

# **Reversal of Fortune:**

**Geography and Institutions in the Making of the Modern World**

**Income distribution**

**Acemoglu, Johnson, Robinson**

**QJE 2002**

# Background

- Another paper on the deep determinants of long-run economic success
- We have seen that Hall and Jones (2001) found a strong correlation between a country's latitude and the quality of its institutions, and through those with current income per person.
- They argue that this may be due to the influence of European settlement and ideas
- How can we separate the influence of Europe through institutions from the direct effect of geography: (through trade, disease, agricultural productivity)?

# Core of the Paper (AJR 2002)

- Fact: Among Countries Colonized by Europeans in the last 500 years those relatively rich in 1500 are now relatively poor and vice-versa.
- Why?
- What can explain this “reversal”?
- A simple Geography-based theory per se cannot.
  - Invariant geographical features would have a hard time explaining such reversal.
  - Even a more sophisticate theory based on agriculture technology does not math the fact that the reversal happened at the time of the industrial revolution
- The authors claim that it was a change in institutions brought by European Colonization and tell us a story of how it happened.

# Key Idea

- **Institutions= organization of societies**
  - 1) institutions of private property and incentives to invest
  - 2) extractive institutions with concentrated power.
- Sparsely populated, poor areas encouraged colonizers to settle and protect private property.
- Rich areas (in materials and minerals) encouraged colonizers to institute (or maintain) extractive institutions to extract taxes and labor and materials.

## Why did European settled the more sparsely populated areas?

- AJR 2001, related to this, emphasizes the disease and climate environment.
- This paper emphasized the initial density of population and initial prosperity on the policies/ institutions adopted.
- The difference is not being colonized by English, Spanish or Portuguese but being settled by European population or being exploited as a source of material, labor and wealth.

# Showing the “fact”

- Urbanization in 1500 is the best measure we have of income per capita. Alternatively we can look at density. Why?
  - Only good agricultural technology, surplus and infrastructure could support cities (Kuznets 1968, Bairoch 1988)
  - Malthusian theory predicts a relation between technology and population
- **Data:** from a very large collection of sources, gathering a lot of work. It is the best that can be done.
  - Caveat: Sub-Saharan Africa does not have data on urbanization, but the density data put it above North America and Australia

