Theories of a Revolution

- Exogenous Growth Theories: there was a shock to a feature outside of the economy (legal institutions, shock in supply of an input, etc.) that induced investment and innovation leading to growth
- Multiple Equilibrium Theories: a shock to the economy (disease, war, discovering new land, etc.) moved the economy from a bad equilibrium to a good equilibrium
- Endogenous Growth Theories: something internal to the economy evolved over time to create the conditions for growth (suggests that the Industrial Revolution was bound to happen eventually)

Theories of a Revolution

Examples of each type of theory:

- Exogenous Growth Theory: legal structures changed as a result of the Glorious Revolution, this created the incentives to innovate
- Multiple Equilibrium Theory: a shock switched families from a high fertility, low investment per child regime to a low fertility, high investment per child regime
- Endogenous Growth Theory: children of wealthy families gradually spread throughout income distribution bringing their high productivity traits with them

What specific theories are we going to consider?

- Institutions made the difference (North and Thomas, Acemoglu, Johnson and Robinson)
- Resources and access to the New World made the difference (Pomeranz)
- Geography made the difference (Diamond, AJR again)
- Fertility and the diffusion of good traits made the difference (Clark)

Institutional Change and the Industrial Revolution

- What are institutions? Why are they relevant to economic performance?
- Who creates institutions and who can change them?
- What changed institutions before the Industrial Revolution?
- How might institutional change explain the Industrial Revolution?
- Are there flaws in the institutional change story?

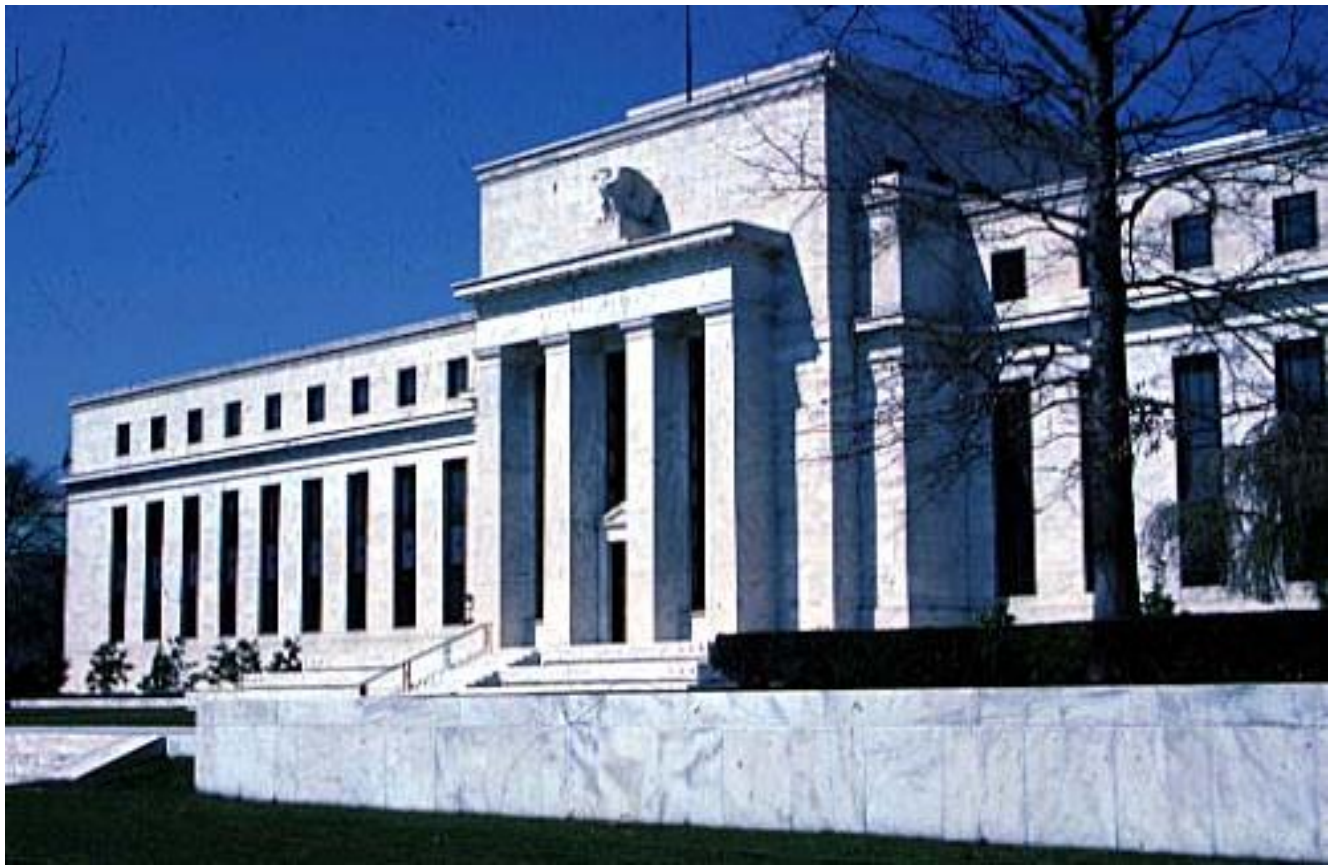
What are institutions?

North and Thomas's definition: 'An institution is "an arrangement between economic units that defines and specifies the ways by which these units can co-operate or compete."

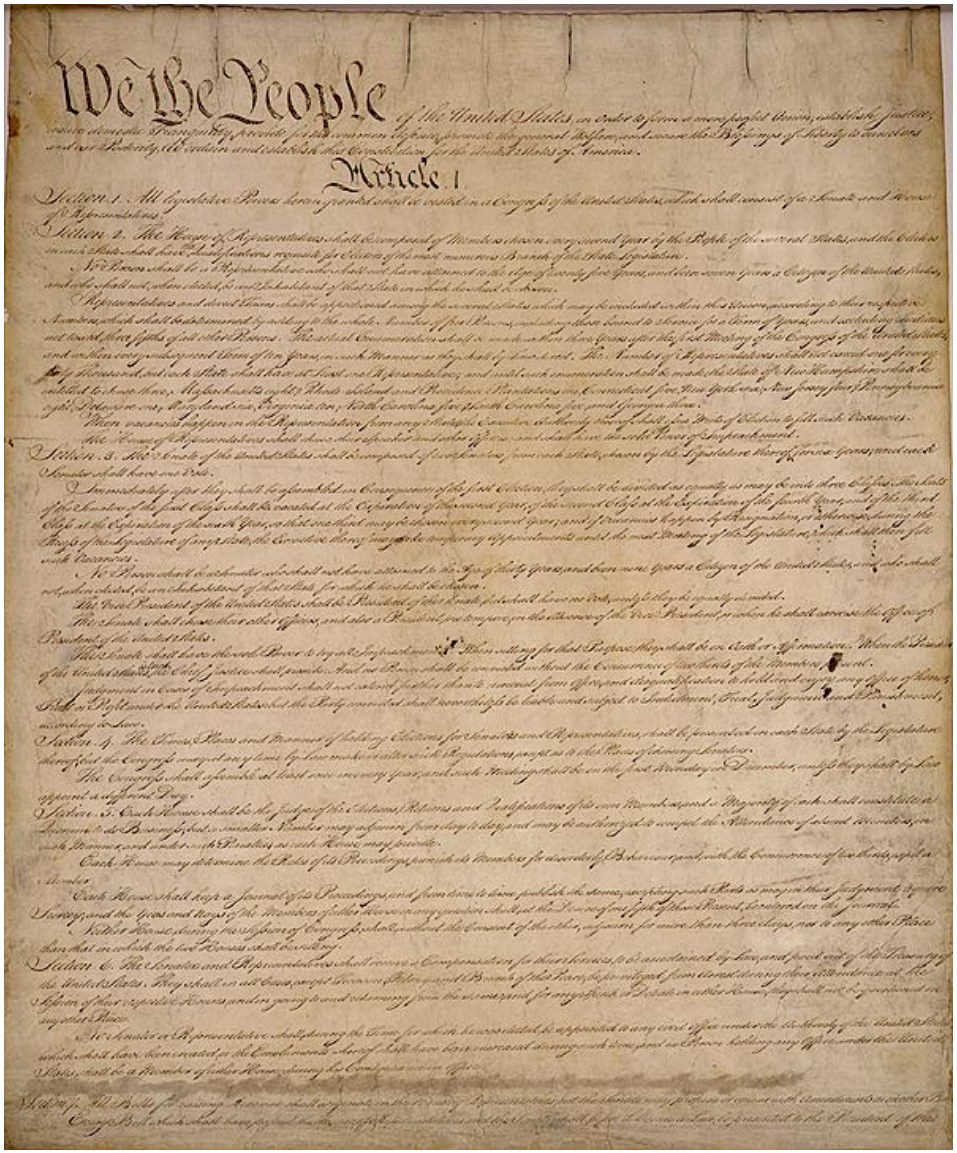
A simpler definition: Institutions are the basic rules of the economy.

What are institutions?

What are institutions?



What are institutions?



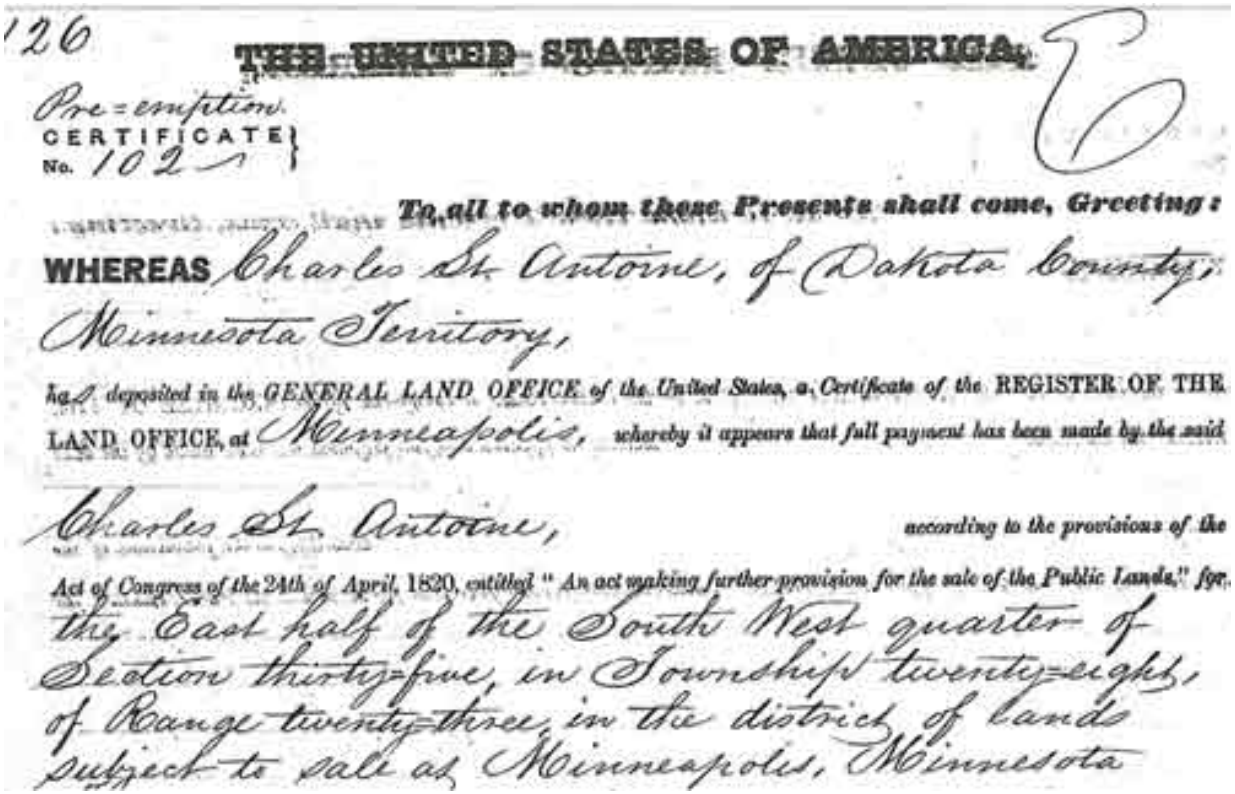
A Few Institutions Around Today

- Democracy
- Property rights
- Usury laws
- English language
- Patent system
- Systems of weights and measurement
- Table manners
- Tipping
- Walking on the right in the Morton stairwell

Formal/governmental institutions vs voluntary institutions

- We often think of the rules and structure of society as coming from the government. After all, the government has the authority to enforce the rules.
- However, many institutions are created not by the government but either through evolving social norms, religion, voluntary agreements between groups of people, organizations or firms, etc.
- The government is in a unique position of coercive power, but there are plenty of ways to punish people that break the rules even without the government's help.

