# Development economics

## Lecture 8: The role of culture and institutions in economic development (social capital)

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LMU, May 5, 2021

# Where are we on our path?

- Lectures
  1. Introduction
  2. Traditional growth models
  3. Modern (endogenous) growth models
  4. Taking stock on growth models and poverty traps
  5. Games in economic development
  6. Measuring poverty and inequality
  7. Group differences and discrimination
  8. **Culture, institutions, and the role of history**
  9. Health and nutrition
  10. Education
  11. The role of foreign aid
  12. Credit markets and microcredit
  13. Risk and insurance
  14. Behavioral development economics

## Role of institutions in economic development

Wealth differences reexamined: institutions

History, factor endowments, institutions, and wealth of nations

Slave trade, state capacity, culture, and wealth of nations

Culture, trust, and persistence of institutions

Understanding persistence of institutions

# Growth reexamined

- In previous lectures we have shown:
  - Huge differences in savings across rich and poor countries
  - Dramatic differences in investment in human capital across countries
  - Very low usage of efficient technologies in poor countries
  - Enormous differences in economic well-being within countries
- But we did not provide an ultimate answer to the question why the differences arise:
  - Why low savings?
  - Why low investment in education?
  - Why so little technology adoption?
  - Why persistent inequalities?
- Potentital causes: *Institutions*

# What are *institutions*?

- North (1990, p. 3): *"Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction."*
  - Recall: economics $\rightarrow$ people respond to incentives. Institutions help shape incentives.
- Distinguish between:
  - **Formal institutions**: codified rules (passed by governments, local administration)
  - **Informal institutions**: related to how formal institutions are used, social norms and their enforcement.

# Why we need institutions?

- Securing **property rights**:
  - Constraints on politicians, elites, and everyone to prevent expropriation of others' properties.
  - Properties: both **physical** (land, buildings, machines...), and **intellectual** (inventions, patents...)
- **Contract enforcement**:
  - What is written will actually be delivered.
  - **Important update**: Now I'm deducting half of the class to the left 20% of their final exam grades. What do you think about this?
- No exclusion of citizens from participation on the above.

# Why we need institutions?

- De Soto (2000, p. 15): *"Imagine a country nobody can identify who owns what, addresses cannot be easily verified, people cannot be made to pay their debts, resources cannot conveniently be turned into money, ownership cannot be divided into shares, descriptions of assets are not standardized and cannot be easily compared, and the rules that govern property vary from neighborhood to neighborhood or even street to street. You have just put yourself into life of developing country or a former communist nation."*
- *"This 80 percent majority is not [...] desperately impoverished. [...] When leaving the door of Nile Hilton, what you are leaving behind is not the high-technology world. [...] The people of Cairo have access to all these things. [...] What you are really leaving behind is the world of legally enforceable transactions on property rights."*

# Property rights and wealth

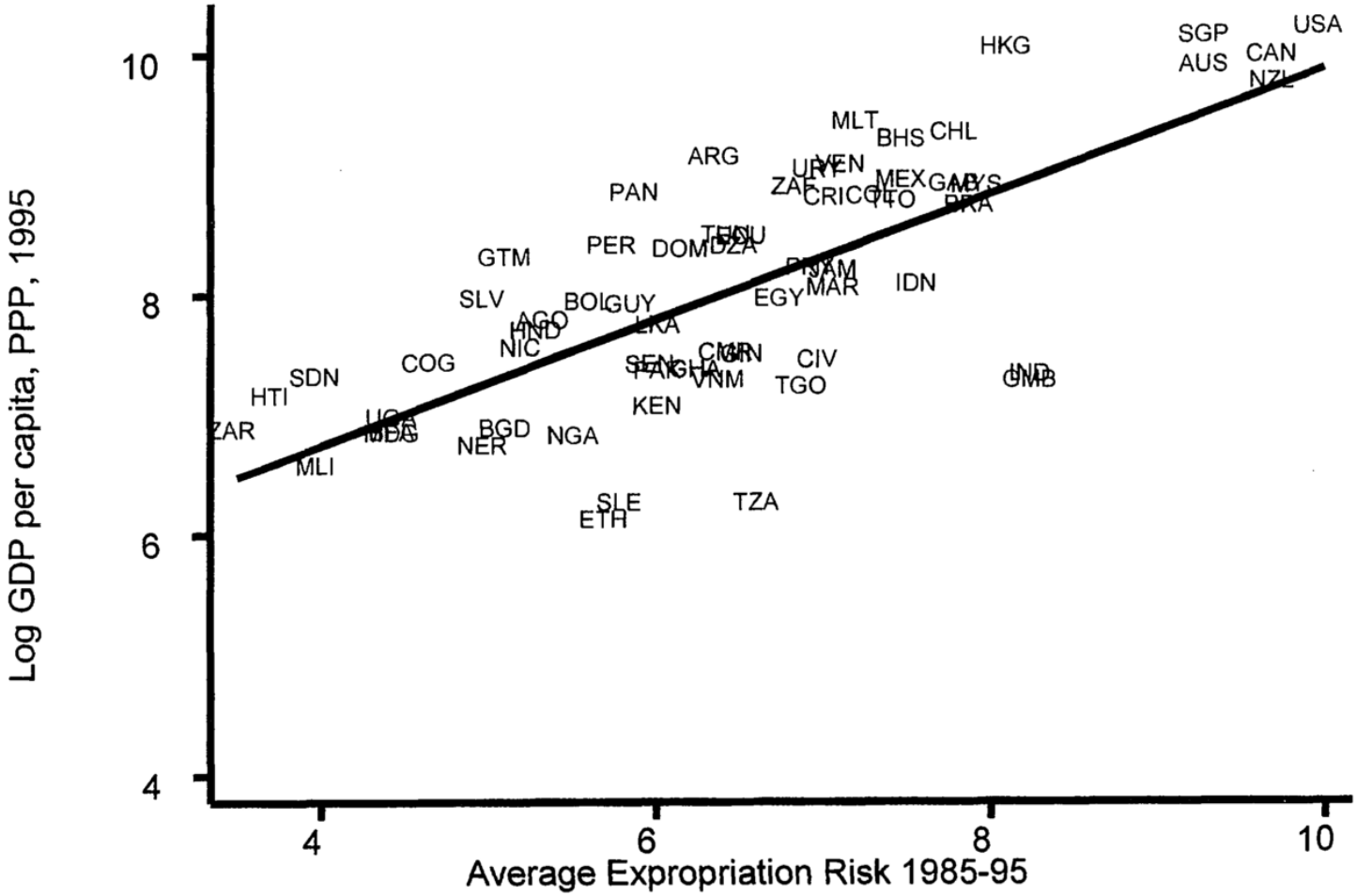
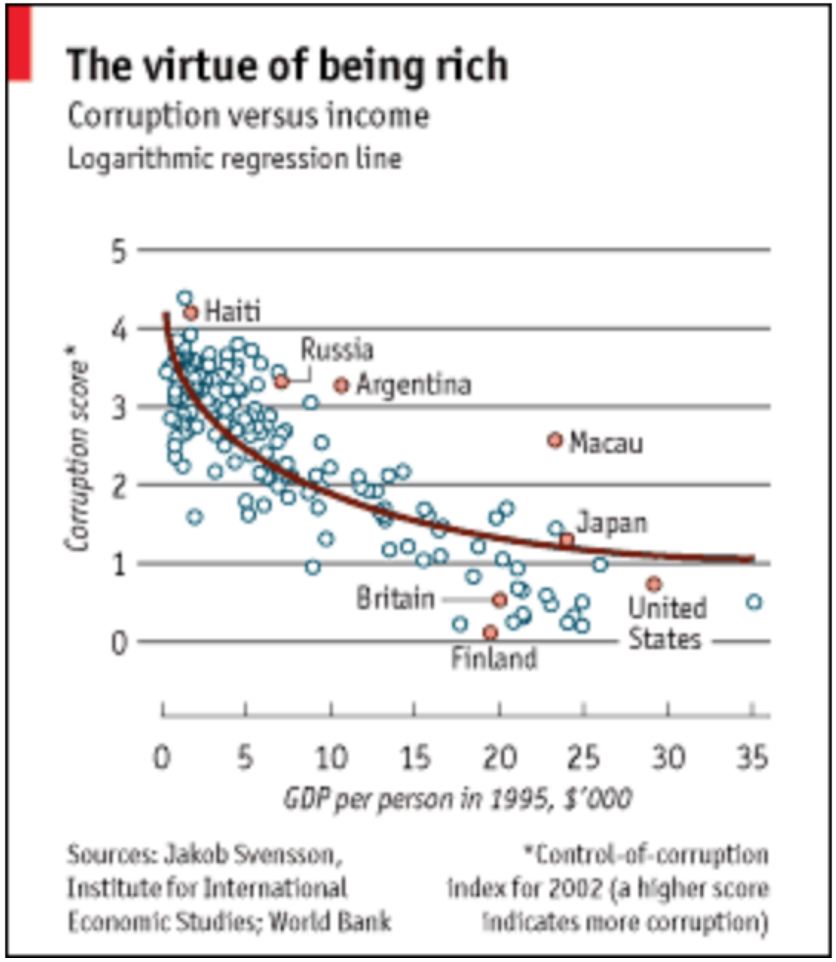



FIGURE 2. OLS RELATIONSHIP BETWEEN EXPROPRIATION RISK AND INCOME

Source: Acemoglu, Johnson, and Robinson (2001)

# Corruption and wealth




Source: The Economist (2006)

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# Hall and Jones (1999): Why Do Some Countries Produce So Much More Output Per Worker Than Others?

- Differences in per capita income across countries due to differences in *social infrastructure*?
- Model: Social infrastructure $\rightarrow$ Inputs and productivity $\rightarrow$ Per capita outcome
  - Note: focus on wealth levels, not growth!
- When social infrastructure missing:
  - Private diversion (mafia, robberies)
  - Government diversion (expropriation, confiscatory taxation, corruption)
- Extreme cases: Niger vs. USA — social infrastructure able to explain the 35x difference between per capita incomes

# Hall and Jones (1999): Why Do Some Countries Produce So Much More Output Per Worker Than Others?

- Production function:

$$Y_i = K_i^{\alpha}(A_i H_i)^{1-\alpha}$$

  - $K_i \ldots$ capital stock
  - $A_i \ldots$ labor-augmenting productivity
  - $H_i \ldots$ human capital stock

- where $H_i = e^{\theta(E_i)} L_i$
  - $\theta(E_i) \ldots$ returns to education as in Mincer (1974)

# Hall and Jones (1999):

- Production function:

$$Y_i = K_i^{\alpha}(A_i H_i)^{1-\alpha}$$

- To decompose causes of wealth econometrically do:

$$Y_i^{\frac{1}{1-\alpha}} = \left[K_i^{\alpha}(A_i H_i)^{1-\alpha}\right]^{\frac{1}{1-\alpha}}$$

$$Y_i^{\frac{1-\alpha}{1-\alpha}} \times Y_i^{\frac{\alpha}{1-\alpha}} = K_i^{\frac{\alpha}{1-\alpha}} A_i H_i$$

$$Y_i = \left(\frac{K_i}{Y_i}\right)^{\frac{\alpha}{1-\alpha}} A_i H_i$$

- Now rearrange to per capita ($L_I$) as follows:

$$y_i = \left(\frac{K_i}{Y_i}\right)^{\frac{\alpha}{1-\alpha}} h_i A_i$$

# Hall and Jones (1999):

$$y_i = \left(\frac{K_i}{Y_i}\right)^{\frac{\alpha}{1-\alpha}} h_i A_i$$

- Can be decomposed into:
  - differences in capital-output ratios
  - differences in average human capital
  - differences in productivity
- Productivity can be calculated as:

$$log(A_i) = log(y_i) - \frac{\alpha}{1-\alpha} log\left(\frac{K_i}{Y_i}\right) - log(h_i)$$

