

Main causes of death of bishops and soldiers (except war):

– Data on early institutions: constraints on executives in 1900. (goes from 1 to 10, with 10 being better)

– Data on number of Europeans in 1900.

- Data on current institutions.

<u>Results</u>

- $\beta_s =$

- $\beta_c =$ (using $\log(M_i)$ as an instrument)

- $\beta_R =$ (using $\log(M_i)$ as an instrument)

- <u>Table 4</u>: Main results

  * First stage:
  $$R_i = \lambda_R + \beta_R \log(M_i) + X_i \gamma_R + V_{iR}$$

  $$\beta_R =$$

  * Second stage equation

  $$\alpha =$$

- What are the potential problems with the strategy:

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Conclusion: if we gave Zaire the institutions of the US, Zaire would be 5 times richer!

# 5   A more specific look at the question: The impact of Colonial Institutions in India

Examines the long term impact of institutions in India. Most of India was colonized by the British, but they used different types of technology to collect land taxes (the major source of revenue for the British):

1. The landord, or *zamindari* system asked a landlord to collect taxes on behalf of the British (have you seen *Lagaan*?). Landlords could collect as much as they wanted and any extra was theirs to keep.

2. The individual responsibility, or *raiyatwari* system asked the farmers to arrange between themselves to collect the taxes. There also existed a village-based system quite similar.

There are many reasons why a system put in place during a colonial period may persist long after independence.

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The British's idea about what system was better evolved over time, so that different places in India who were colonized at different times have different institutions, even within current states.

See Map.

See Figure 4: dates of conquest determines in part time of governance: places colonized between 1820 and 1856 more likely to have a non-landlord system.

Still correlated with yield today!!

Can look at OLS (compare non-landlord/landlord area) and IV, using as instrument the date of conquest.

Conclusion: Even today, yields are higher in non-landlord districts. Very persistent effects of long-run institutions.