# Urbanization in 1500 and Income per person 1995

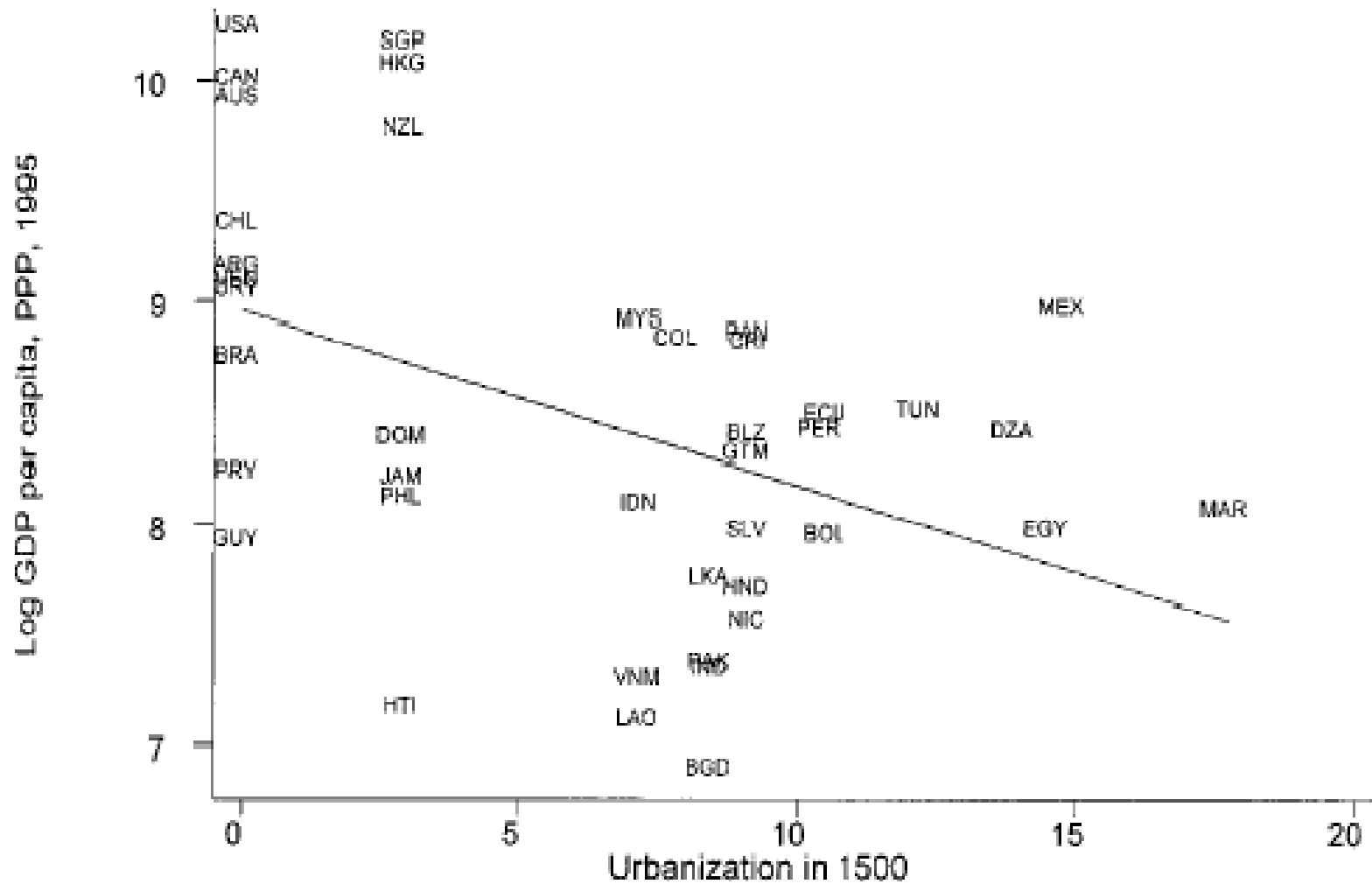


FIGURE I



1) Establish that urbanization is highly correlated with income per person

TABLE II  
URBANIZATION AND PER CAPITA INCOME

	Cross-sectional regression in 1913, all countries (1)	Cross-sectional regression in 1950, all countries (2)	Cross-sectional regression in 1995, all countries (3)	Cross-sectional regression in 1995, only for ex-colonies (4)	Cross-sectional regression in 1995, never colonized countries only (5)	Cross-sectional regression in 1995, all countries, with continent dummies (6)	Panel data set through 1913 (7)
<i>Dependent variable is log GDP per capita</i>							
Urbanization	0.038 (0.006)	0.026 (0.002)	0.036 (0.002)	0.037 (0.003)	0.033 (0.007)	0.030 (0.002)	0.026 (0.004)
$R^2$	0.69	0.57	0.63	0.69	0.34	0.68	0.93
Number of observations	22	128	162	93	51	162	55

## Data on density

- Based on estimates. Especially for the pre-Colombian societies.
- Calculated as population/arable area
- There is no cross-sectional relation between density and income per person currently
- Used as a check. Important role in explaining the reversal

## 2) Establish the reversal and its robustness

TABLE III  
URBANIZATION IN 1500 AND GDP PER CAPITA IN 1995 FOR FORMER EUROPEAN COLONIES

Dependent variable is log GDP per capita (PPP) in 1995

	Base sample (1)	Without North Africa (2)	Without the Americas (3)	Just the Americas (4)	With continent dummies (5)	Without neo-Europes (6)	Controlling for latitude (7)	Controlling for climate (8)	Controlling for resources (9)	Controlling for colonial origin (10)	Controlling for religion (11)
Urbanization in 1500	-0.078 (0.026)	-0.101 (0.032)	-0.115 (0.051)	-0.053 (0.029)	-0.083 (0.030)	-0.046 (0.026)	-0.072 (0.025)	-0.088 (0.030)	-0.058 (0.029)	-0.071 (0.028)	-0.060 (0.033)
Asia dummy					-1.33		←————→			←————→	
							Geographical controls			Culture	

10 percentage point lower urbanization in 1500  
Implies 118% higher income per person in 1995 ( $\exp(0.78)$ )

## Establish that the reversal is a robust fact (continued)

- Caveat: Sample size (with urbanization data) is at most 41
- An array of robustness checks
  - Using different urbanization measures
  - Using different samples
  - Using population density
- Significance may vary but the basic relation is the same: there is a negative and large correlation between urbanization in 1500 and income per capita in 1995 among ex-colonies