# Hall and Jones (1999): Decomposing wealth

TABLE I
PRODUCTIVITY CALCULATIONS: RATIOS TO U. S. VALUES

| Country | $Y/L$ | Contribution from $(K/Y)^{\alpha/(1-\alpha)}$ | Contribution from $H/L$ | Contribution from $A$ |
|---|---|---|---|---|
| United States | 1.000 | 1.000 | 1.000 | 1.000 |
| Canada | 0.941 | 1.002 | 0.908 | 1.034 |
| Italy | 0.834 | 1.063 | 0.650 | 1.207 |
| West Germany | 0.818 | 1.118 | 0.802 | 0.912 |
| France | 0.818 | 1.091 | 0.666 | 1.126 |
| United Kingdom | 0.727 | 0.891 | 0.808 | 1.011 |
| Hong Kong | 0.608 | 0.741 | 0.735 | 1.115 |
| Singapore | 0.606 | 1.031 | 0.545 | 1.078 |
| Japan | 0.587 | 1.119 | 0.797 | 0.658 |
| Mexico | 0.433 | 0.868 | 0.538 | 0.926 |
| Argentina | 0.418 | 0.953 | 0.676 | 0.648 |
| U.S.S.R. | 0.417 | 1.231 | 0.724 | 0.468 |
| India | 0.086 | 0.709 | 0.454 | 0.267 |
| China | 0.060 | 0.891 | 0.632 | 0.106 |
| Kenya | 0.056 | 0.747 | 0.457 | 0.165 |
| Zaire | 0.033 | 0.499 | 0.408 | 0.160 |
| Average, 127 countries: | 0.296 | 0.853 | 0.565 | 0.516 |
| Standard deviation: | 0.268 | 0.234 | 0.168 | 0.325 |
| Correlation with $Y/L$ (logs) | 1.000 | 0.624 | 0.798 | 0.889 |
| Correlation with $A$ (logs) | 0.889 | 0.248 | 0.522 | 1.000 |

The elements of this table are the empirical counterparts to the components of equation (3), all measured as ratios to the U. S. values. That is, the first column of data is the product of the other three columns.

Source: Hall and

# Hall and Jones (1999): Productivity and wealth

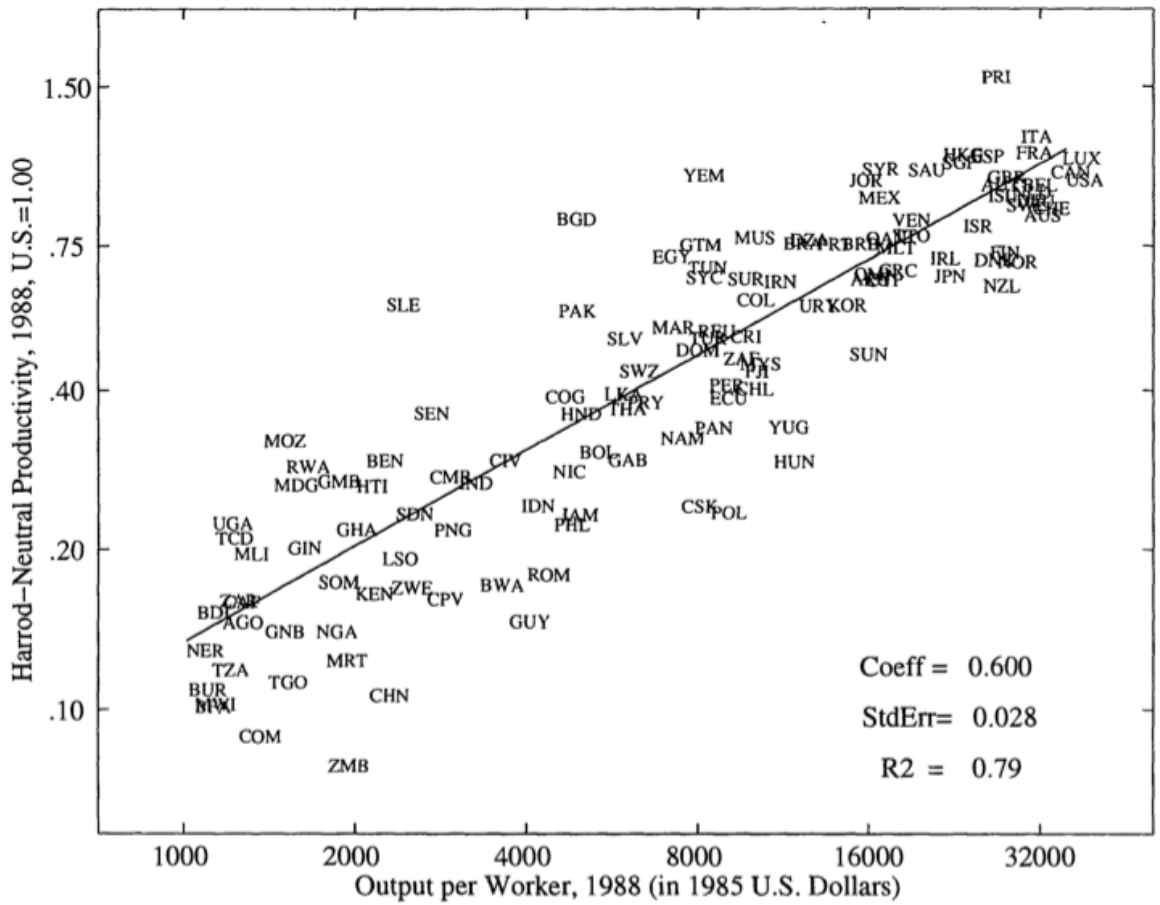


FIGURE I
Productivity and Output per Worker

Source: Hall and Jones (1999)

# Hall and Jones (1999): Social infrastructure

- But: **Why** do capital and productivity differ across countries?
  - Productive activities vulnerable to predation (need for protection and/or lower investment in otherwise profitable activities because of insecurity; diversion as a tax)

- Measuring social infrastructure: $S_i = \frac{GADP_i + IT_i}{2}$
  1. Index of government antidiversion policies (GADP): combines (i) law and order, (ii) bureaucratic quality, (iii) corruption, (iv) risk of expropriation, (v) government repudiation of contracts
  2. Openness to international trade (tariffs and quotas as opportunities for diversion)
     - 2.1 Sachs-Warner index: how many years between 1950-1994 a country open: (i) non-tariff barriers cover less than 40% of trade, (ii) average tariff rates less than 40%, (iii) black mkt premium less than 20%, (iv) non-socialist country, (v) no government monopoly on major exports.

# Hall and Jones (1999): Social infrastructure

- Original model: Social infrastructure $\rightarrow$ Inputs and productivity $\rightarrow$ Per capita outcome

$$log(y_i) = \alpha + \beta S_i + \varepsilon_i$$

  - Note: use restricted model with forced same coefficient for both measures of social infrastructure

# Hall and Jones (1999): Social infrastructure and wealth

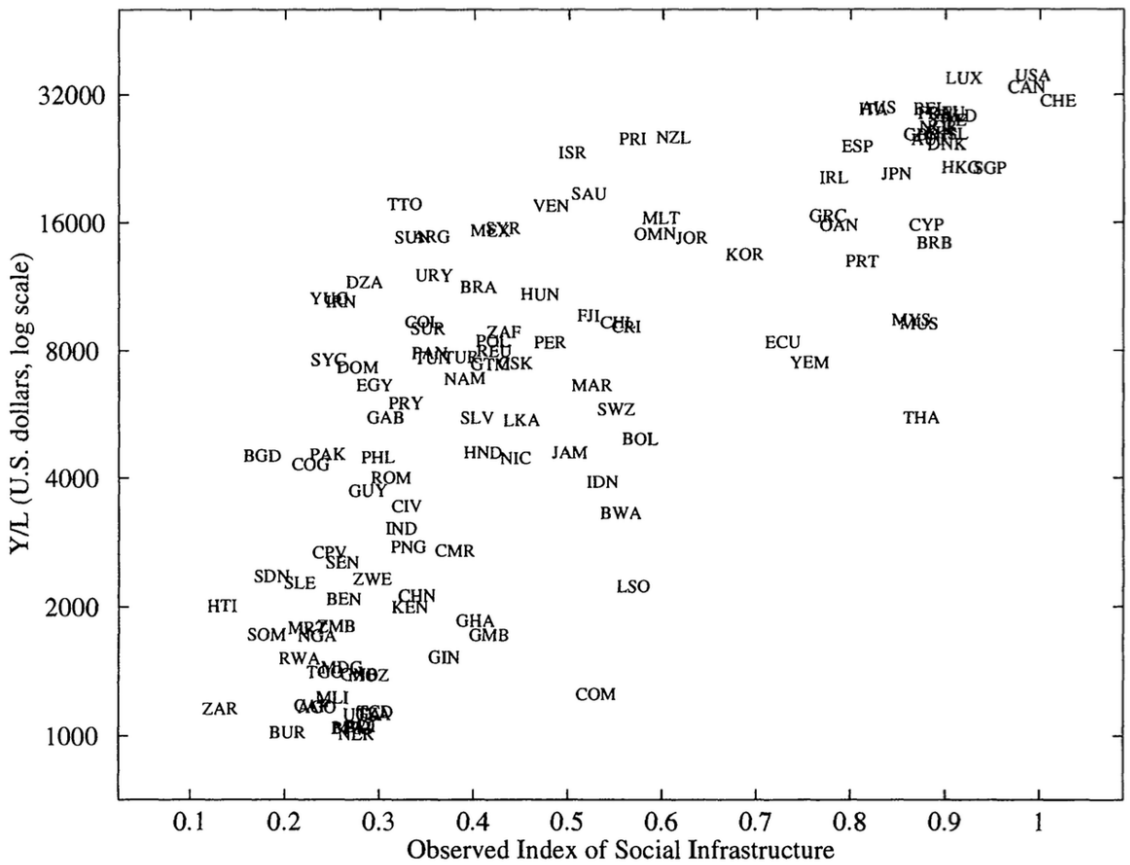


FIGURE II
Social Infrastructure and Output per Worker

Source: Hall and Jones (1999)

# Hall and Jones (1999): Identification?

- But what if: Per capita outcome $\rightarrow$ Social infrastructure (i.e. endogeneity of social infrastructure)

$$S_i = \gamma + \delta log(y_i) + X\theta + u_i$$

  - Q: Why might social infrastructure be endogenous?
- Solution: **Instrumental variables**

# Hall and Jones (1999): Instruments

- Instruments used:
  - **Distance from the equator** — Europeans settled permanently in areas with similar climate (references to working paper resulting in Sokolof and Engerman, 2000; plus see Acemoglu, Johnson and Robinson, 2001)
  - Which **languages are spoken as first languages** (English, French, Spanish, Portuguese, German) — colonising countries set up different institutions (extractive vs. inclusive)

# Hall and Jones (1999): First stage

TABLE III
REDUCED-FORM REGRESSIONS

| Regressors | Dependent variables: Social infrastructure | Dependent variables: Log (output per worker) |
|---|---|---|
| Distance from the equator, (0,1) scale | 0.708 | 3.668 |
| | (.110) | (.337) |
| Log of Frankel-Romer predicted trade share | 0.058 | 0.185 |
| | (.031) | (.081) |
| Fraction of population speaking English | 0.118 | 0.190 |
| | (.076) | (.298) |
| Fraction of population speaking a European language | 0.130 | 0.995 |
| | (.050) | (.181) |
| $R^2$ | .41 | .60 |

N = 127. Standard errors are computed using a bootstrap method, as described in the text. A constant term is included but not reported.