Example of an institution created and protected by the government: property rights



126

THE UNITED STATES OF AMERICA.

Pre-emption.
CERTIFICATE
No. 102

To all to whom these Presents shall come, Greeting:

WHEREAS Charles St. Antoine, of Dakota County, Minnesota Territory,

has deposited in the GENERAL LAND OFFICE of the United States, a Certificate of the REGISTER OF THE LAND OFFICE, at Minneapolis, whereby it appears that full payment has been made by the said

Charles St. Antoine, according to the provisions of the Act of Congress of the 24th of April, 1820, entitled "An act making further provision for the sale of the Public Lands," for the East half of the South West quarter of Section thirty-five, in Township twenty-eight, of Range twenty-three, in the district of lands subject to sale at Minneapolis, Minnesota

A non-governmental approach to property rights

A Famous Case of Firms Creating Voluntary Institutions

The Maghribi Traders' Coalition (Greif, 1993)

- The traders had a problem: how do you sell your goods in far away markets?
- Initial solution: hire an agent, but agents were likely to cheat the merchant
- Formal legal institutions didn't help
- Solution: form a coalition of merchants and punish agents that cheat by not employing them in the future

How do institutions change?

- Institutions can quietly evolve over time (think of social norms)
- The government can change certain institutions through legislation
- Firms and other individuals can change voluntary institutions through renegotiating contracts and arrangements
- Institutional change can also occur through less civil means (think revolution)
- No matter how it occurs, institutional change involves some cost. For it to happen, the potential benefits have to outweigh the costs for someone with enough power to initiate change

Basic Outline of North and Thomas Argument

1. Malthusian population pressure led to changes in relative product and factor prices.
2. These changes relative prices induced fundamental institutional change.
3. The new institutions channeled incentives toward productivity raising types of economic activity
4. The result was that productivity advance became an internalized feature of the economy.
5. By creating incentives for innovation, these new institutions created the condition for sustained productivity allowing us to escape the Malthusian trap.

North and Thomas's Characterization of the Medieval World

- There was an abundance of land available for colonization and settlement that was of equal quality to the land already being settled.
- Labor, not land, was the scarce factor of production.
- There was little long-distance trade; most trade was confined to the local exchange of goods and services.
- The rate of innovative activity was fairly low.

Population Pressure and the Agricultural Sector

- Population growth changed the value of feudalism as an institution.
- Labor became more abundant and land became more scarce.
- Agricultural prices rose relative to non-agricultural prices leading to increased land value and decreased wages.
- It became more profitable to control land than to control people.
- Developed new notions of private property (for example, the enclosure movement)

Population Pressure and the Non-Agricultural Sectors

- Differences in population pressure throughout Europe led to differences in relative factor endowments of different regions and increased potential gains to trade.
- However, trade was obstructed by high transaction costs (lack of information about potential markets, pirates, etc.)
- Merchant trading groups develop, people place agents in different cities, deposit banking and insurance institutions are created.

Other Effects of Trade Expansion on Institutions

- Formal contracts replace informal agreements and trading relationships become more impersonal.
- Fostering the concept of contractual obligation helps create a foundation for stronger property rights.
- Creates new firm structures like the joint-stock company.
- As trade covered larger distances, larger political units were created to handle the needs of traders.
- International financial markets develop.

How did these institutional changes lead to steady innovation?

- The expansion of markets led to greater potential profits from innovation.
- Institutional changes were made to direct the returns from innovation to the innovator.
- Development of patents protected innovator's profits.
- Improvements to land became profitable with the development of property rights.
- Investment in human capital became profitable when labor became free.
- Investment in innovation became profitable with the development of property rights (as well as other bounties and subsidies).

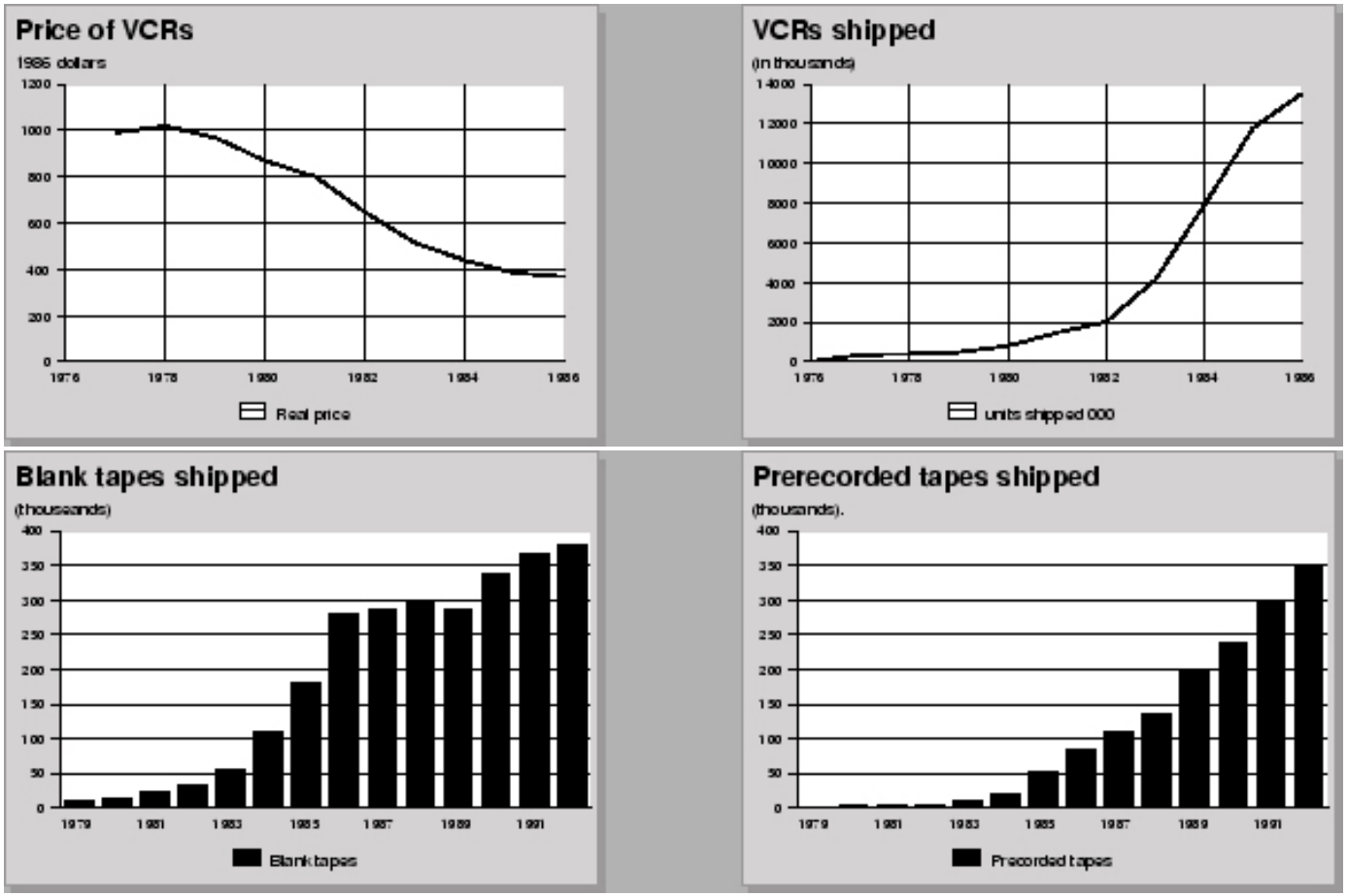
Summary of the North and Thomas Story

- Institutions are a crucial part of how well economies will function.
- Institutions like property rights, patent systems, rule of law, international financial institutions, etc. can all help provide incentives for individuals to innovate and invest.
- As population pressures grew, changes in relative prices between land and labor and between countries led to changes in the value of property relative to people and the potential gains from international trade.
- New institutions arose to protect private property, to facilitate impersonal contracts and international trade, and to protect innovations.
- The potential profits from innovation were large due to expanding markets and secured by new institutions. This internalized innovation in the economic system.

A Modern Example (with far less importance)