## Regressions using population density (stronger results)

TABLE V  
POPULATION DENSITY AND GDP PER CAPITA IN FORMER EUROPEAN COLONIES

Dependent variable is log GDP per capita (PPP) in 1995

	Base sample	Without Africa	Without the Americas	Just the Americas	With continent dummies	Without neo-Europes	Controlling for latitude	Controlling for climate	Controlling for resources	Controlling for colonial origin	Controlling for religion
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<i>Panel A: Log population density in 1500 as independent variable</i>											
Log population density in 1500	-0.38 (0.06)	-0.40 (0.05)	-0.32 (0.07)	-0.25 (0.09)	-0.26 (0.05)	-0.32 (0.06)	-0.33 (0.06)	-0.31 (0.06)	-0.30 (0.06)	-0.32 (0.06)	-0.37 (0.07)
Asia dummy					-0.91 (0.55)						
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# An important robustness check

TABLE VI  
ROBUSTNESS CHECKS FOR URBANIZATION AND LOG POPULATION DENSITY

Dependent variable is log GDP per capita (PPP) in 1995										
	Assuming lower urbanization in the Americas	Assuming lower urbanization in North Africa	Assuming lower urbanization in Indian subcontinent	Using least favorable combination of assumptions	Using augmented Toynbee definition of civilization	Using land area in 1995 for population density	Alternative assumptions for log population density	All countries never colonized by Europe	Europe (including Eastern Europe)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Former colonies							Never colonized		
<i>Panel A: Unweighted regressions</i>										
Urbanization in 1500	-0.078 (0.026)	-0.089 (0.027)	-0.102 (0.029)	-0.073 (0.027)	-0.105 (0.032)	-0.117 (0.052)			0.068 (0.023)	0.077 (0.023)
Log population density in 1500							-0.41 (0.06)	-0.32 (0.07)		
R <sup>2</sup>	0.20	0.22	0.24	0.16	0.21	0.30	0.35	0.21	0.18	0.27
Number of observations	41	41	41	41	41	14	91	91	43	32

No reversal in Europe and non-colonies

### 3) The timing of the reversal

- An important feature of the reversal is that it did not happen right after the colonization but during the 1800's, period during which industrial growth took off in Europe.