# Hall and Jones (1999): Results

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

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

The coefficient on Social infrastructure reflects the change in log output per worker associated with a one-unit increase in measured social infrastructure. For example, the coefficient of 5.14 means than a difference of .01 in our measure of social infrastructure is associated with a 5.14 percent difference in output per worker. Standard errors are computed using a bootstrap method, as described in the text. The main specification uses distance from the equator, the Frankel-Romer instrument, the fraction of the population speaking English at birth, and the fraction of the population speaking a Western European language at birth as instruments. The OverID test column reports the result of testing the overidentifying restrictions, and the Coeff test reports the result of testing for the equality of the coefficients on the *GADP* policy index variable and the openness variable. The standard deviation of $\log Y/L$ is 1.078.

Source: Hall and Jones (1999)

- For OLS: 0.01 increase in $S_i$ is associated with an increase in per capita output of 3.29 percent
- For 2SLS: 0.01 increase in $S_i$ is associated with an increase in per capita output of 5.14 percent

# Hall and Jones (1999): Results by component

TABLE IV
RESULTS FOR $\log K/Y$, $\log H/L$, and $\log A$
$Component = \alpha + \beta\tilde{S} + \tilde{\epsilon}$

| | Dependent variable | | |
|---|---|---|---|
| | $\frac{\alpha}{1-\alpha}\log K/Y$ | $\log H/L$ | $\log A$ |
| Social infrastructure | 1.052 | 1.343 | 2.746 |
| | (.164) | (.171) | (.336) |
| OverID test ($p$) | .784 | .034 | .151 |
| Test result | Accept | Reject | Accept |
| $\hat{\sigma}_{\tilde{\epsilon}}$ | .310 | .243 | .596 |
| $\hat{\sigma}_{\text{Depvar}}$ | .320 | .290 | .727 |

Estimation is carried out as in the main specification in Table II. Standard errors are computed using a bootstrap method, as described in the text.

TABLE V
FACTORS OF VARIATION: MAXIMUM/MINIMUM

| | $Y/L$ | $(K/Y)^{\alpha/(1-\alpha)}$ | $H/L$ | $A$ |
|---|---|---|---|---|
| Observed factor of variation | 35.1 | 4.5 | 3.1 | 19.9 |
| Ratio, 5 richest to 5 poorest countries | 31.7 | 1.8 | 2.2 | 8.3 |
| Predicted variation, only measurement error | 38.4 | 2.1 | 2.6 | 7.0 |
| Predicted variation, assuming $r^2_{\tilde{S},S} = .5$ | 25.2 | 1.9 | 2.3 | 5.6 |

The first two rows report actual factors of variation in the data, first for the separate components and then for the geometric average of the five richest and five poorest countries (sorted according to $Y/L$). The last two rows report predicted factors of variation based on the estimated range of variation of true social infrastructure. Specifically, these last two rows report $\exp(r\hat{\beta}_{IV}(\tilde{S}_{\max} - \tilde{S}_{\min}))$, first with $r = .800$ and second with $r^2 = .5$.

# Hall and Jones (1999): Summary

- Large variation in output per worker across countries only partially explained by differences in physical capital and educational attainment; large unexplained residual
- Social infrastructure $\Rightarrow$ large differences in capital accumulation, educational attainment, and productivity; and hence income
- Social infrastructure adoption partially related to historical influence of Western Europe (see next)

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# Sokoloff and Engerman (2000)

- But why do countries have different levels of social infrastructure (or social capital)?
- US and Canada now among richest countries in the world. Central and South America rather considered a laggard.
- But from a historical perspective we would foresee a different story:
  - Voltaire: French and British fighting over North America during Seven Years' War (1756-63): madness, this "fighting over a few acres of snow."
  - After British won, repatriation considerations: should we take the island of Guadeloupe or Canada?
  - 1700: Caribbean richest (regardless of country of origin of colonization), Mexico on par with the US
- Being rich does not always produce good institutions (recall the correlation graph at the beginning).
  - What (might have) happened?

# Sokoloff and Engerman (2000): Reversal of fortunes

*Table 1*

**The Record of Gross Domestic Product per Capita in Selected New World Economies, 1700–1997**

| | *GDP per capita relative to the U.S.* | | | |
|---|---|---|---|---|
| | *1700* | *1800* | *1900* | *1997* |
| Argentina | — | 102 | 52 | 35 |
| Barbados | 150 | — | — | 51 |
| Brazil | — | 50 | 10 | 22 |
| Chile | — | 46 | 38 | 42 |
| Cuba | 167 | 112 | — | — |
| Mexico | 89 | 50 | 35 | 28 |
| Peru | — | 41 | 20 | 15 |
| Canada | — | — | 67 | 76 |
| United States (GDP p.c. in 1985$) | 550 | 807 | 3,859 | 20,230 |

*Notes and Sources:* The relative GDP per capita figures for Latin American countries come primarily from Coatsworth (1998). Coatsworth relied extensively on Maddison (1994), and we draw our estimates for Canada and the United States in 1800 and 1900 from the same source (using linear interpolation to obtain the 1900 figures from 1890 and 1913 estimates). The GDP per capita estimates for Barbados in 1700 are from Eltis (1995). The 1997 figures are based on the estimates of GDP with purchasing power parity adjustments in World Bank (1999). Since there was no adjustment factor reported for Barbados in that year, we used that for Jamaica in our calculations. The 1700 figure for the United States was obtained from Gallman (2000), by projecting backward the same rate of growth that Gallman estimated between 1774 and 1800. Maddison (1991) has published alternative sets of estimates, which yield somewhat different growth paths (especially for Argentina) during the late nineteenth and early twentieth centuries, and he has a more positive assessment of Brazilian economic performance during the early nineteenth century than does Coatsworth, but the qualitative implications of the different estimates are essentially the same for our purposes.

Source: Sokoloff and Engerman (2000)

# Sokoloff and Engerman (2000): Factor endowments

- Factor endowments at critical points of history (colonization) lead to differences in distribution of political power
- Three types of countries:
  1. Large-scale staple crop producers (e.g., Barbados, Cuba, Jamaica, Brazil)
  2. Mineral extractors (e.g., Mexico, Peru)
  3. Basic agricultural production (US, Canada)
- (1) and (2) needed lots of manual labor: either through import of slave labor (1) or through enslaving domestic population where there was plenty (2).
  - Legally codified inequality intrinsic to slavery created inequalities in political rights and institutional setting shaping the development centuries later.
  - Reason: value of keeping power too large to give up in unequal societies + more likely to crush dissent (Compare to situations of more equal countries.)

# Sokoloff and Engerman (2000): : Franchise 1840-80

**Laws Governing the Franchise and the Extent of Voting in Selected American Countries, 1840–1940**

| | | *Lack of Secrecy In Balloting* | *Wealth Requirement* | *Literacy Requirement* | *Proportion of the Population Voting* |
|---|---|---|---|---|---|
| | | | *1840–80* | | |
| Chile | 1869 | Y | Y | Y | 1.6% |
| Costa Rica | 1890 | Y | Y | Y | — |
| Ecuador | 1856 | Y | Y | Y | 0.1 |
| Mexico | 1840 | Y | Y | Y | — |
| Peru | 1875 | Y | Y | Y | — |
| Uruguay | 1880 | Y | Y | Y | — |
| Venezuela | 1880 | Y | Y | Y | — |
| Canada | 1867 | Y | Y | N | 7.7 |
| | 1878 | N | Y | N | 12.9 |
| United States | 1850[a] | N | N | N | 12.9 |
| | 1880 | N | N | N | 18.3 |

Source: Sokoloff and Engerman (2000)

# Sokoloff and Engerman (2000): Franchise 1921-40

| | | *Lack of Secrecy In Balloting* | *Wealth Requirement* | *Literacy Requirement* | *Proportion of the Population Voting* |
|---|---|---|---|---|---|
| | | | *1921–40* | | |
| Argentina | 1937 | N | N | N | 15.0 |
| Bolivia | 1951 | — | Y | Y | 4.1 |
| Brazil | 1930 | Y | Y | Y | 5.7 |
| Colombia | 1930 | N | N | N | 11.1 |
| Chile | 1931 | Y | N | Y | 6.5 |
| Costa Rica | 1940 | N | N | N | 17.6 |
| Ecuador | 1940 | N | N | Y | 3.3 |
| Mexico | 1940 | N | N | N | 11.8 |
| Peru | 1940 | N | N | Y | — |
| Uruguay | 1940 | N | N | N | 19.7 |
| Venezuela | 1940 | N | Y | Y | — |
| Canada | 1940 | N | N | N | 41.1 |
| United States | 1940 | N | N | Y | 37.8 |

Source: Sokoloff and Engerman (2000)

# Sokoloff and Engerman (2000): Summary

- Lower inequalities $\rightarrow$ institutions of public schools promoting literacy (schools) $\rightarrow$ human capital $\uparrow$ $\rightarrow$ growth
  - US most literate population in the world by 1800
  - Between 1825 and 1850, nearly every state in the American west or north had free schools open to all children, paid from taxes.
  - Latin American countries more than 75 years behind the US
- Differences in inequality in wealth, human capital, and political power initially rooted in the factor endowments persisted over time. Preserved by institutions, affecting growth.

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# Role of history in shaping institutions

- Now on slave trade from the other side of the ocean.
  - Further evidence on historical "experiments" predisposing countries to have worse institutions.
- One explanation for Africa's underdevelopment is its history of extraction, characterised by two events: the slave trades and colonialism.
  - On colonialism in Acemoglu, Johnson, and Robinson (2001).

# Nunn (2008): The long-term effects of Africa's slave trades

- Q: Does the intensity of slave trade predict wealth of African countries centuries later?
- Manning (1990, p. 124): *"Slavery was corruption: it involved theft, bribery, and exercise of brute force as well as ruses. Slavery thus may be seen as one source of precolonial origins for modern corruption."*
- **Data:** number of slaves exported from each country in Africa in each century between 1400 and 1900 by combining data from ship records on the number of slaves shipped from each African port or region with data from a variety of historical documents that report the ethnic identities of slaves that were shipped from Africa.