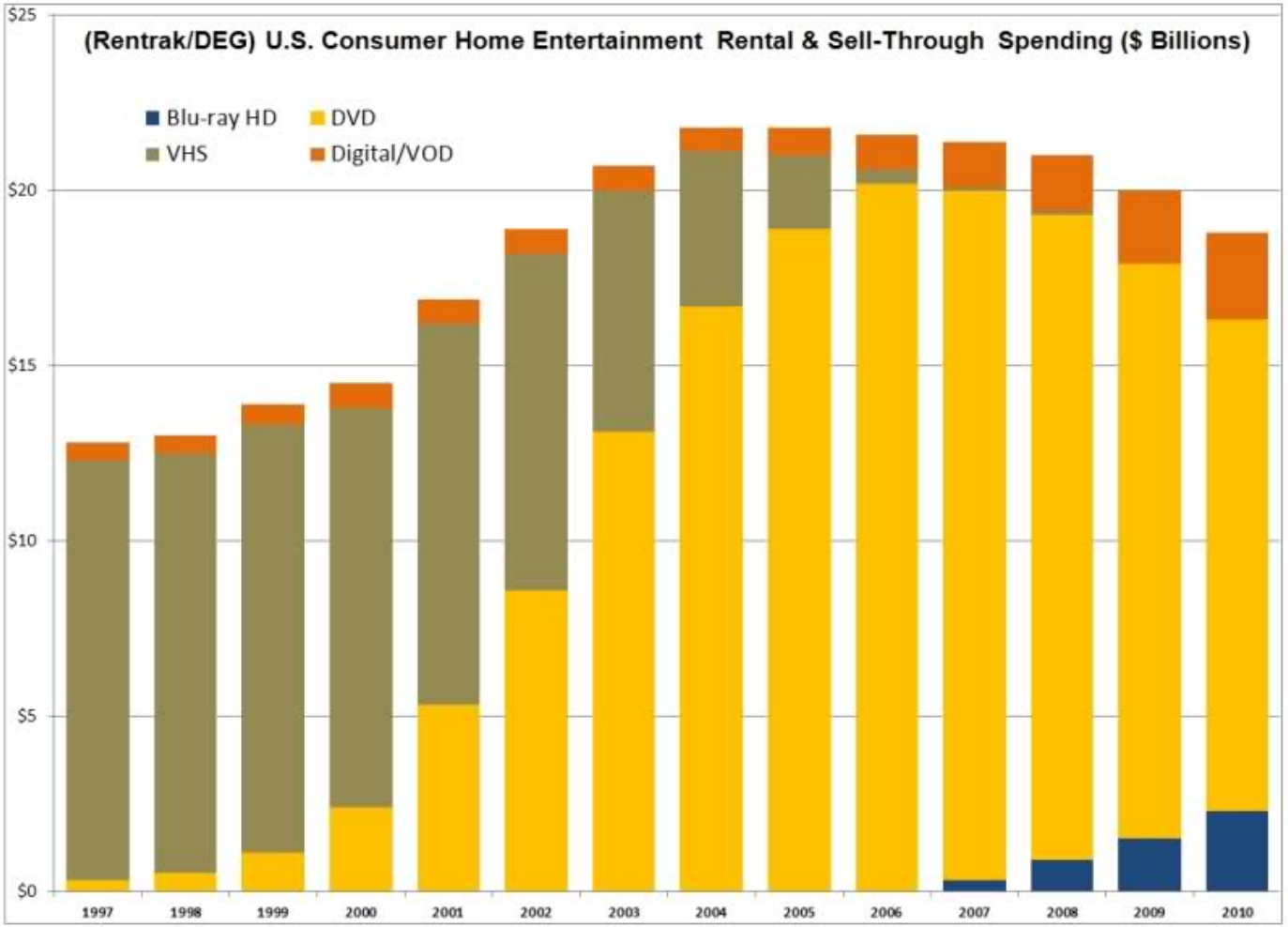
2007-2008 Writers Guild of America Strike

A Modern Example (with far less importance)



2007-2008 Writers Guild of America Strike

A Modern Example (with far less importance)



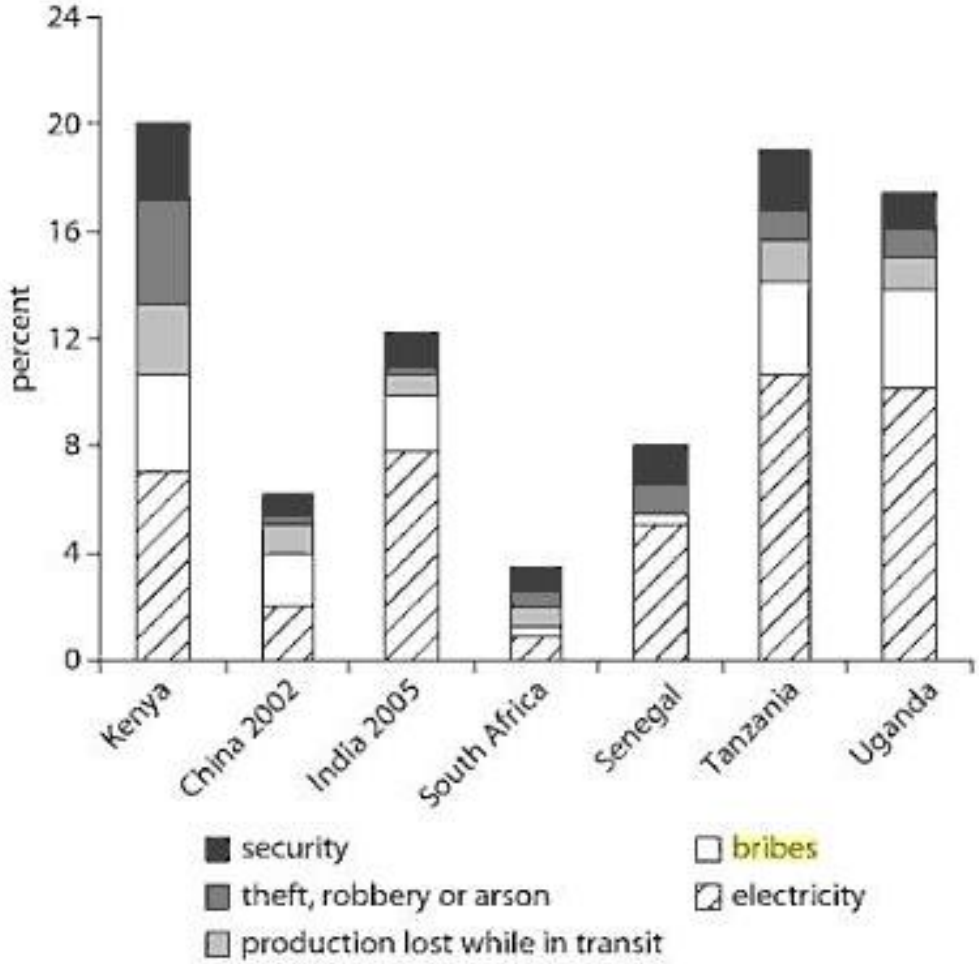
2007-2008 Writers Guild of America Strike

The Importance of Institutions

- It is a compelling story, but how do we test something like the importance of institutions?
- Let's start with a very basic approach
- Is there direct evidence that better institutions are correlated with better economic performance?
- If so, then we can move on to asking whether there is evidence that better institutions *cause* better economic performance

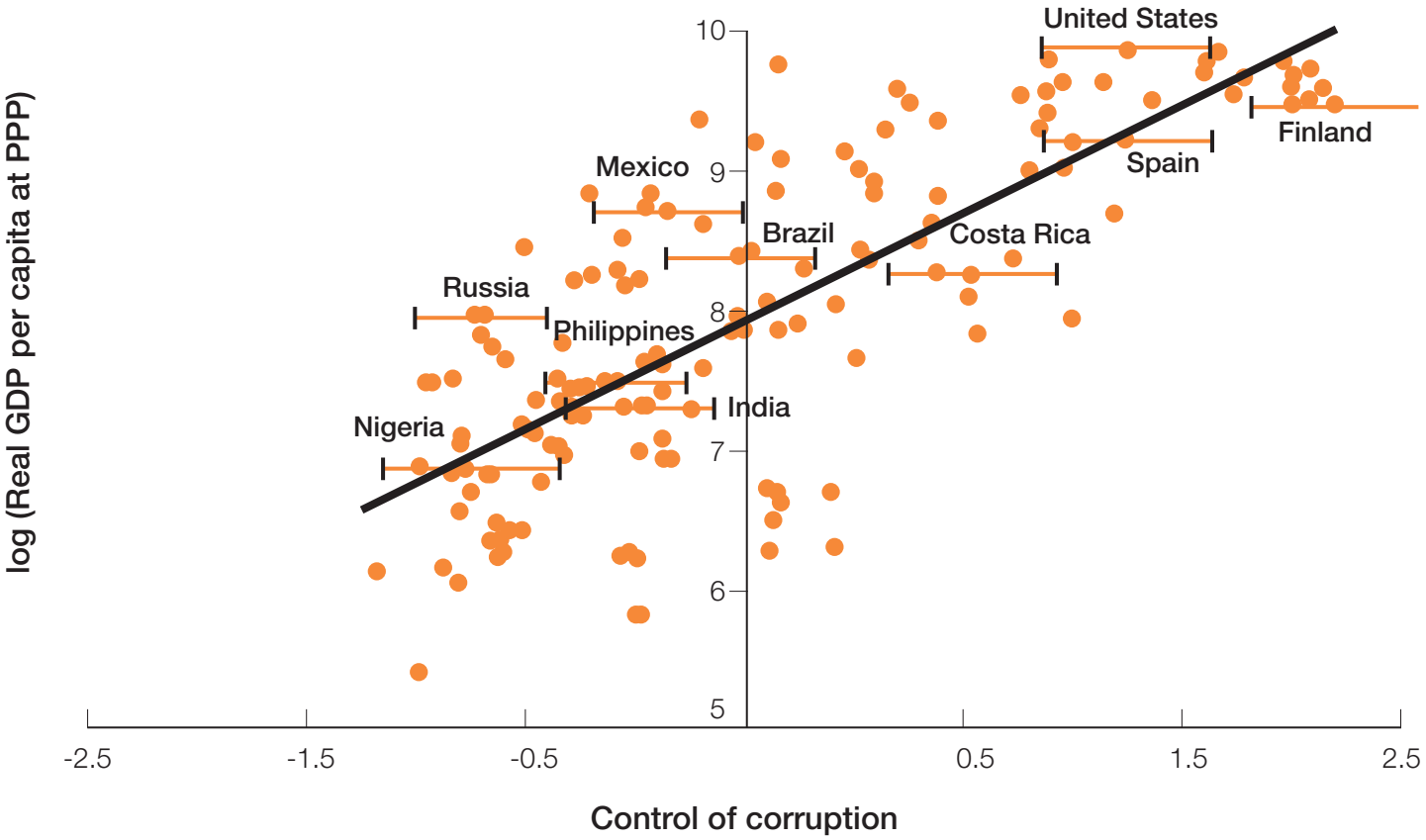
How costly are bad institutions?