# Timing of reversals: 1750

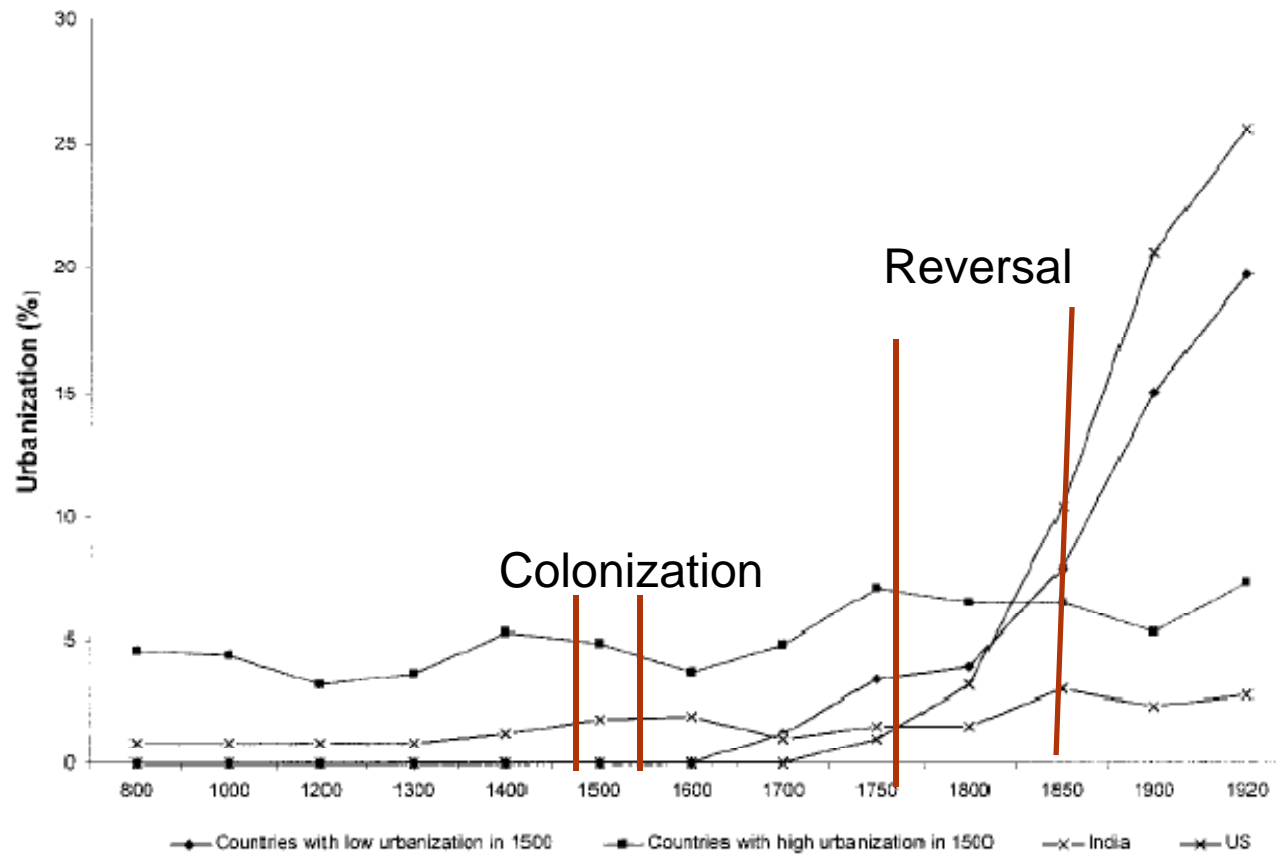
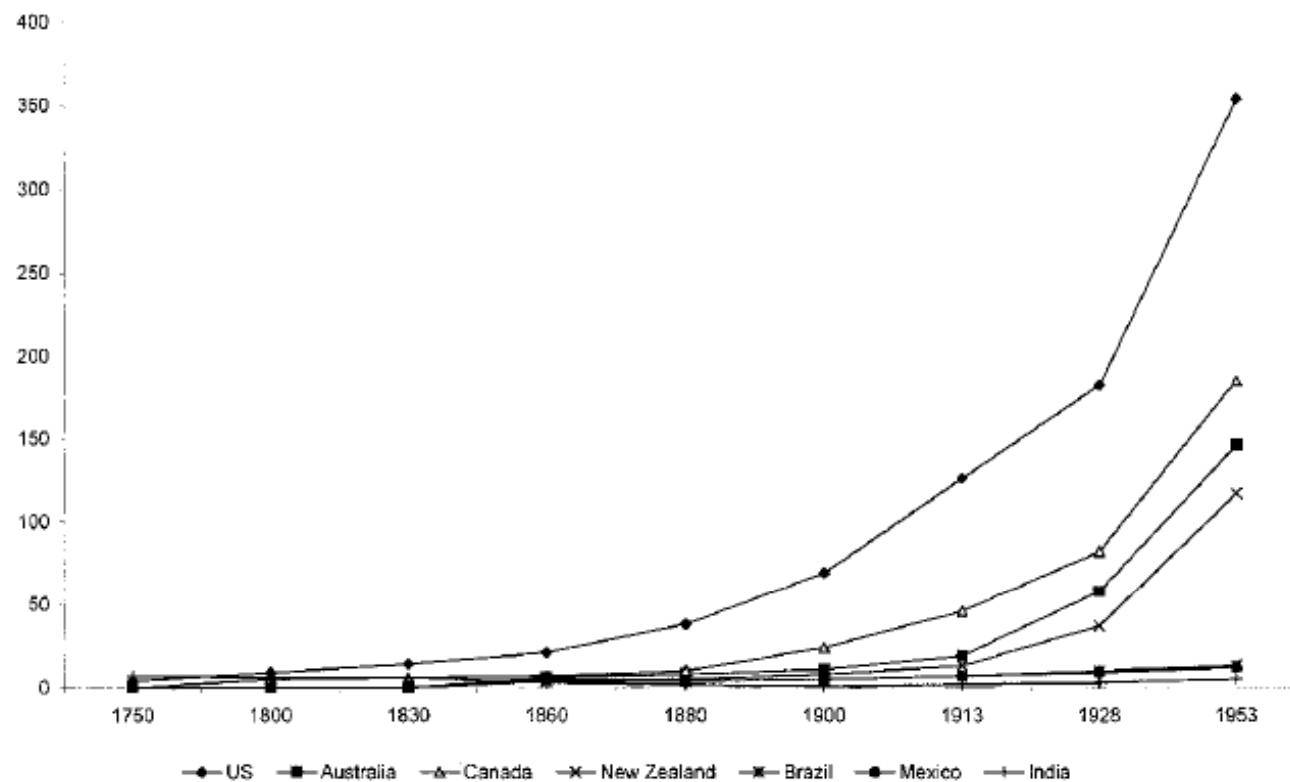