# Nunn (2008): The long-term effects of Africa's slave trades

TABLE II
ESTIMATED TOTAL SLAVE EXPORTS BETWEEN 1400 AND 1900 BY COUNTRY

| Isocode | Country name | Trans-Atlantic | Indian Ocean | Trans-Saharan | Red Sea | All slave trades |
|---|---|---|---|---|---|---|
| AGO | Angola | 3,607,020 | 0 | 0 | 0 | 3,607,020 |
| NGA | Nigeria | 1,406,728 | 0 | 555,796 | 59,337 | 2,021,859 |
| GHA | Ghana | 1,614,793 | 0 | 0 | 0 | 1,614,793 |
| ETH | Ethiopia | 0 | 200 | 813,899 | 633,357 | 1,447,455 |
| SDN | Sudan | 615 | 174 | 408,261 | 454,913 | 863,962 |
| MLI | Mali | 331,748 | 0 | 509,950 | 0 | 841,697 |
| ZAR | Democratic Republic of Congo | 759,468 | 7,047 | 0 | 0 | 766,515 |
| MOZ | Mozambique | 382,378 | 243,484 | 0 | 0 | 625,862 |
| TZA | Tanzania | 10,834 | 523,992 | 0 | 0 | 534,826 |
| TCD | Chad | 823 | 0 | 409,368 | 118,673 | 528,862 |
| BEN | Benin | 456,583 | 0 | 0 | 0 | 456,583 |
| SEN | Senegal | 278,195 | 0 | 98,731 | 0 | 376,926 |
| GIN | Guinea | 350,149 | 0 | 0 | 0 | 350,149 |
| TGO | Togo | 289,634 | 0 | 0 | 0 | 289,634 |
| GNB | Guinea-Bissau | 180,752 | 0 | 0 | 0 | 180,752 |
| BFA | Burkina Faso | 167,201 | 0 | 0 | 0 | 167,201 |
| MRT | Mauritania | 417 | 0 | 164,017 | 0 | 164,434 |

Source: Nunn (2008)

# Nunn (2008): The long-term effects of Africa's slave trades

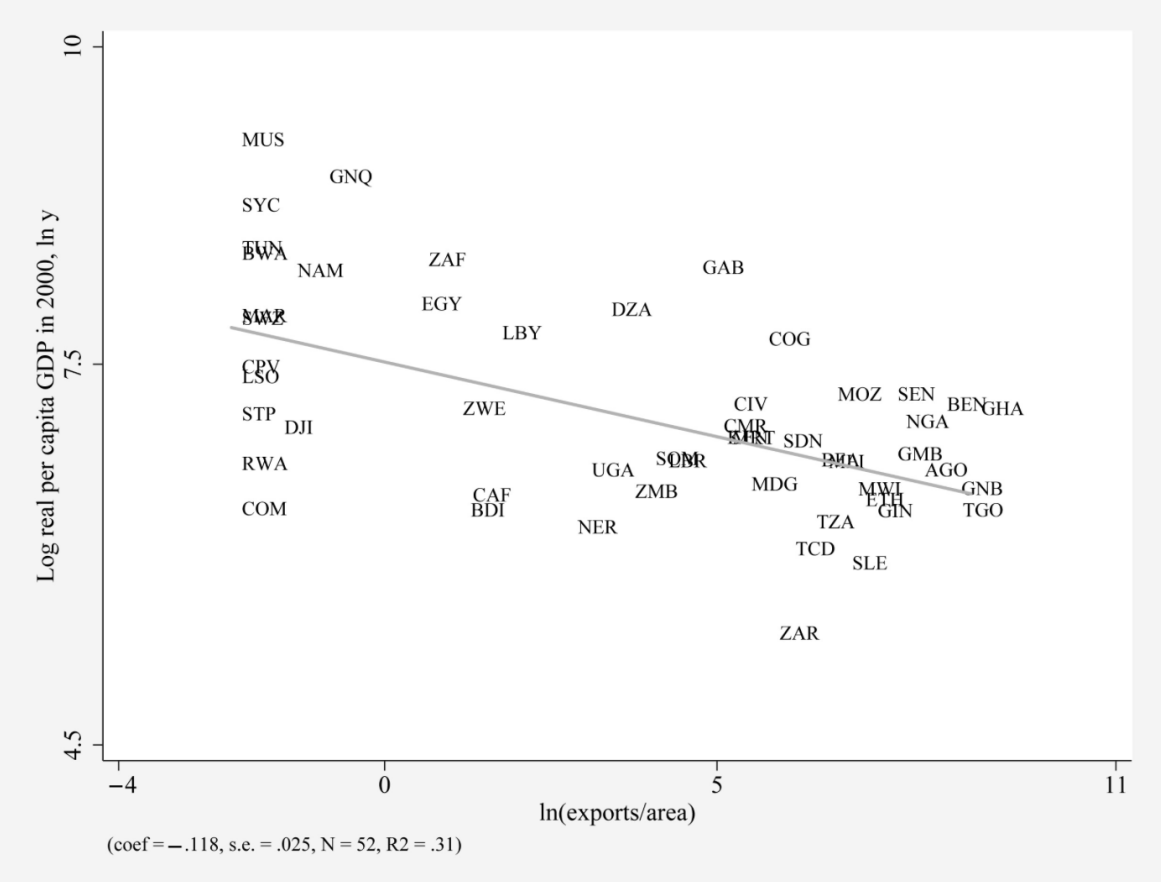



FIGURE III
Relationship between Log Slave Exports Normalized by Land Area, ln(exports/area), and Log Real Per Capita GDP in 2000, ln $y$

Source: Nunn (2008)

# Nunn (2008): The long-term effects of Africa's slave trades

TABLE III
RELATIONSHIP BETWEEN SLAVE EXPORTS AND INCOME

| | Dependent variable is log real per capita GDP in 2000, ln $y$ | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ln(exports/area) | −0.112*** | −0.076*** | −0.108*** | −0.085** | −0.103*** | −0.128*** |
| | (0.024) | (0.029) | (0.037) | (0.035) | (0.034) | (0.034) |
| Distance from equator | | 0.016 | −0.005 | 0.019 | 0.023 | 0.006 |
| | | (0.017) | (0.020) | (0.018) | (0.017) | (0.017) |
| Longitude | | 0.001 | −0.007 | −0.004 | −0.004 | −0.009 |
| | | (0.005) | (0.006) | (0.006) | (0.005) | (0.006) |
| Lowest monthly rainfall | | −0.001 | 0.008 | 0.0001 | −0.001 | −0.002 |
| | | (0.007) | (0.008) | (0.007) | (0.006) | (0.008) |
| Avg max humidity | | 0.009 | 0.008 | 0.009 | 0.015 | 0.013 |
| | | (0.012) | (0.012) | (0.012) | (0.011) | (0.010) |
| Avg min temperature | | −0.019 | −0.039 | −0.005 | −0.015 | −0.037 |
| | | (0.028) | (0.028) | (0.027) | (0.026) | (0.025) |
| ln(coastline/area) | | 0.085** | 0.092** | 0.095** | 0.082** | 0.083** |
| | | (0.039) | (0.042) | (0.042) | (0.040) | (0.037) |
| Island indicator | | | | −0.398 | −0.150 | |
| | | | | (0.529) | (0.516) | |
| Percent Islamic | | | | −0.008*** | −0.006* | −0.003 |
| | | | | (0.003) | (0.003) | (0.003) |
| French legal origin | | | | 0.755 | 0.643 | −0.141 |
| | | | | (0.503) | (0.470) | (0.734) |
| North Africa indicator | | | | 0.382 | −0.304 | |
| | | | | (0.484) | (0.517) | |
| ln(gold prod/pop) | | | | | 0.011 | 0.014 |
| | | | | | (0.017) | (0.015) |
| ln(oil prod/pop) | | | | | 0.078*** | 0.088*** |
| | | | | | (0.027) | (0.025) |
| ln(diamond prod/pop) | | | | | −0.039 | −0.048 |
| | | | | | (0.043) | (0.041) |
| Colonizer fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Number obs. | 52 | 52 | 42 | 52 | 52 | 42 |
| $R^2$ | .51 | .60 | .63 | .71 | .77 | .80 |

# Nunn (2008): The long-term effects of Africa's slave trades

- So far: OLS estimates shows a relationship between slave exports and current economic performance.
- But: What if societies that were initially underdeveloped selected into the slave trades, and these societies continue to be underdeveloped today? What to do?

# Nunn (2008): The long-term effects of Africa's slave trades

- **Historical evidence on selection during slave trade**
  - *"Only societies with institutions that were sufficiently developed were able to facilitate trade with the Europeans."* (Nunn, 2008, p. 157)
  - More prosperous areas also the most densely populated. Population density as a proxy for wealth (Acemoglu, Johnson, and Robinson, 2002)
  - Most prosperous countries in 1400 most impacted by slave trades $\rightarrow$