Figure 2.3 Indirect Costs, All Formal Firms—International Comparison

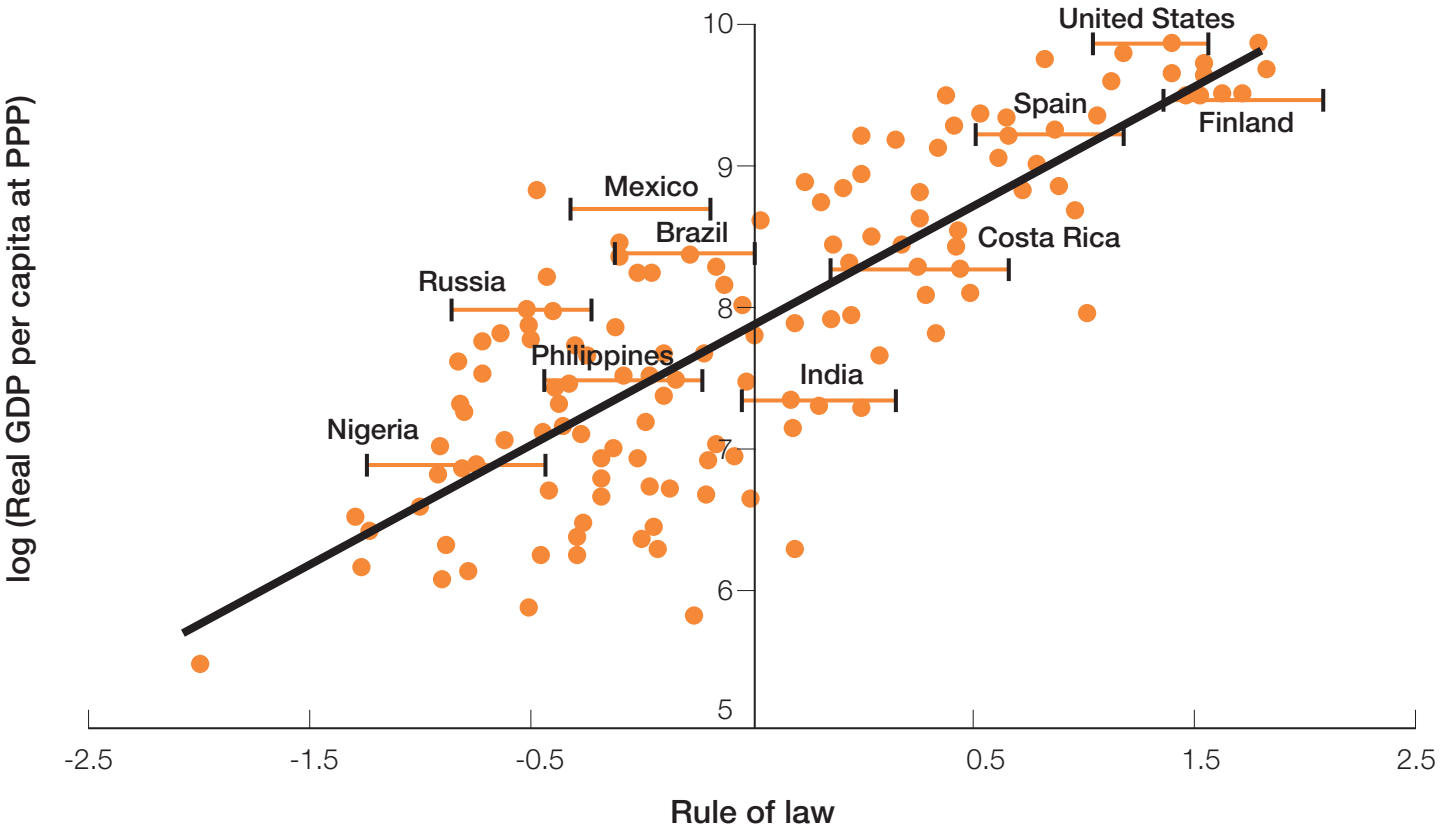


Source: ICA Survey.

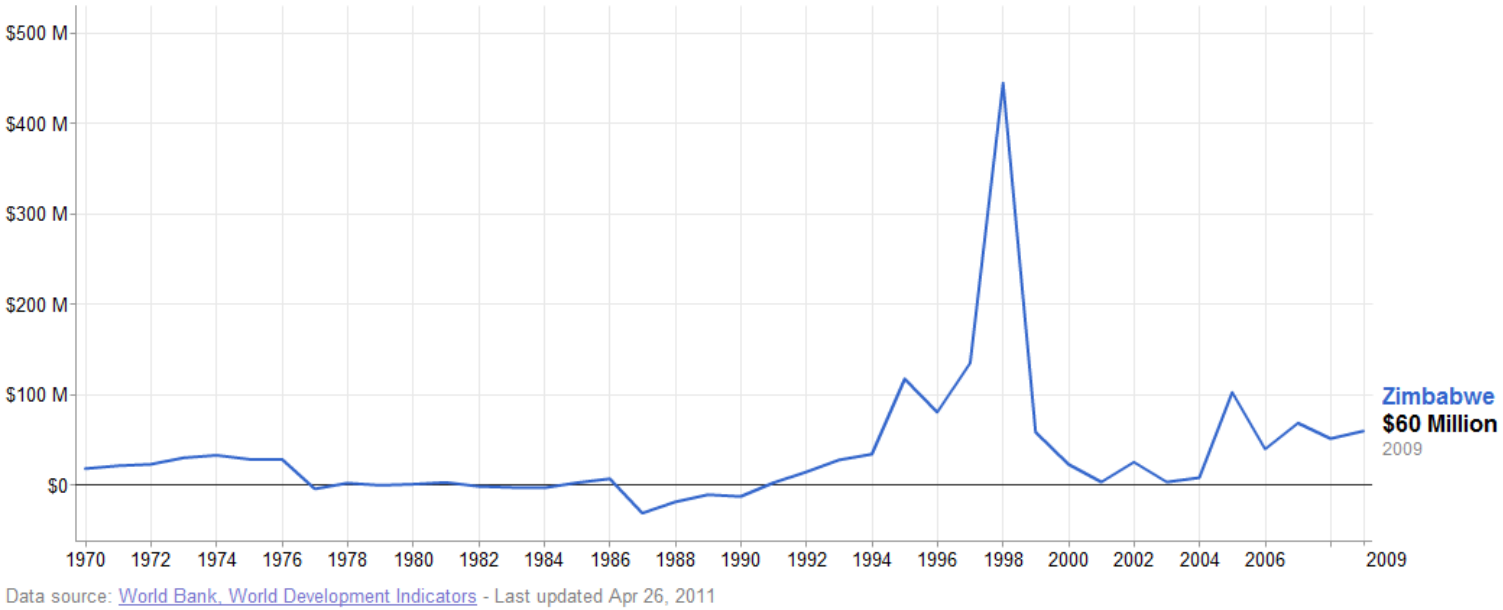
How costly are bad institutions?



How costly are bad institutions?



How costly are bad institutions?



Foreign direct investment in Zimbabwe, 1970-2009

Institutions and the Direction of Innovation

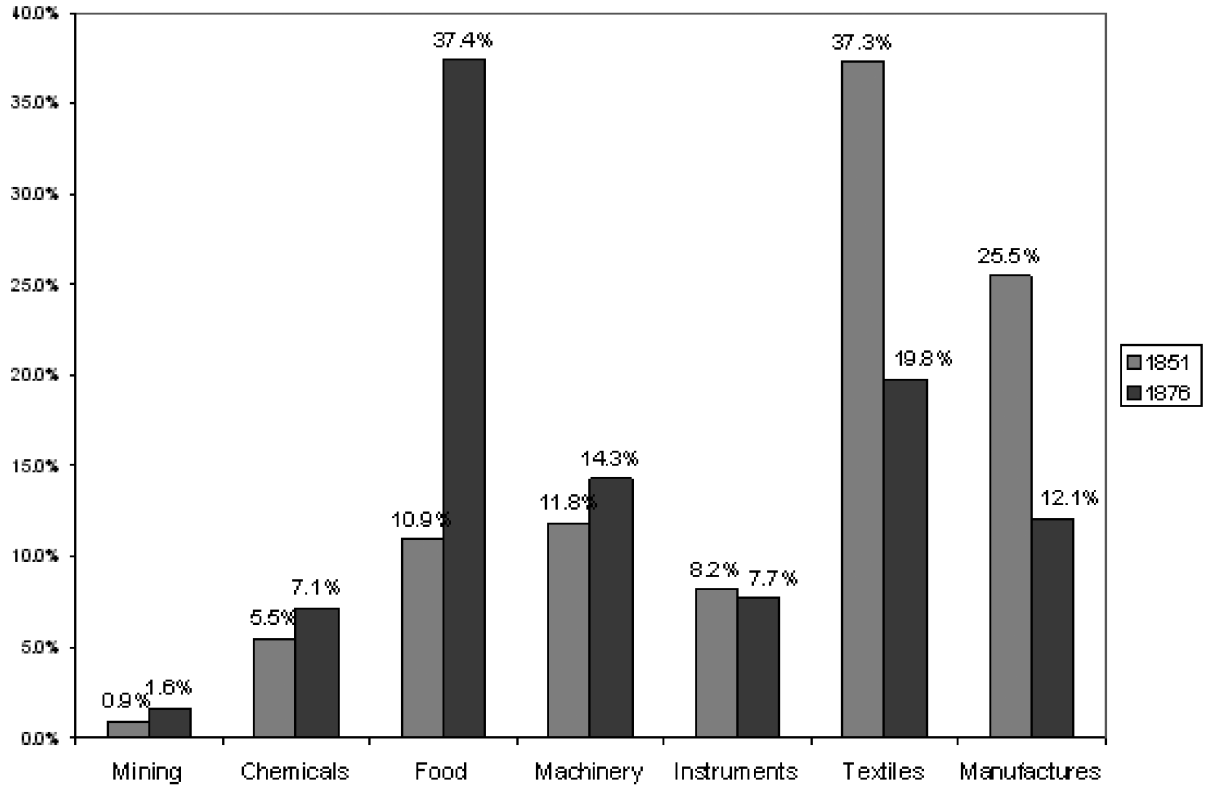


FIGURE 3. DUTCH INNOVATIONS ACROSS INDUSTRIES BEFORE AND AFTER THE ABOLITION OF PATENT LAWS IN 1869

Criticisms of the Institutional Explanation

- If institutional change is driven by people wanting to improve economic efficiency, institutions themselves aren't that interesting. People will change them when they need changing.
- People find ways around institutions: consider bans on interest rates (or on scalping).
- North and Thomas story may help explain 'why Europe' but not necessarily 'why not China, Japan, India, etc.' (more on this later)
- It's not as clearcut as one might think that the innovations of the Industrial Revolution happened because institutions directed a large part of the returns to the individual.

Private Returns to Innovation During the Industrial Revolution

Gains from Innovation During the Industrial Revolution

Inventor	Invention	Result
John Kay	flying shuttle	Impoverished by litigation to enforce patent, house attacked by machine breakers, fled to France and died in poverty
James Hargreaves	spinning jenny	Difficulty enforcing patent, forced to flee by machine breakers
Richard Arkwright	water frame	Died wealthy but had trouble enforcing (and keeping) patents
Samuel Crompton	mule	Did not patent invention, did receive an award from parliament but never saw big success
Edmund Cartwright	power loom	Mill repossessed by creditors, factory burned by machine breakers
Eli Whitney	cotton gin	Costly litigation to enforce patent, near bankruptcy
Richard Roberts	self-acting mule	In financial trouble by end of career

Experimental Evidence

- There are some big questions about institutions as an explanation
- It could be that societies that develop good institutions develop them because of other traits
- These other traits may be the truly important causes of economic growth
- In other words, if institutions are endogenous, they aren't a complete story
- If we were in the hard sciences, we would set up an experiment: take two Petri dishes with cloned economies in them and put a few drops of good institutions in one and bad institutions in the other

Experimental Evidence

- We don't have the luxury of Petri dishes
- What we can try to use is a *natural experiment*
- From the New Palgrave Dictionary of Economics:

> *Natural experiments or quasi-natural experiments in economics are serendipitous situations in which persons are assigned randomly to a treatment (or multiple treatments) and a control group, and outcomes are analysed for the purposes of putting a hypothesis to a severe test; they are also serendipitous situations where assignment to treatment approximates randomized design or a well-controlled experiment.*

Experimental Evidence

- We don't have the luxury of Petri dishes
- What we can try to use is a *natural experiment*
- A slightly different definition:

  Natural experiments are cases where there is variation in the explanatory variable of interest driven by some random process unrelated to either the dependent variable or important unobserved variables, effectively giving us the equivalent of a randomized trial.