FIGURE IVa

# Industrial Production 1750-1950

1258

*QUARTERLY JOURNAL OF ECONOMICS*



# The geography hypothesis

- 1) Simple: weather, climate, diseases affect productivity. (Long term effects of Neolithic revolution, disease environment)
  - This is easily dismissed as those did not “reverse”
  
- 2) Sophisticated: Position, resources, coastal access were very relevant at the time of industrial revolution (and not before). Temperate drift (new technologies, crops, are better in temperate climates).
  - Geography variable controls did not change the reversal effect
  - The spread of EU agricultural techniques takes place 1500-1700.
  - Trade? Coal? Neither very relevant in regressions.

# The institution hypothesis

- Key Institution: protection of private Property Rights
- In sparsely populated areas, poorer of people and resources and more apt to settling, colonizers brought institutions that ensured to a large cross section of society well defined property rights.
- In densely populated colonies, with large groups of people and resources to exploit and low possibility of settling colonizers brought “extractive institutions” where the majority of population faces large risk of expropriation by the elite.
  - Local density and disease environment both affected probability of settlement.

# Why did these institutions stick?

- Extractive institutions may be an equilibrium because the elite would not allow broader participation to power.
- Moreover in periods of change when new ideas and entrepreneurship would benefit from diffused property rights the elite may fear a loss of power and prevent this.

# Effect of population density on institutions

TABLE VII  
URBANIZATION, POPULATION DENSITY, AND INSTITUTIONS

	Dependent variable is:								
	Average protection against expropriation risk, 1985–1995			Constraint on executive in 1990			Constraint on executive in first year of independence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Panel A: Without additional controls</i>									
Urbanization in 1500	-0.107 (0.043)		-0.001 (0.059)	-0.154 (0.066)		-0.037 (0.098)	-0.132 (0.069)		0.018 (0.103)
Log population density in 1500		-0.37 (0.10)	-0.37 (0.15)		-0.49 (0.15)	-0.40 (0.25)		-0.33 (0.15)	-0.54 (0.28)
R <sup>2</sup>	0.14	0.16	0.25	0.12	0.12	0.18	0.31	0.16	0.37
Number of observations	42	75	42	41	84	41	42	85	42
<i>Panel B: Controlling for latitude</i>									
Urbanization in 1500	-0.097 (0.042)		-0.001 (0.059)	-0.159 (0.067)		-0.038 (0.099)	-0.128 (0.070)		0.022 (0.104)
Log population density in 1500		-0.31 (0.10)	-0.34 (0.15)		-0.45 (0.16)	-0.41 (0.25)		-0.30 (0.16)	-0.54 (0.28)
Latitude	2.87 (1.48)	3.53 (1.25)	2.57 (1.41)	-1.49 (2.38)	2.63 (2.01)	-1.86 (2.34)	1.52 (2.54)	2.68 (2.17)	1.48 (2.46)
R <sup>2</sup>	0.21	0.24	0.31	0.13	0.13	0.19	0.32	0.17	0.38
Number of observations	42	75	42	41	84	41	42	84	42

## Do Institution Account for the full reversal?

- If the effect of initial density on income per person works only through the quality of institutions established, then by including the quality of institution as explanatory variable, the initial density should have no effect.
- However we need an instrument for institutions. We use the mortality rate of settlers at the time of colonization (as in AJR 2002).