# Nunn (2008): The long-term effects of Africa's slave trades

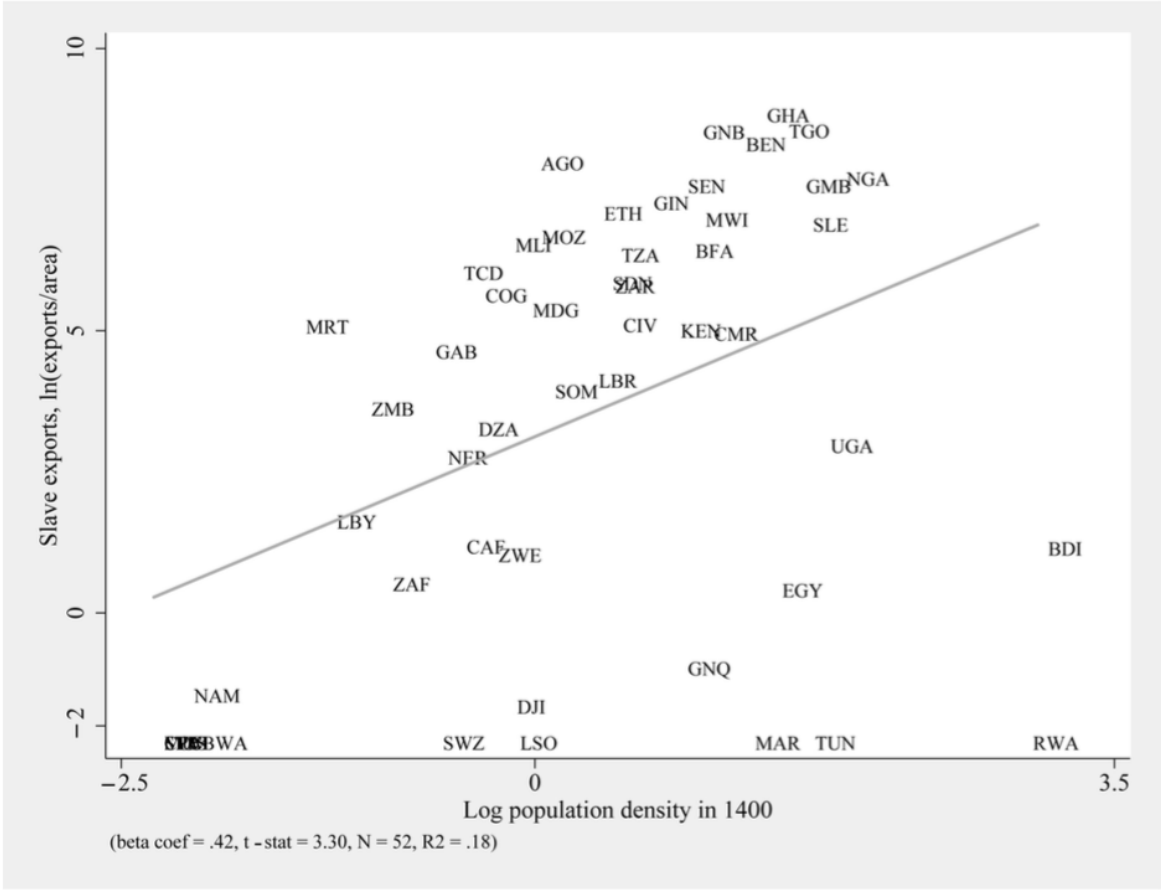



FIGURE IV
Relationship between Initial Population Density and Slave Exports

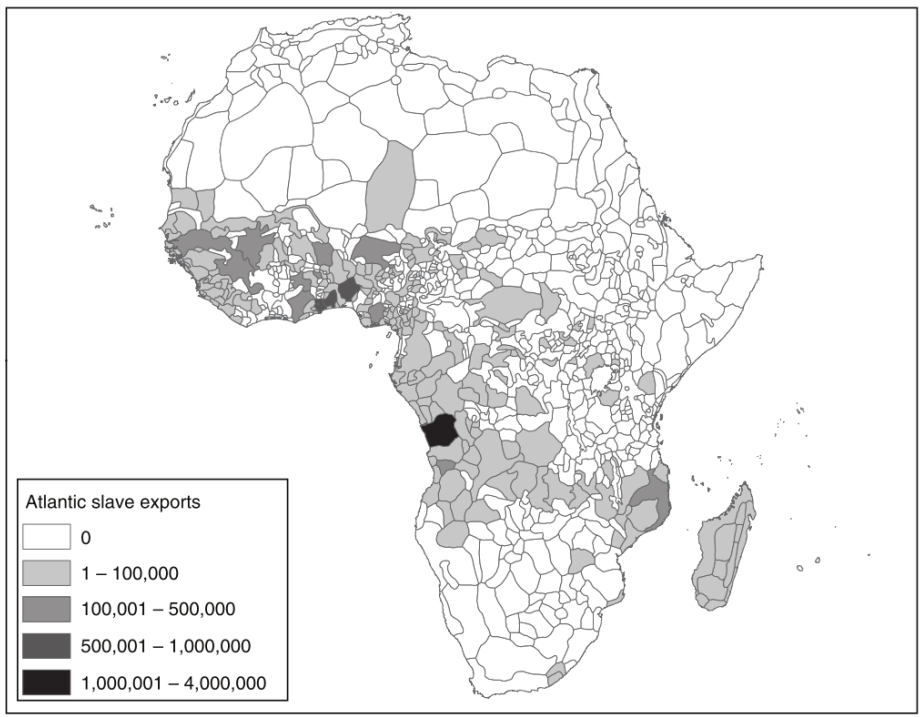
Source: Nunn (2008)

# Nunn (2008): The long-term effects of Africa's slave trades

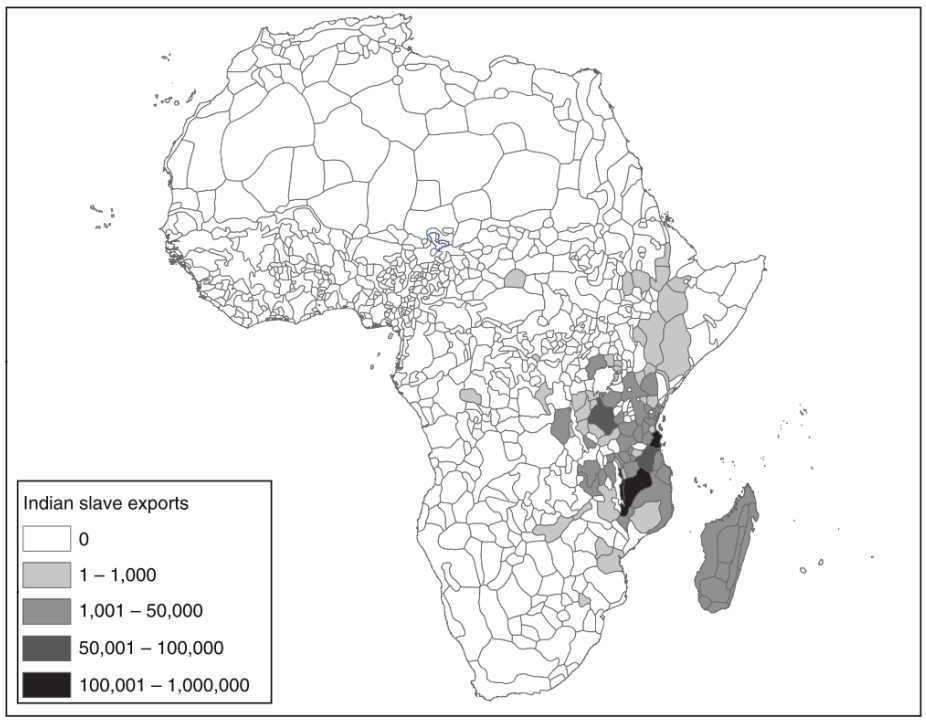
- **Instruments for slave trade:** *"location of demand that influenced the location of supply and not vice versa"* (Nunn, 2008, p. 160)
  1. Sailing distance from main importing places across Atlantic ocean (Virginia, USA; Havana, Cuba; Haiti; Kingston, Jamaica; Dominica; Martinique; Guyana; Salvador, Brazil; and Rio de Janeiro, Brazil)
  2. The sailing distance from the point on the coast to the closest of the two major slave destinations of the Indian Ocean slave trade (Mauritius and Muscat, Oman)
  3. Overland distance from a closest port of export for the trans-Saharan slave trade (Algiers, Tunis, Tripoli, Benghazi, and Cairo).
  4. Overland distance from the closest port of export for the Red Sea slave trade (Massawa, Suakin, and Djibouti).
- Minimum distance used (average and median give similar results).

# Nunn (2008): The long-term effects of Africa's slave trades

Panel A. Transatlantic slave trade




Panel B. Indian Ocean slave trade




Source: Nunn and Watchkenson (2011)

# Nunn (2008): The long-term effects of Africa's slave trades

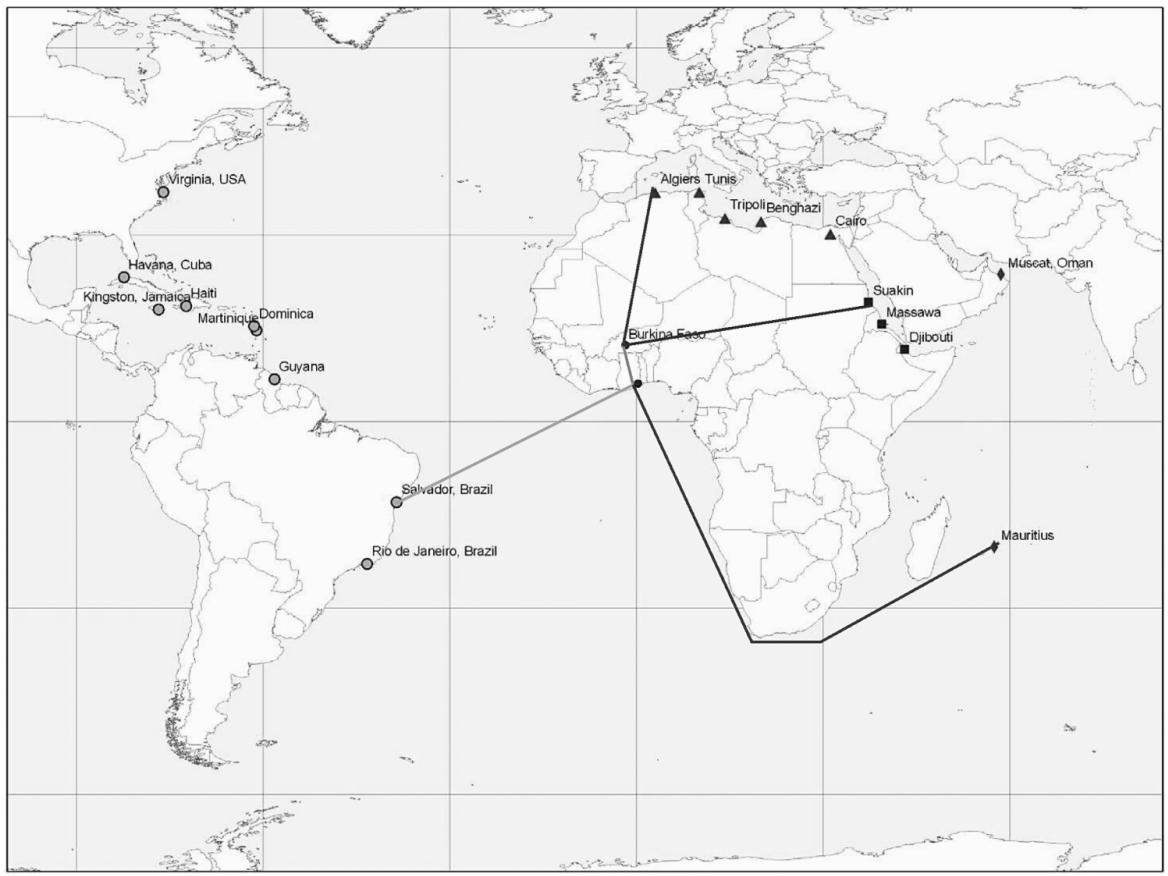



FIGURE V
Example Showing the Distance Instruments for Burkina Faso

Source: Nunn (2008)

# Nunn (2008): The long-term effects of Africa's slave trades

First Stage. Dependent variable is slave exports, ln(exports/area)

| | | | | |
|---|---|---|---|---|
| Atlantic distance | −1.31*** | −1.74*** | −1.32* | −1.69** |
| | (0.357) | (0.425) | (0.761) | (0.680) |
| Indian distance | −1.10*** | −1.43*** | −1.08 | −1.57* |
| | (0.380) | (0.531) | (0.697) | (0.801) |
| Saharan distance | −2.43*** | −3.00*** | −1.14 | −4.08** |
| | (0.823) | (1.05) | (1.59) | (1.55) |
| Red Sea distance | −0.002 | −0.152 | −1.22 | 2.13 |
| | (0.710) | (0.813) | (1.82) | (2.40) |
| $F$-stat | 4.55 | 2.38 | 1.82 | 4.01 |
| Colonizer fixed effects | No | Yes | Yes | Yes |
| Geography controls | No | No | Yes | Yes |
| Restricted sample | No | No | No | Yes |
| Hausman test ($p$-value) | .02 | .01 | .02 | .04 |
| Sargan test ($p$-value) | .18 | .30 | .65 | .51 |

Source: Nunn (2008)

# Nunn (2008): The long-term effects of Africa's slave trades

TABLE IV
ESTIMATES OF THE RELATIONSHIP BETWEEN SLAVE EXPORTS AND INCOME

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Second Stage. Dependent variable is log income in 2000, $\ln y$ | | | | |
| ln(exports/area) | $-0.208^{***}$ | $-0.201^{***}$ | $-0.286^{*}$ | $-0.248^{***}$ |
| | (0.053) | (0.047) | (0.153) | (0.071) |
| | $[-0.51, -0.14]$ | $[-0.42, -0.13]$ | $[-\infty, +\infty]$ | $[-0.62, -0.12]$ |
| Colonizer fixed effects | No | Yes | Yes | Yes |
| Geography controls | No | No | Yes | Yes |
| Restricted sample | No | No | No | Yes |
| $F$-stat | 15.4 | 4.32 | 1.73 | 2.17 |
| Number of obs. | 52 | 52 | 52 | 42 |

Source: Nunn (2008)

- Check: distance from slave ports used to determine wealth outside Africa: no effect. Q: Why such check needed?

# Nunn (2008): Channels and take-aways

- Channels through which slave trade affects current day wealth:
  1. Weakening ties between villages $\rightarrow$ discouraging the formation of larger communities and broader ethnic identities $\rightarrow$ ethnic fractionalization $\rightarrow$ lower public goods provision (Alesina et al. 1999) $\rightarrow$ lower economic development
  2. Weakening and underdevelopment of states: slave trades $\rightarrow$ long-term political instability $\rightarrow$ weak states $\rightarrow$ inability to collect taxes $\rightarrow$ inability to provide public goods
- Some support for both channels
- Adverse effects of historical events on present day economic performance.