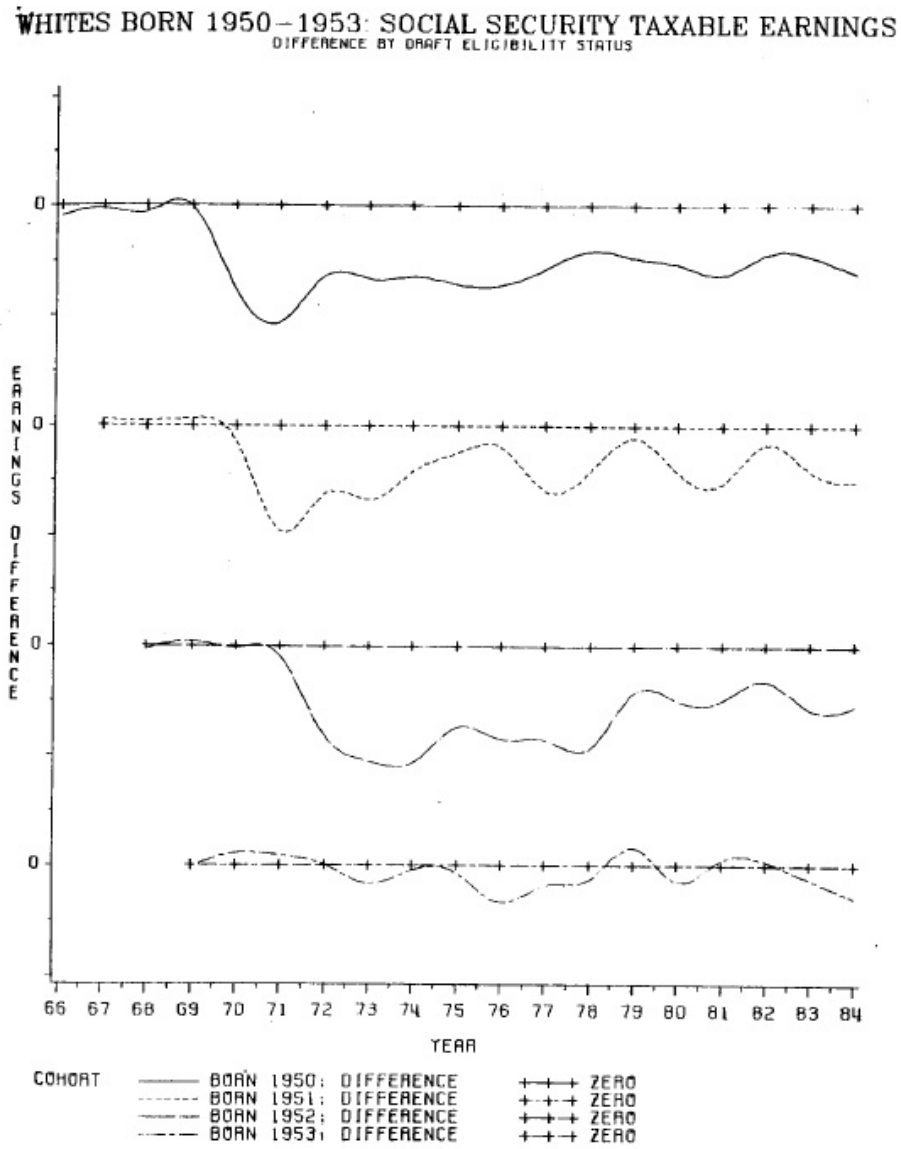
Natural Experiments

- For example, suppose we want to know how military service affects income later in life
- The problem is that military service is correlated with lots of other things affecting income
- It could be that people go into the military because they can't get into college
- It could be that people go into the military because they want to go to college on the GI Bill
- Differences in earnings for vets and non-vets may be about these underlying differences in enlistees and non-enlistees, not about the effects of military service

Natural Experiments

Natural Experiments

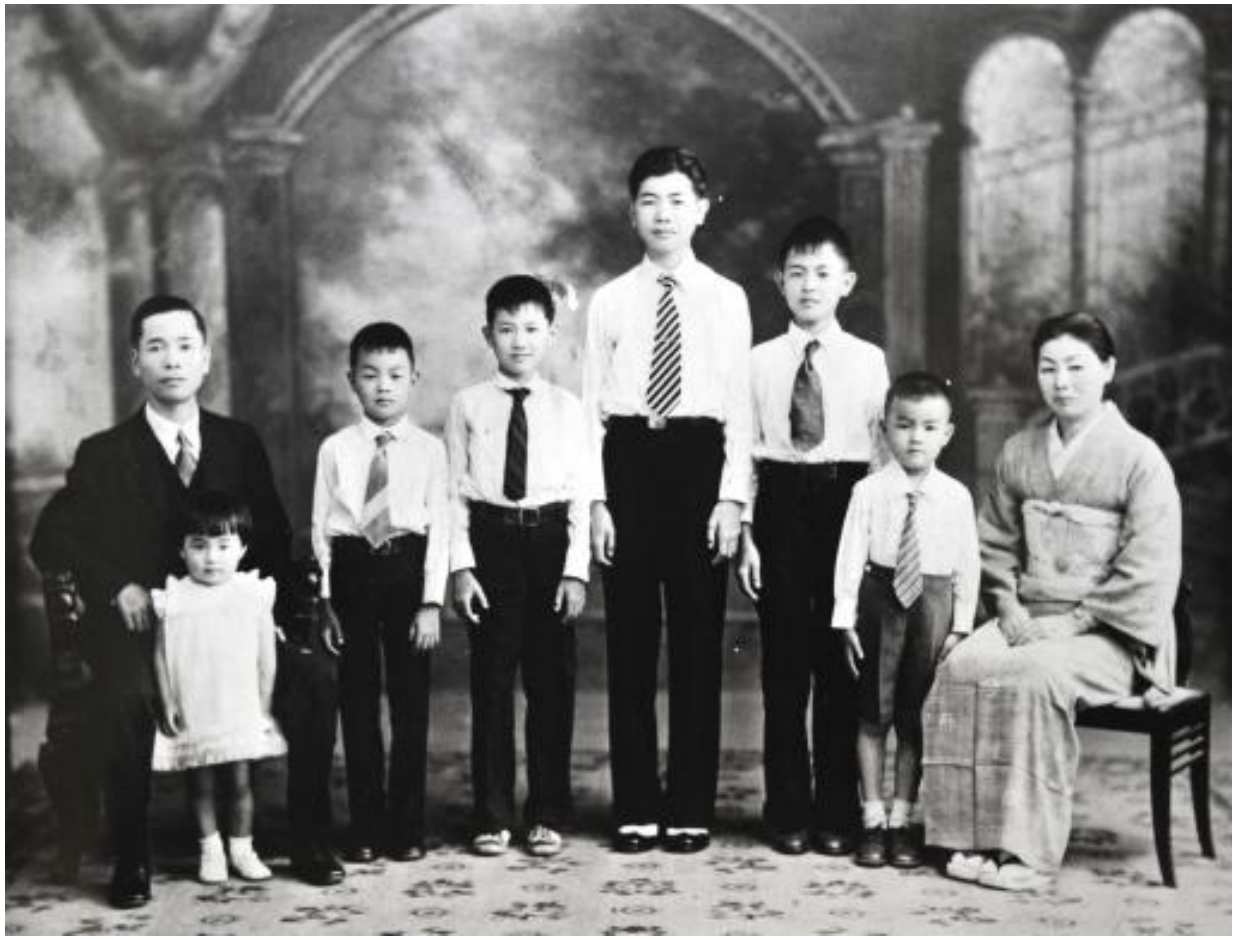
Natural Experiments



Natural Experiments

- Another example, how does having an additional child affect labor force participation?
- The group of women choosing small families may have different preferences and unobserved characteristics than women choosing large families
- The difference in labor force participation between these groups may be about preferences for work, family, etc. and not the actual effect of additional children
- So how do we get random variation in family size?
- Is there a draft where if your number is called, you have to have a new kid?

Natural Experiments



Iwatake family, Hawaii, 1930s

Natural Experiments

Child gender and family size (Angrist and Evans, 1998)

Sex of first two children	Fraction of sample	Fraction who had another child
Boy, girl	0.497	0.331
Two girls	0.239	0.408
Two boys	0.264	0.396
Boy, girl	0.497	0.331
Both same sex	0.503	0.401
Difference		0.07

Natural Experiments

TABLE 7—OLS AND 2SLS ESTIMATES OF LABOR-SUPPLY MODELS USING 1980 CENSUS DATA

	All women			Married women			Husbands of married women		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Estimation method	OLS	2SLS	2SLS	OLS	2SLS	2SLS	OLS	2SLS	2SLS
Instrument for *More than 2 children*	—	*Same sex*	*Two boys, Two girls*	—	*Same sex*	*Two boys, Two girls*	—	*Same sex*	*Two boys, Two girls*
Dependent variable:									
Worked for pay	−0.176	−0.120	−0.113	−0.167	−0.120	−0.113	−0.008	0.004	0.001
	(0.002)	(0.025)	(0.025)	(0.002)	(0.028)	(0.028)	(0.001)	(0.009)	(0.008)
			[0.013]			[0.013]			[0.013]
Weeks worked	−8.97	−5.66	−5.37	−8.05	−5.40	−5.16	−0.82	0.59	0.45
	(0.07)	(1.11)	(1.10)	(0.09)	(1.20)	(1.20)	(0.04)	(0.60)	(0.59)
			[0.017]			[0.071]			[0.030]
Hours/week	−6.66	−4.59	−4.37	−6.02	−4.83	−4.61	0.25	0.56	0.50
	(0.06)	(0.95)	(0.94)	(0.08)	(1.02)	(1.01)	(0.05)	(0.70)	(0.69)
			[0.030]			[0.049]			[0.71]
Labor income	−3768.2	−1960.5	−1870.4	−3165.7	−1344.8	−1321.2	−1505.5	−1248.1	−1382.3
	(35.4)	(541.5)	(538.5)	(42.0)	(569.2)	(565.9)	(103.5)	(1397.8)	(1388.9)
			[0.126]			[0.703]			(0.549)
ln(*Family income*)	−0.126	−0.038	−0.045	−0.132	−0.051	−0.053	—	—	—
	(0.004)	(0.064)	(0.064)	(0.004)	(0.056)	(0.056)			
			[0.319]			[0.743]			
ln(*Non-wife income*)	—	—	—	−0.053	0.023	0.016	—	—	—
				(0.005)	(0.066)	(0.066)			
						[0.297]			

Natural Experiments and Institutions

- With this notion of natural experiments, let's rethink the possibility of our Petri dishes and dropper full of institutions
- Perhaps there is a source of exogenous variation in institutions, some variation that is completely independent of the relevant characteristics of the society in question
- The two Acemoglu, Johnson and Robinson papers on the reading list explore this possibility
- African countries will be our Petri dishes
- Colonial powers will be dropping in the institutions

Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution

- Written by Acemoglu, Johnson and Robinson in the Quarterly Journal of Economics (2002)
- Argues that countries colonized by Europeans that were rich are now poor
- The basic argument is the following:
  - Europeans were more likely to introduce institutions protecting private property in regions that were poor
  - Europeans were more likely to introduce institutions of extraction in regions that were rich
  - These institutions led to different development paths and the "reversal of fortune"

Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution

- If an area was underdeveloped, Europeans had the incentives to encourage development in order to make the colony valuable to the Europeans
- In these cases, Europeans were likely to introduce *institutions of private property*
- In AJR's words:

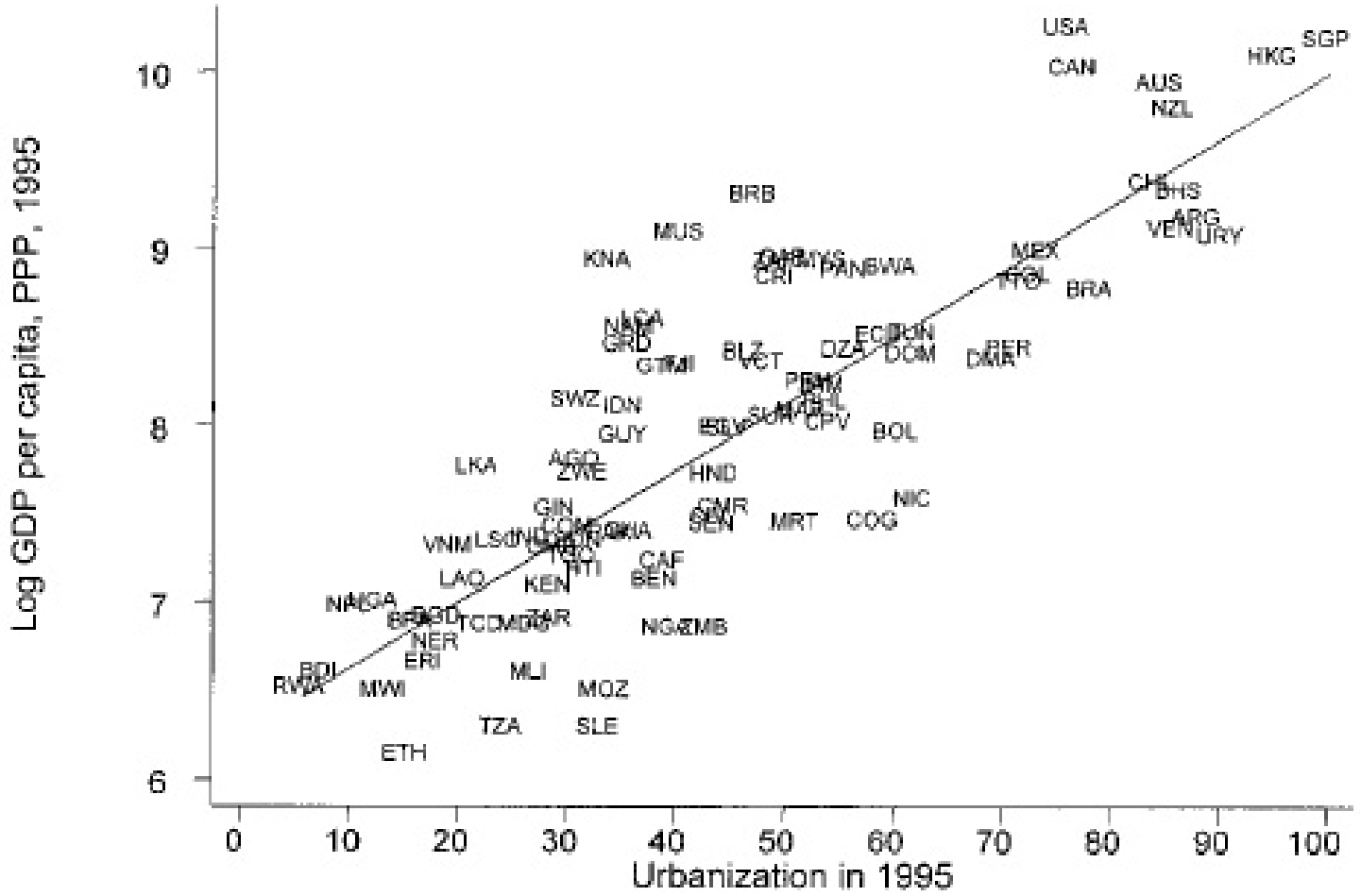
  > *...a cluster of institutions ensuring secure property rights for a broad cross section of society...essential for investment incentives*

Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution

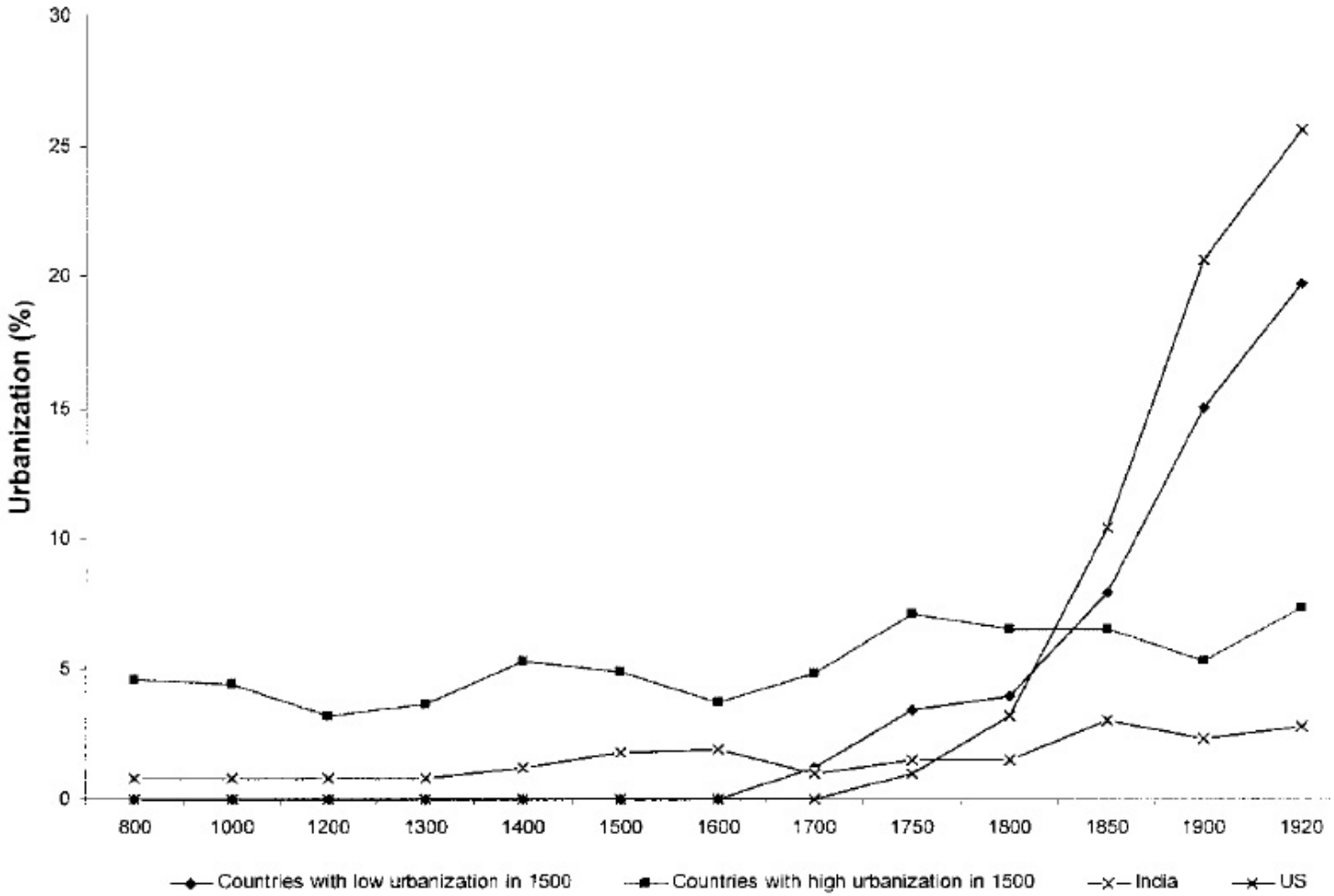
- If an area was already well developed, Europeans were more likely to focus on the short term benefits of extracting as much of the wealth and resources as possible
- In these cases, Europeans were likely to introduce *extractive institutions*
- In AJR's words:

> *...[institutions] which concentrate power in the hands of a small elite and create a high risk of expropriation for the majority...[and] discourage investment and economic development...*