# Do Institutions Explain the whole reversal?

TABLE VIII  
GDP PER CAPITA AND INSTITUTIONS

Institutions as measured by:	Dependent variable is log GDP per capita (PPP) in 1995					
	Average protection against expropriation risk, 1985–1995		Constraint on executive in 1990		Constraint on executive in first year of independence	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Second-stage regressions</i>						
Institutions	0.52 (0.10)	0.88 (0.21)	0.84 (0.47)	0.50 (0.11)	0.37 (0.12)	0.46 (0.16)
Urbanization in 1500	-0.024 (0.021)		0.030 (0.078)		-0.023 (0.034)	
Log population density in 1500		-0.08 (0.10)		-0.10 (0.10)		-0.13 (0.10)
<i>Panel B: First-stage regressions</i>						
Log settler mortality	-1.21 (0.23)	-0.47 (0.14)	-0.75 (0.44)	-0.88 (0.20)	-1.81 (0.40)	-0.78 (0.25)
Urbanization in 1500	-0.042 (0.035)		-0.088 (0.066)		-0.043 (0.061)	
Log population density in 1500		-0.21 (0.11)		-0.35 (0.15)		-0.24 (0.17)
$R^2$	0.53	0.29	0.17	0.37	0.56	0.26
Number of observations	38	64	37	67	38	67
<i>Panel C: Coefficient on institutions without urbanization or population density in 1500</i>						
Institutions	0.56 (0.09)	0.96 (0.17)	0.77 (0.33)	0.54 (0.09)	0.39 (0.11)	0.52 (0.15)

## Finally: did institution matter the most during the industrial revolution?

- Yes, because broader well defined property rights encouraged investments (in human, physical and knowledge capital) by many people. This matters in industrial societies.
- Why elite do not take up on these opportunities?
  - Entrepreneurial ability can be diffused
  - Elite fear loss of power
- Hence the good institutions provided more growth potential in the period after the British industrial revolution.

# Interacting institutions and UK industrialization

$$y_{it} = \mu_t + \delta_i + \pi \cdot X_{it} + \phi \cdot X_{it} \cdot UKIND_t + \epsilon_{its}$$

X= measure of institutions (constraint on the executive)

UKIND= UK industrial production

TABLE IX  
THE INTERACTION OF U. K. INDUSTRIALIZATION AND INSTITUTIONS

	Former colonies, using only pre-1950 data (1)	Former colonies, using data through 1980 (all data) (2)	Former colonies, using only pre-1950 data (3)	Former colonies, using only pre-1950 data and for independent countries (4)	Former colonies, with average institutions for each country, using only pre-1950 data (5)	Former colonies, with average institutions for each country, using only pre-1590 data (6)	Former colonies, with average institutions for each country, instrumenting using settler mortality, pre-1950 data (7)	Former colonies, with average institutions for each country, instrumenting using settler mortality, pre-1950 data (8)	Former colonies, with average institutions for each country, instrumenting using settler mortality, pre-1950 data (9)	Former colonies, with average institutions for each country, instrumenting using settler mortality, pre-1950 data (10)
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Panel A: Dependent variable is industrial production per capita

U. K. industrialization *institutions	0.132 (0.026)	0.132 (0.027)	0.145 (0.035)	0.160 (0.048)	0.202 (0.019)	0.206 (0.022)	0.168 (0.030)	0.169 (0.032)	0.156 (0.065)	0.158 (0.065)
Institutions	8.97 (2.30)	-3.36 (4.46)	10.51 (3.50)	1.48 (9.51)						
Independence			-14.3 (22.9)			-6.4 (11.4)		1.1 (12.6)		2.0 (14.2)
U. K. industrialization *independence			-0.12 (0.21)			-0.042 (0.12)		0.046 (0.13)		0.06 (0.17)
U. K. industrialization *latitude								0.13 (0.50)		0.12 (0.48)
R <sup>2</sup>	0.75	0.74	0.75	0.84	0.89	0.89	0.88	0.88	0.87	0.87
Number of observations	59	75	59	32	59	59	59	59	59	59

The sophisticated geographic Hypothesis does not work as well

# Conclusions

- Simple, very linear paper, readable by any social scientist with a reasoning backed by simple statistics and simple regressions.
- Interesting and reasonable story.
- It matches the broad correlations, the timing, channel.
- Geography might have mattered before 1500 for economic fortunes but, for Europe ex-colonies did not matter much after colonization.

# Comments

- Left-out: Europe and non-colonized countries (such as Japan—China) what explains differences among those?
- In a grander scheme the reversal could have been even more drastic. Homo Sapiens evolved in Africa only, First civilization were in Egypt and Mesopotamia. So reversal is not new, the first one may be due to agricultural technologies. It is however uncommon in recent perspectives.
- Is the “private property” part of institution really the most important? Could it be literacy or diffused education?