Role of institutions in economic development

Wealth differences reexamined: institutions

History, factor endowments, institutions, and wealth of nations

Slave trade, state capacity, culture, and wealth of nations

Culture, trust, and persistence of institutions

Understanding persistence of institutions

# Nunn and Wantchekon (2011): The Slave Trade and the Origins of Mistrust in Africa

- But what is it about slave trade that caused worse institutions now?
  - Recall Manning (1990, p. 124): *"Slavery was corruption: it involved theft, bribery, and exercise of brute force as well as ruses."*
  - Add Nunn and Wantchekon (2011): *"Initially, slaves were captured primarily through state organized raids and warfare, but as the trade progressed, the environment of ubiquitous insecurity caused individuals to turn on others — including friends and family members — and to kidnap, trick, and sell each other into slavery (Koelle 1854; Hair 1965; Piot 1996)."*
- Does the mistrust prevail in societies exposed to most slave trade up until these days?

# Nunn and Wantchekon (2011)

- Why the persistence?
  - Cultural anthropology: rules of thumbs (**social norms**) used for decision-making in environments where information acquisition costly or imperfect (Boyd and Richerson, 1985).
  - Social norms of mistrust towards others likely more beneficial than norms of trust in a society where you can get kidnapped by your cousin.
- Measuring trust: 2005 Afrobarometer survey
  - How much your trust your relatives / neighbors / locally elected government council / those in the same country from other ethnic groups / those from the same ethnic group?
  - Not at all / just a little / somewhat / a lot.

# Nunn and Wantchekon (2011)

- Estimation strategy:

$$trust_{i,e,d,c} = \alpha_c + \beta slaveexports_e + X'_{i,e,d,c}\Gamma + X'_{d,c}\Omega + X'_e\Theta + \varepsilon_{i,e,d,c}$$

  - $trust_{i,e,d,c}$ ... natural log of one plus slave exports normalized by land area (measure normalized by the size of ethnic groups)
  - $e$ ... ethnic group
  - $d$ ... district
  - $c$ ... country
  - $X'_{i,e,d,c}$ ... age, gender, urban/rural, religion, occupation
  - $X'_{d,c}$ ... district ethnic fractionalization, share of the district's population that is of the same ethnicity as the respondent
  - $X'_e$ ... ethnicity-level variables capturing historical characteristics of ethnicities, and differing impacts of colonial rule on ethnic groups (prevalence of malaria, 1400 urbanization indicator variable, sophistication of precolonial settlements, precolonial sophistication of political institutions...)

# Nunn and Wantchekon (2011)

TABLE 2—OLS ESTIMATES OF THE DETERMINANTS OF THE TRUST OF OTHERS

| | Trust of relatives (1) | Trust of neighbors (2) | Trust of local council (3) | Intra-group trust (4) | Inter-group trust (5) |
|---|---|---|---|---|---|
| ln (1 + exports/area) | −0.133*** | −0.159*** | −0.111*** | −0.144*** | −0.097*** |
| | (0.037) | (0.034) | (0.021) | (0.032) | (0.028) |
| Individual controls | Yes | Yes | Yes | Yes | Yes |
| District controls | Yes | Yes | Yes | Yes | Yes |
| Country fixed effects | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 20,062 | 20,027 | 19,733 | 19,952 | 19,765 |
| Number of ethnicity clusters | 185 | 185 | 185 | 185 | 185 |
| Number of district clusters | 1,257 | 1,257 | 1,283 | 1,257 | 1,255 |
| $R^2$ | 0.13 | 0.16 | 0.20 | 0.14 | 0.11 |

*Notes:* The table reports OLS estimates. The unit of observation is an individual. Standard errors are adjusted for two-way clustering at the ethnicity and district levels. The individual controls are for age, age squared, a gender indicator variable, five living conditions fixed effects, ten education fixed effects, 18 religion fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The district controls include ethnic fractionalization in the district and the share of the district's population that is the same ethnicity as the respondent.

Source: Nunn and Wantchekon (2011)

# Nunn and Wantchekon (2011)

- But: what if ethnic groups that were inherently less trusting were more likely to be taken during the slave trades? How to control for this possible **reverse causality**?
- Already have some controls for ethnic group fixed effects (see previous slide), but still possibly some *omitted variables*?
- **Instrumental variables**: Historical distance of the ethnic group from the coast.

# Nunn and Wantchekon (2011)

TABLE 5—IV ESTIMATES OF THE EFFECT OF THE SLAVE TRADE ON TRUST

| | Trust of relatives (1) | Trust of neighbors (2) | Trust of local council (3) | Intragroup trust (4) | Intergroup trust (5) |
|---|---|---|---|---|---|
| Second stage: Dependent variable is an individual's trust | | | | | |
| ln (1 + exports/area) | −0.190*** | −0.245*** | −0.221*** | −0.251*** | −0.174** |
| | (0.067) | (0.070) | (0.060) | (0.088) | (0.080) |
| Hausman test ($p$-value) | 0.88 | 0.53 | 0.09 | 0.44 | 0.41 |
| $R^2$ | 0.13 | 0.16 | 0.20 | 0.15 | 0.12 |
| First stage: Dependent variable is ln (1 + exports/area) | | | | | |
| Historical distance of ethnic group from coast | −0.0014*** | −0.0014*** | −0.0014*** | −0.0014*** | −0.0014*** |
| | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0003) |
| Colonial population density | Yes | Yes | Yes | Yes | Yes |
| Ethnicity-level colonial controls | Yes | Yes | Yes | Yes | Yes |
| Individual controls | Yes | Yes | Yes | Yes | Yes |
| District controls | Yes | Yes | Yes | Yes | Yes |
| Country fixed effects | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 16,709 | 16,679 | 15,905 | 16,636 | 16,473 |
| Number of clusters | 147 / 1,187 | 147 / 1,187 | 146 / 1,194 | 147 / 1,186 | 147 / 1,184 |
| $F$-stat of excl. instrument | 26.9 | 26.8 | 27.4 | 27.1 | 27.0 |
| $R^2$ | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |

*Notes:* The table reports IV estimates. The top panel reports the second-stage estimates, and the bottom panel reports first-stage estimates. Standard errors are adjusted for two-way clustering at the ethnicity and district levels. The individual controls, district controls, ethnicity-level colonial controls, and colonial population density measures are described in Table 3. The null hypothesis of the Hausman test is that the OLS estimates are consistent.

Source: Nunn and Wantchekon (2011)

# Nunn and Wantchekon (2011)

TABLE 8—REDUCED FORM RELATIONSHIP BETWEEN THE DISTANCE FROM THE COAST AND TRUST WITHIN AND OUTSIDE OF AFRICA

| | Intergroup trust | | | | |
|---|---|---|---|---|---|
| | Afrobarometer sample | | WVS non-Africa sample | | WVS Nigeria |
| | (1) | (2) | (3) | (4) | (5) |
| Distance from the coast | 0.00039*** | 0.00037*** | −0.00020 | −0.00019 | 0.00054*** |
| | (0.00013) | (0.00012) | (0.00014) | (0.00012) | (0.00010) |
| Country fixed effects | Yes | Yes | Yes | Yes | n/a |
| Individual controls | No | Yes | No | Yes | Yes |
| Number of observations | 19,970 | 19,970 | 10,308 | 10,308 | 974 |
| Number of clusters | 185 | 185 | 107 | 107 | 16 |
| $R^2$ | 0.09 | 0.10 | 0.09 | 0.11 | 0.06 |

*Notes* : The table reports OLS estimates. The unit of observation is an individual. The dependent variable in the WVS sample is the respondent's answer to the question: "How much do you trust <nationality> people in general?" The categories for the respondent's answers are: "not at all," "not very much," "neither trust nor distrust," "a little," and "completely." The responses take on the values 0, 1, 1.5, 2, and 3. Standard errors are clustered at the ethnicity level in the Afrobarometer regressions and at the location (city) level in the Asiabarometer and the WVS samples. The individual controls are for age, age squared, a gender indicator, an indicator for living in an urban location, and occupation fixed effects.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

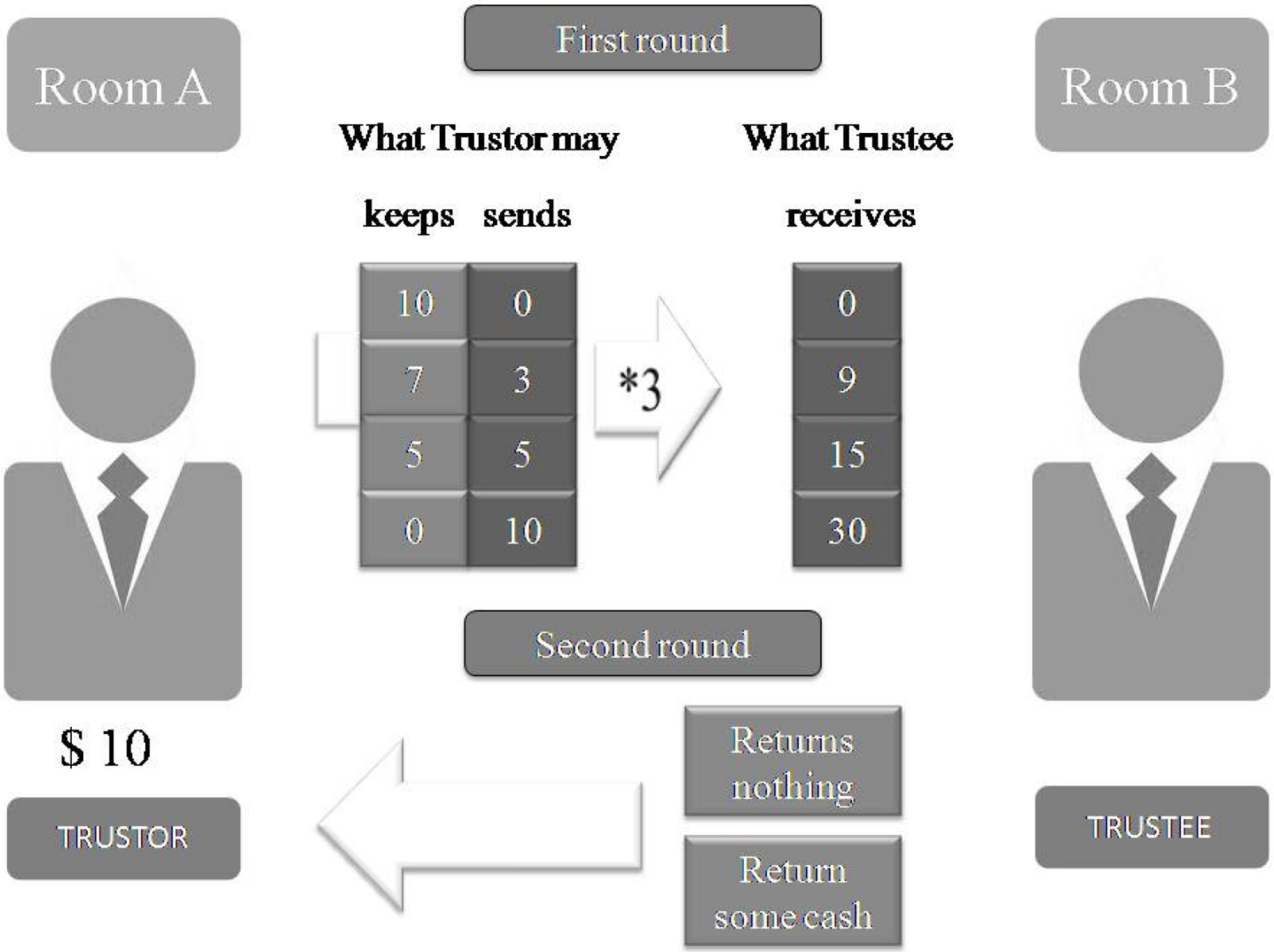
*Significant at the 10 percent level.