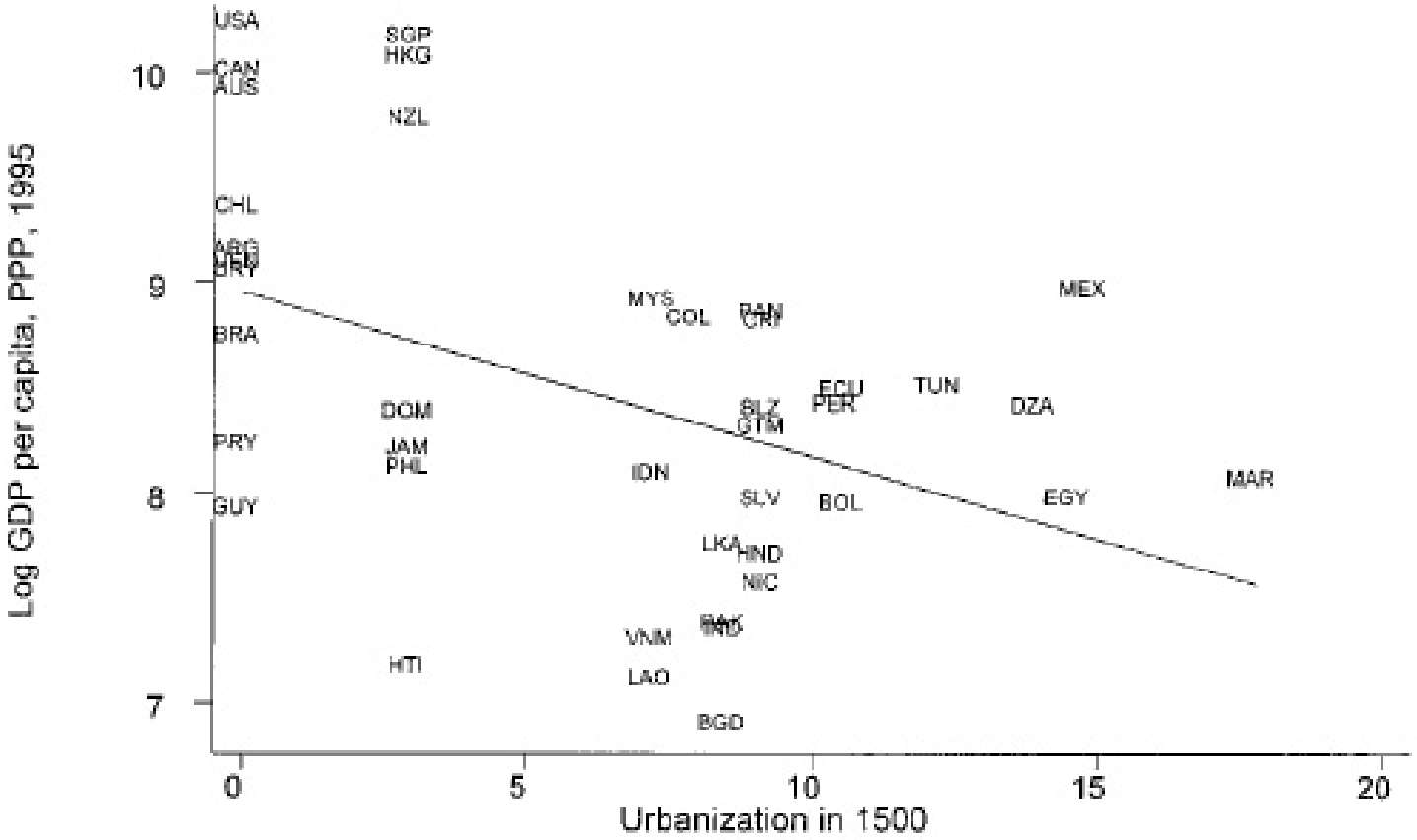
Modern GDP and Urbanization Rates



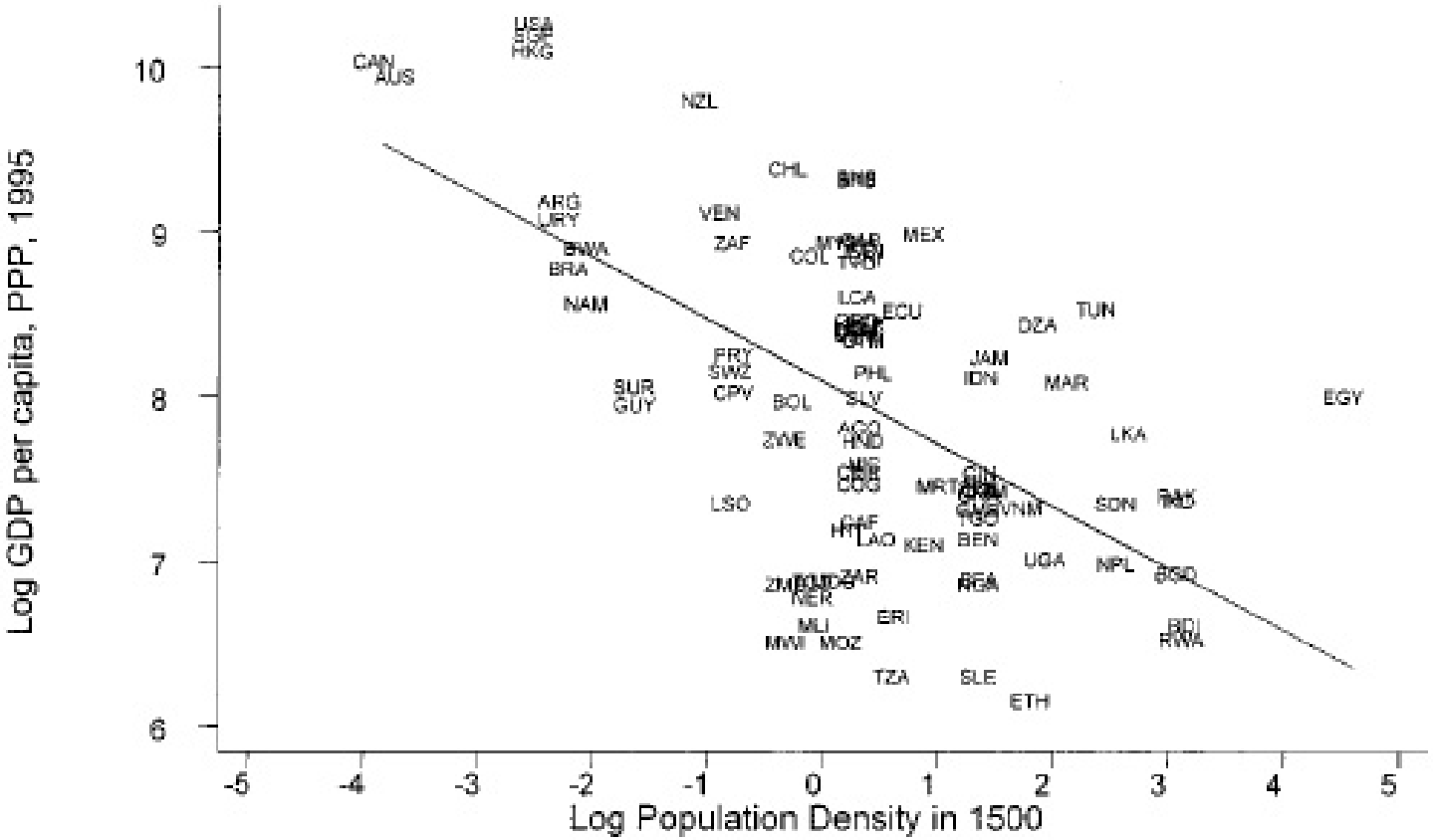
Urbanization Rates Over Time



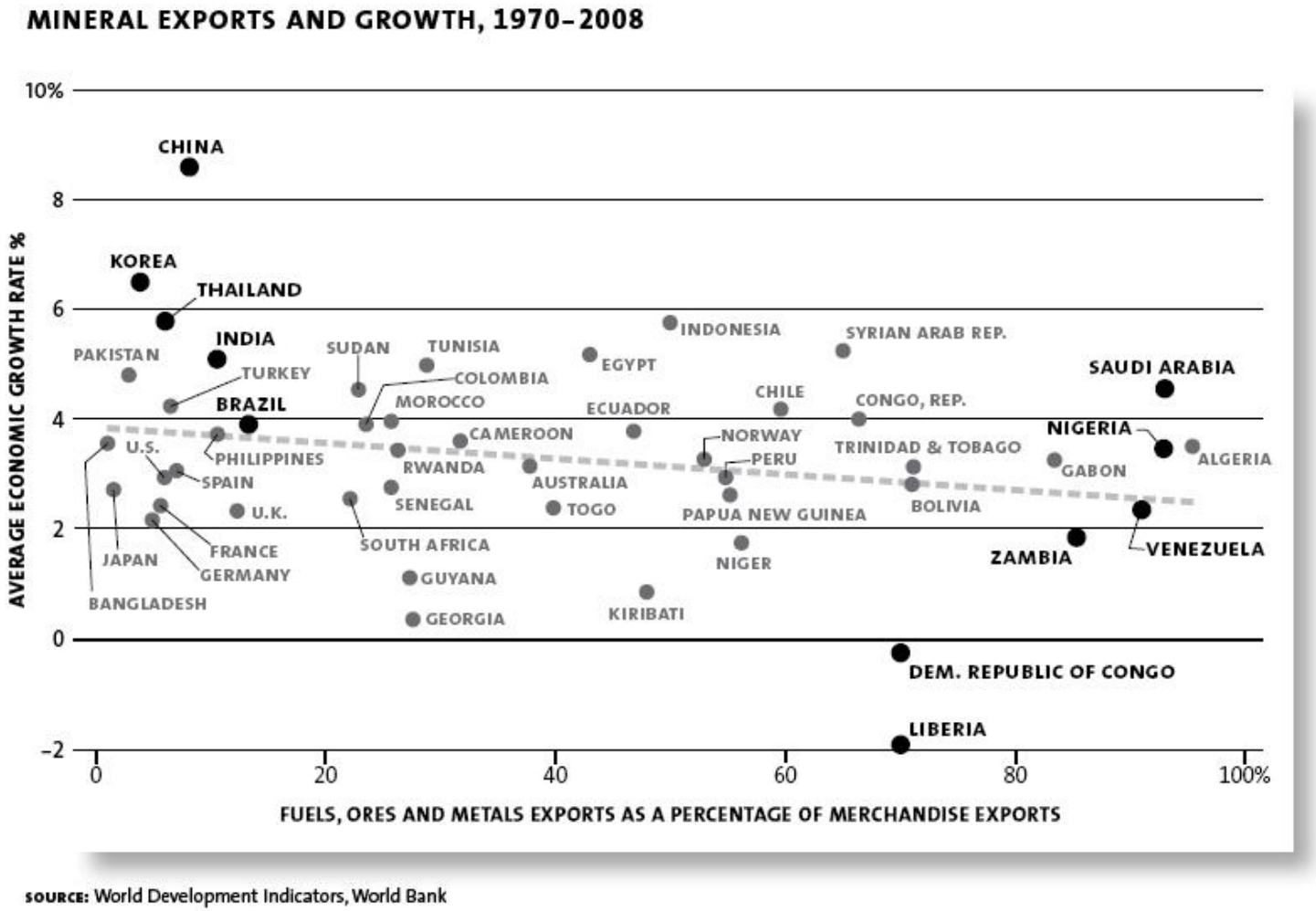
Economic Development and Urbanization in 1500



Economic Development and Population Density in 1500



The Resource Curse

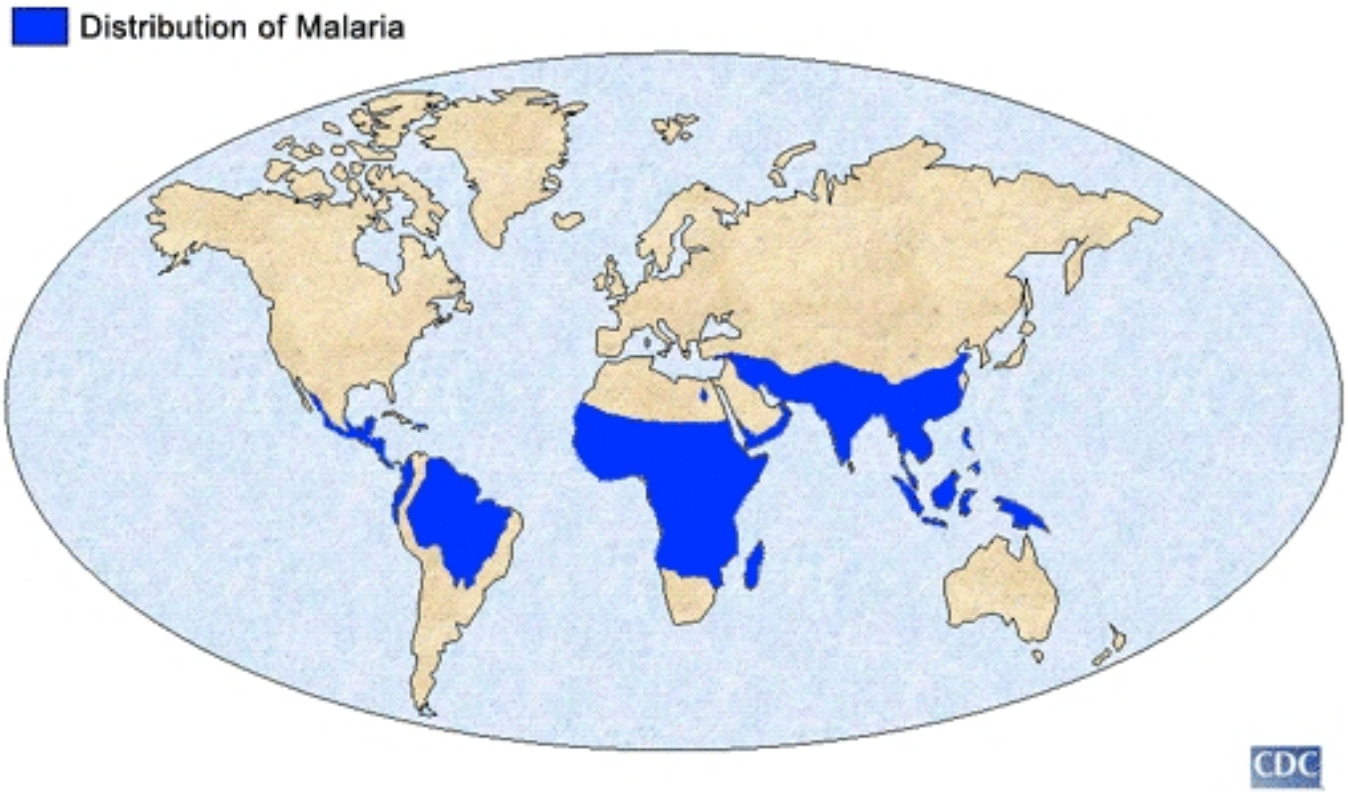


SOURCE: World Development Indicators, World Bank

The Colonial Origins of Comparative Development

- Written by Acemoglu, Johnson and Robinson in the American Economic Review (2001)
- Similar to other argument, development depends on the types of institutions Europeans set up
- Type of institutions is determined by whether Europeans could settle the area
- Areas with high mortality rates for Europeans were more likely to get extractive institutions
- Areas with low mortality rates were better for settling long term and if you want to be there for a while, you want good institutions