Source: Nunn and Wantchekon (2011)

# Nunn and Wantchekon (2011)

- How does the mistrust persist?
  1. General beliefs or "rules-of-thumb" based on mistrust transmitted from parents to children over time (**social norms**).
  2. Slave trade resulted in a deterioration of legal and political institutions. Because these institutions persist, individuals are not constrained to act in a trustworthy manner, leading to lower trust (**legal enforcement**).
- Both channels seem to be at play.

# Side-note: Measuring trust(worthiness) in a laboratory



Role of institutions in economic development

Wealth differences reexamined: institutions

History, factor endowments, institutions, and wealth of nations

Slave trade, state capacity, culture, and wealth of nations

Culture, trust, and persistence of institutions

Understanding persistence of institutions

# Dell (2010): The Persistent Effects of Peru's Mining Mita

- Further understanding mechanisms behind the role of historical institutions in persistence of present day underdevelopment
- This paper: land tenure and public goods as channels
- Setting:
  - Mining *mita* in Peru and Bolivia instituted by Spanish government (1573-1812): one-seventh of adult male population of over 200 communities forced to work in silver and mercury mines.
- Identification strategy: regression discontinuity design (RDD)
  - Validity: all relevant factors besides treatment show no discontinuity; only focuses on a subset of the border region that satisfies this (part of the Andean range in southern Peru)

# Dell (2010): Mita area

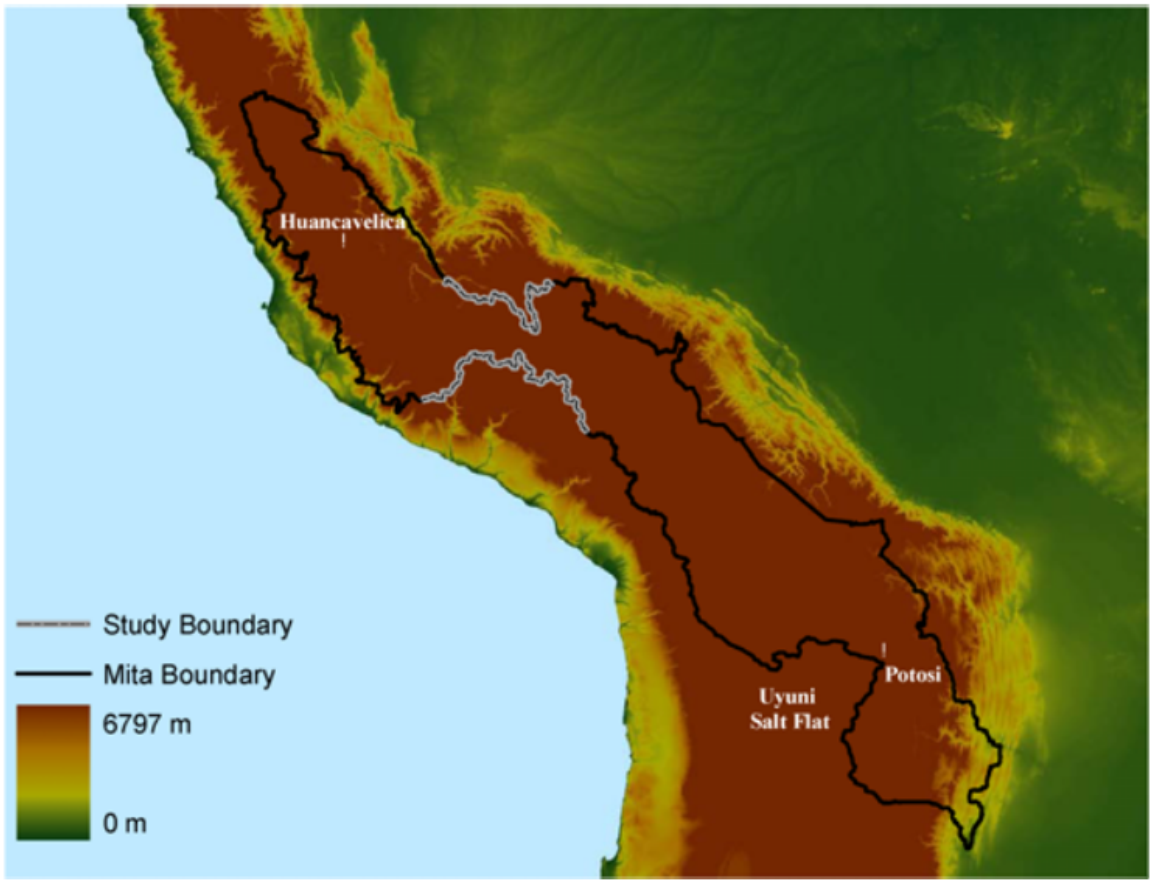



FIGURE 1.—The *mita* boundary is in black and the study boundary in light gray. Districts falling inside the contiguous area formed by the *mita* boundary contributed to the *mita*. Elevation is shown in the background.

Source: Dell (2010)

# Dell (2010)

$$c_{idb} = \alpha + \gamma mita_d + X_{id}^{'}\beta + f(\text{geographic locationd id}) + \Phi_b + \varepsilon_{idb}$$

- Identification assumptions:
  - $E[c_1|lat, lon]$ and $E[c_0|lat, lon]$ continuous at the discontinuity threshold ($c \ldots$ outcomes (geographical data, ethnicity, pre-mita data on settlements and taxation).
  - Treatment effect identified using variation at discontinuity: relies on samples 25km, 50km, 75km, and 100km from *mita* boundary
  - No migration across boundaries: not satisfied during *mita* period, now reasonable (land tenure)
  - $i \ldots$ individual, $b \ldots$ segment of the *mita* boundary, $d \ldots$ district
  - $f(\text{geographic locationd id}) \ldots$ RD polynomial controlling for smooth functions of geographic location
  - $\Phi_b \ldots$ boundary segment fixed effects

# Dell (2010)

- "Black box" results:
  - Using present day household survey data: equivalent household consumption lower by 25% and childhood stunting higher by 6 p.p. in *mita* subjected districts
- Examining channels:
  - Using data from the Spanish Empire and Peruvian Republic
  - Focus on land tenure (formation of *haciendas*), public goods, and market participation. Data:
    - *Haciendas* in 1689, 1845, and 1940 (parish reports)
    - Education: Population Census (1876 and 1940), ENAHO (2001)
    - Roads: GIS road map of Peru produced by the Ministro de Transporte (2006)
    - Agriculture: Population Census (1993), Agricultural Census (1994)
  - Results: *mita* limited the establishment of large landowners + land tenure affected public goods provision and smallholder participation in agricultural markets

# Dell (2010): Modern results

LIVING STANDARDS[a]

| | Dependent Variable | | | | | | |
|---|---|---|---|---|---|---|---|
| | Log Equiv. Household Consumption (2001) | | | Stunted Growth, Children 6–9 (2005) | | | |
| Sample Within: | <100 km of Bound. (1) | <75 km of Bound. (2) | <50 km of Bound. (3) | <100 km of Bound. (4) | <75 km of Bound. (5) | <50 km of Bound. (6) | Border District (7) |
| | | | Panel A. Cubic Polynomial in Latitude and Longitude | | | | |
| *Mita* | −0.284 | −0.216 | −0.331 | 0.070 | 0.084* | 0.087* | 0.114** |
| | (0.198) | (0.207) | (0.219) | (0.043) | (0.046) | (0.048) | (0.049) |
| $R^2$ | 0.060 | 0.060 | 0.069 | 0.051 | 0.020 | 0.017 | 0.050 |
| | | | Panel B. Cubic Polynomial in Distance to Potosí | | | | |
| *Mita* | −0.337*** | −0.307*** | −0.329*** | 0.080*** | 0.078*** | 0.078*** | 0.063* |
| | (0.087) | (0.101) | (0.096) | (0.021) | (0.022) | (0.024) | (0.032) |
| $R^2$ | 0.046 | 0.036 | 0.047 | 0.049 | 0.017 | 0.013 | 0.047 |
| | | | Panel C. Cubic Polynomial in Distance to *Mita* Boundary | | | | |
| *Mita* | −0.277*** | −0.230** | −0.224** | 0.073*** | 0.061*** | 0.064*** | 0.055* |
| | (0.078) | (0.089) | (0.092) | (0.023) | (0.022) | (0.023) | (0.030) |
| $R^2$ | 0.044 | 0.042 | 0.040 | 0.040 | 0.015 | 0.013 | 0.043 |
| Geo. controls | yes | yes | yes | yes | yes | yes | yes |
| Boundary F.E.s | yes | yes | yes | yes | yes | yes | yes |
| Clusters | 71 | 60 | 52 | 289 | 239 | 185 | 63 |
| Observations | 1478 | 1161 | 1013 | 158,848 | 115,761 | 100,446 | 37,421 |

[a]The unit of observation is the household in columns 1–3 and the individual in columns 4–7. Robust standard errors, adjusted for clustering by district, are in parentheses. The dependent variable is log equivalent household consumption (ENAHO (2001)) in columns 1–3, and a dummy equal to 1 if the child has stunted growth and equal to 0 otherwise in columns 4–7 (Ministro de Educación (2005a)). *Mita* is an indicator equal to 1 if the household's district contributed to the *mita* and equal to 0 otherwise (Saignes (1984), Amat y Juniet (1947, pp. 249, 284)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include controls for elevation and slope, as well as boundary segment fixed effects (F.E.s). Columns 1–3 include demographic controls for the number of infants, children, and adults in the household. In columns 1 and 4, the sample includes observations whose district capitals are located within 100 km of the *mita* boundary, and this threshold is reduced to 75 and 50 km in the succeeding columns. Column 7 includes only observations whose districts border the *mita* boundary. 78% of the observations are in *mita* districts in column 1, 71% in column 2, 68% in column 3, 78% in column 4, 71% in column 5, 68% in column 6, and 58% in column 7. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

Source: Dell (2010)

# Dell (2010): Manipulation check

TABLE V

1572 TRIBUTE AND POPULATION[a]

| | Dependent Variable | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Share of Tribute Revenues | | | | Percent | | |
| | Log Mean Tribute | Spanish Nobility | Spanish Priests | Spanish Justices | Indig. Mayors | Men | Boys | Females |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Panel A. Cubic Polynomial in Latitude and Longitude** | | | | | | | | |
| *Mita* | 0.020 | −0.010 | 0.004 | 0.004 | 0.003 | −0.006 | 0.011 | −0.009 |
| | (0.031) | (0.030) | (0.019) | (0.010) | (0.005) | (0.009) | (0.012) | (0.016) |
| $R^2$ | 0.762 | 0.109 | 0.090 | 0.228 | 0.266 | 0.596 | 0.377 | 0.599 |
| **Panel B. Cubic Polynomial in Distance to Potosí** | | | | | | | | |
| *Mita* | 0.019 | −0.013 | 0.008 | 0.006 | −0.001 | −0.012 | 0.005 | −0.011 |
| | (0.029) | (0.025) | (0.015) | (0.009) | (0.004) | (0.008) | (0.010) | (0.012) |
| $R^2$ | 0.597 | 0.058 | 0.073 | 0.151 | 0.132 | 0.315 | 0.139 | 0.401 |
| **Panel C. Cubic Polynomial in Distance to *Mita* Boundary** | | | | | | | | |
| *Mita* | 0.040 | −0.009 | 0.005 | 0.003 | −0.001 | −0.011 | 0.001 | −0.008 |
| | (0.030) | (0.018) | (0.012) | (0.006) | (0.004) | (0.007) | (0.008) | (0.010) |
| $R^2$ | 0.406 | 0.062 | 0.096 | 0.118 | 0.162 | 0.267 | 0.190 | 0.361 |
| Geo. controls | yes | yes | yes | yes | yes | yes | yes | yes |
| Boundary F.E.s | yes | yes | yes | yes | yes | yes | yes | yes |
| Mean dep. var. | 1.591 | 0.625 | 0.203 | 0.127 | 0.044 | 0.193 | 0.204 | 0.544 |
| Observations | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |

[a]The dependent variable in column 1 is the log of the district's mean 1572 tribute rate (Miranda (1583)). In columns 2–5, it is the share of tribute revenue allocated to Spanish nobility (*encomenderos*), Spanish priests, Spanish justices, and indigenous mayors (*caciques*), respectively. In columns 6–8, it is the share of 1572 district population composed of males (aged 18–50), boys, and females (of all ages), respectively. Panel A includes a cubic polynomial in longitude and latitude, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include geographic controls and boundary segment fixed effects. The samples include districts whose capitals are less than 50 km from the *mita* boundary. Column 1 weights by the square root of the district's tributary population and columns 6–8 weight by the square root of the district's total population. 66% of the observations are from *mita* districts. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

Source: Dell (2010)

# Dell (2010): Channels: land ownership

LAND TENURE AND LABOR SYSTEMS[a]

| | Dependent Variable | | | | |
|---|---|---|---|---|---|
| | *Haciendas* per District in 1689 (1) | *Haciendas* per 1000 District Residents in 1689 (2) | Percent of Rural Tributary Population in *Haciendas* in ca. 1845 (3) | Percent of Rural Population in *Haciendas* in 1940 (4) | Land Gini in 1994 (5) |
| | Panel A. Cubic Polynomial in Latitude and Longitude | | | | |
| *Mita* | −12.683*** | −6.453** | −0.127* | −0.066 | 0.078 |
| | (3.221) | (2.490) | (0.067) | (0.086) | (0.053) |
| $R^2$ | 0.538 | 0.582 | 0.410 | 0.421 | 0.245 |
| | Panel B. Cubic Polynomial in Distance to Potosí | | | | |
| *Mita* | −10.316*** | −7.570*** | −0.204** | −0.143*** | 0.107*** |
| | (2.057) | (1.478) | (0.082) | (0.051) | (0.036) |
| $R^2$ | 0.494 | 0.514 | 0.308 | 0.346 | 0.194 |
| | Panel C. Cubic Polynomial in Distance to *Mita* Boundary | | | | |
| *Mita* | −11.336*** | −8.516*** | −0.212*** | −0.120*** | 0.124*** |
| | (2.074) | (1.665) | (0.060) | (0.045) | (0.033) |
| $R^2$ | 0.494 | 0.497 | 0.316 | 0.336 | 0.226 |
| Geo. controls | yes | yes | yes | yes | yes |
| Boundary F.E.s | yes | yes | yes | yes | yes |
| Mean dep. var. | 6.500 | 5.336 | 0.135 | 0.263 | 0.783 |
| Observations | 74 | 74 | 81 | 119 | 181 |

[a]The unit of observation is the district. Robust standard errors are in parentheses. The dependent variable in column 1 is *haciendas* per district in 1689 and in column 2 is *haciendas* per 1000 district residents in 1689 (Villanueva Urteaga (1982)). In column 3 it is the percentage of the district's tributary population residing in *haciendas* ca. 1845 (Peralta Ruiz (1991)), in column 4 it is the percentage of the district's rural population residing in *haciendas* in 1940 (Dirección de Estadística del Perú (1944)), and in column 5 it is the district land gini (INEI (1994)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include geographic controls and boundary segment fixed effects. The samples include districts whose capitals are less than 50 km from the *mita* boundary. Column 3 is weighted by the square root of the district's rural tributary population and column 4 is weighted by the square root of the district's rural population. 58% of the observations are in *mita* districts in columns 1 and 2, 59% in column 3, 62% in column 4, and 66% in column 5. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

# Dell (2010): Channels: Public goods: Education

EDUCATION[a]

| | Dependent Variable | | |
|---|---|---|---|
| | Literacy 1876 (1) | Mean Years of Schooling 1940 (2) | Mean Years of Schooling 2001 (3) |
| | Panel A. Cubic Polynomial in Latitude and Longitude | | |
| *Mita* | −0.015 | −0.265 | −1.479* |
| | (0.012) | (0.177) | (0.872) |
| $R^2$ | 0.401 | 0.280 | 0.020 |
| | Panel B. Cubic Polynomial in Distance to Potosí | | |
| *Mita* | −0.020*** | −0.181** | −0.341 |
| | (0.007) | (0.078) | (0.451) |
| $R^2$ | 0.345 | 0.187 | 0.007 |
| | Panel C. Cubic Polynomial in Distance to *Mita* Boundary | | |
| *Mita* | −0.022*** | −0.209*** | −0.111 |
| | (0.006) | (0.076) | (0.429) |
| $R^2$ | 0.301 | 0.234 | 0.004 |
| Geo. controls | yes | yes | yes |
| Boundary F.E.s | yes | yes | yes |
| Mean dep. var. | 0.036 | 0.470 | 4.457 |
| Clusters | 95 | 118 | 52 |
| Observations | 95 | 118 | 4038 |

[a]The unit of observation is the district in columns 1 and 2 and the individual in column 3. Robust standard errors, adjusted for clustering by district, are in parentheses. The dependent variable is mean literacy in 1876 in column 1 (Dirección de Estadística del Perú (1878)), mean years of schooling in 1940 in column 2 (Dirección de Estadística del Perú (1944)), and individual years of schooling in 2001 in column 3 (ENAHO (2001)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include geographic controls and boundary segment fixed effects. The samples include districts whose capitals are less than 50 km from the *mita* boundary. Columns 1 and 2 are weighted by the square root of the district's population. 64% of the observations are in *mita* districts in column 1, 63% in column 2, and 67% in column 3. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

Source: Dell (2010)

# Dell (2010): Channels: Public goods: Roads

ROADS[a]

| | Dependent Variable | | |
|---|---|---|---|
| | Density of Local Road Networks (1) | Density of Regional Road Networks (2) | Density of Paved/Gravel Regional Roads (3) |
| **Panel A. Cubic Polynomial in Latitude and Longitude** | | | |
| *Mita* | 0.464 | −29.276* | −22.426* |
| | (18.575) | (16.038) | (12.178) |
| $R^2$ | 0.232 | 0.293 | 0.271 |
| **Panel B. Cubic Polynomial in Distance to Potosí** | | | |
| *Mita* | −1.522 | −32.644*** | −30.698*** |
| | (12.101) | (8.988) | (8.155) |
| $R^2$ | 0.217 | 0.271 | 0.256 |
| **Panel C. Cubic Polynomial in Distance to *Mita* Boundary** | | | |
| *Mita* | 0.535 | −35.831*** | −32.458*** |
| | (12.227) | (9.386) | (8.638) |
| $R^2$ | 0.213 | 0.226 | 0.208 |
| Geo. controls | yes | yes | yes |
| Boundary F.E.s | yes | yes | yes |
| Mean dep. var. | 85.34 | 33.55 | 22.51 |
| Observations | 185 | 185 | 185 |

[a]The unit of observation is the district. Robust standard errors are in parentheses. The road densities are defined as total length in meters of the respective road type in each district divided by the district's surface area, in kilometers squared. They are calculated using a GIS map of Peru's road networks (Ministro de Transporte (2006)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include geographic controls and boundary segment fixed effects. The samples include districts whose capitals are less than 50 km from the *mita* boundary. 66% of the observations are in *mita* districts. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

Source: Dell (2010)

# Dell (2010): Proximate determinants of consumption

CONSUMPTION CHANNELS[a]

| | Dependent Variable | | |
|---|---|---|---|
| | Percent of District Labor Force in Agriculture—1993 (1) | Agricultural Household Sells Part of Produce in Markets—1994 (2) | Household Member Employed Outside the Agricultural Unit—1994 (3) |
| | Panel A. Cubic Polynomial in Latitude and Longitude | | |
| *Mita* | 0.211 | −0.074** | −0.013 |
| | (0.140) | (0.036) | (0.032) |
| $R^2$ | 0.177 | 0.176 | 0.010 |
| | Panel B. Cubic Polynomial in Distance to Potosí | | |
| *Mita* | 0.101 | −0.208*** | −0.033 |
| | (0.061) | (0.030) | (0.020) |
| $R^2$ | 0.112 | 0.144 | 0.008 |
| | Panel C. Cubic Polynomial in Distance to *Mita* Boundary | | |
| *Mita* | 0.092* | −0.225*** | −0.038** |
| | (0.054) | (0.032) | (0.018) |
| $R^2$ | 0.213 | 0.136 | 0.006 |
| Geo. controls | yes | yes | yes |
| Boundary F.E.s | yes | yes | yes |
| Mean dep. var. | 0.697 | 0.173 | 0.245 |
| Clusters | 179 | 178 | 182 |
| Observations | 179 | 160,990 | 183,596 |

[a]Robust standard errors, adjusted for clustering by district in columns 2 and 3, are in parentheses. The dependent variable in column 1 is the percentage of the district's labor force engaged in agriculture as a primary occupation (INEI (1993)), in column 2 it is an indicator equal to 1 if the agricultural unit sells at least part of its produce in markets, and in column 3 it is an indicator equal to 1 if at least one member of the household pursues secondary employment outside the agricultural unit (INEI (1994)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include geographic controls and boundary segment fixed effects. Column 1 is weighted by the square root of the district's population. 66% of the observations in column 1 are in *mita* districts, 68% in column 2, and 69% in column 3. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

Source: Dell (2010)

# Dell (2010): Discussion

- Long-term presence of large landowners $\Rightarrow$ stable land tenure system $\Rightarrow \uparrow$ public goods provision
  - Note the contrast to Sokoloff and Engermann (2000): there large landowners associated with inequality and underdevelopment. Why?
  - Here large landowners secure property rights + lobby with government for access to public goods subsidies
  - Small-holders without property rights, inequality instituted by land seizures. In contrast Sokoloff and Engermann (2000) assume secure, enfranchised small-holders as a counterfactual to South Americas large landowners.
- Exploring constraints on how the state can be used to shape economic interactions maybe a better starting point than land inequality for modeling Latin America's long-run growth.

# Taking stock

1. Social infrastructure (institutions) seem to affect wealth of nations
2. Factor endowments determine what institutions emerge
3. Effects of institutions are long-lasting; social norms and culture may explain the persistence
4. **Do not take any single explanation of historical theories of development as a universal fact!**
5. Big ideas sell well, but many paths could have been just due to mere coincidence, luck, or many other potential explanations:
   - See wide heterogeneity of economic outcomes for countries with very different social infrastructure (Hall and Jones, 1999), across South American countries (Sokoloff and Engerman, 2000), or in slave trade numbers (Nunn, 2008).

- Where next? Health and nutrition