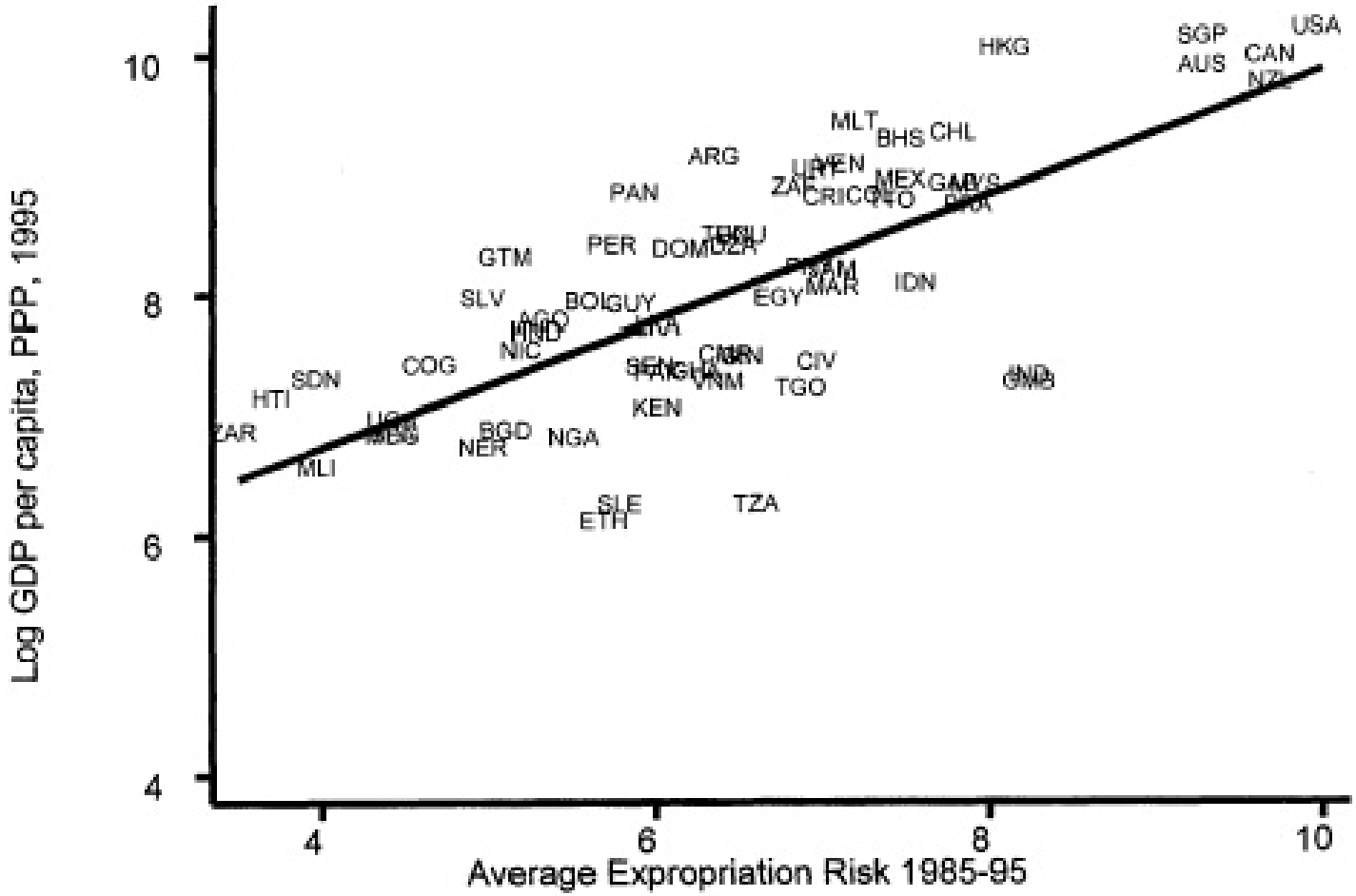
Economic Development and Colonial Mortality



Economic Development, Institutions and Settler Mortality

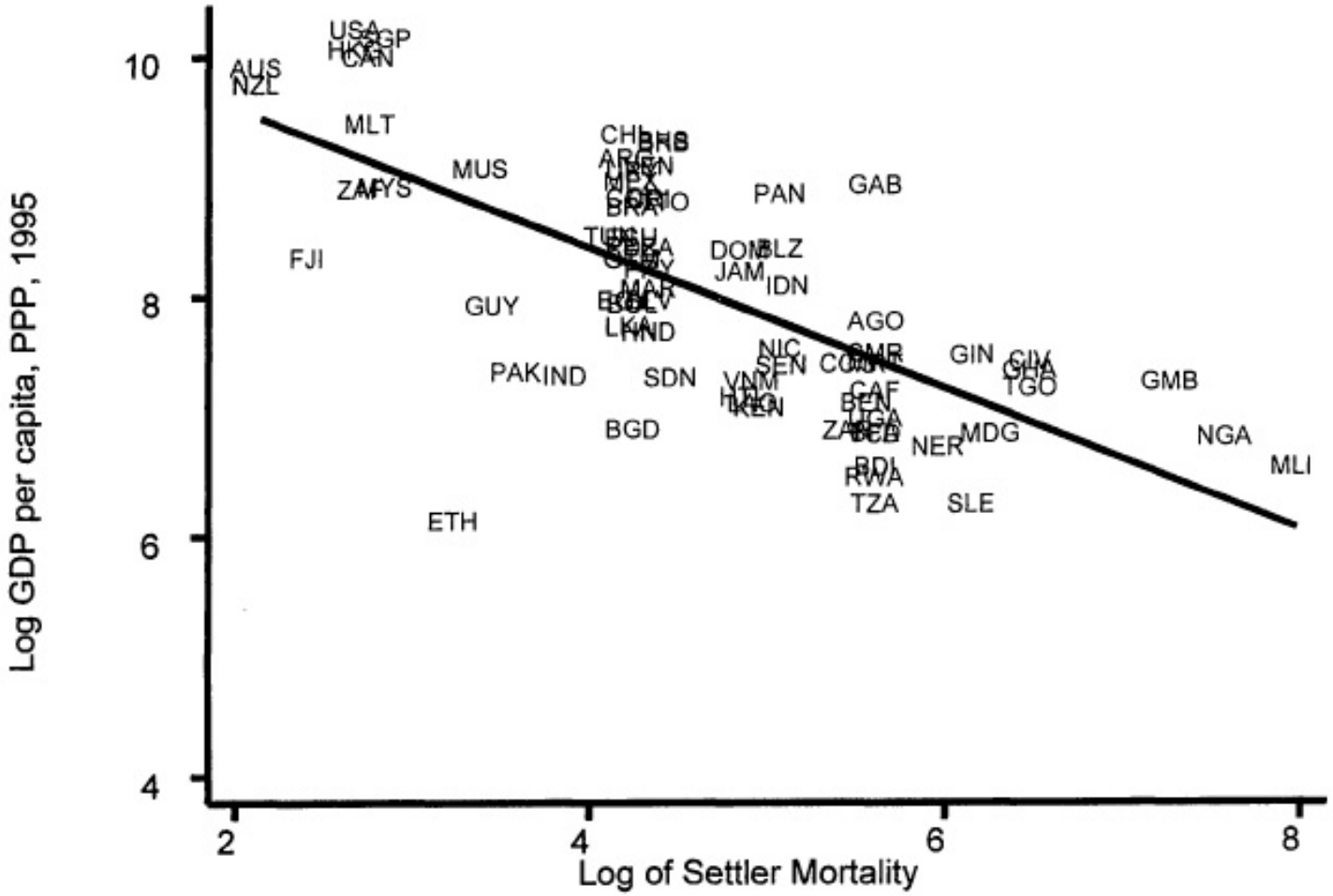
	Quartiles of settler mortality			
	Bottom	2nd	3rd	Top
Log GDP per capita in 1995	8.9	8.4	7.7	7.2
Average protection against expropriation risk, 1985-1995	7.9	6.5	6	5.9
Constraint on executive in 1990	5.3	5.1	3.3	2.3
Constraint on executive in 1900	3.7	3.4	1.1	1
Democracy in 1900	3.9	2.8	0.19	0
European settler mortality rate	20	74	134	545

Economic Development and Expropriation Risk



Horizontal axis measures protection against expropriation risk, so a higher number means less expropriation risk

Economic Development and Colonial Mortality



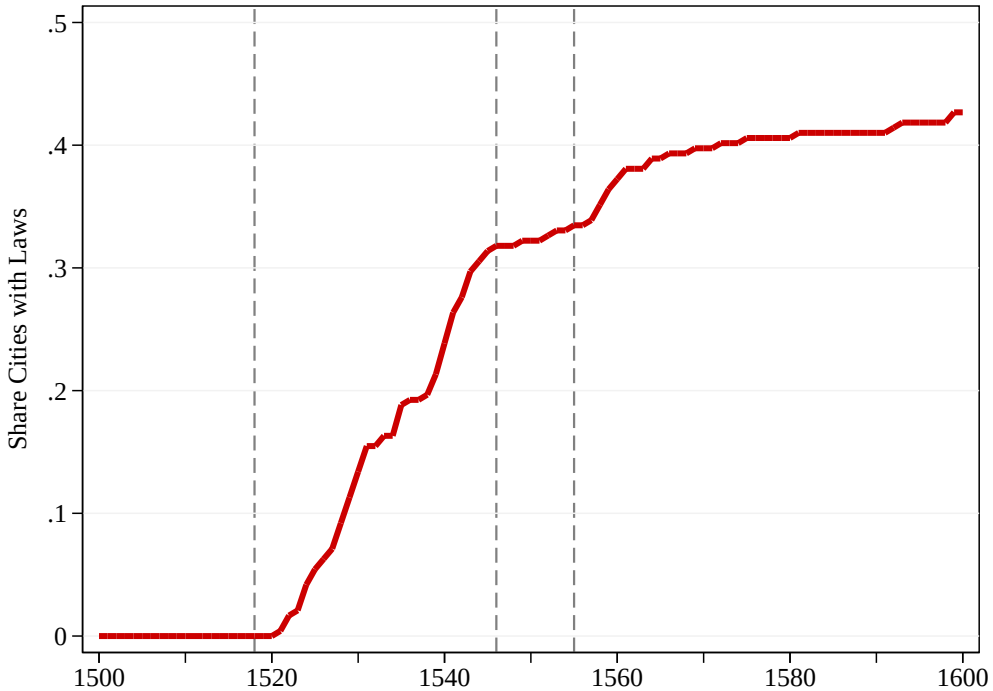
Evidence from Europe

- Acemoglu, Johnson and Robinson offer empirical evidence for institutions and economic growth in colonies, but what about institutions in Europe?
- Is there an exogenous source of institutional change within European countries?
- Let's look at some very recent work by Dittmar and Meisenzahl on Germany in the 1500s

Evidence from Europe

Evidence from Europe

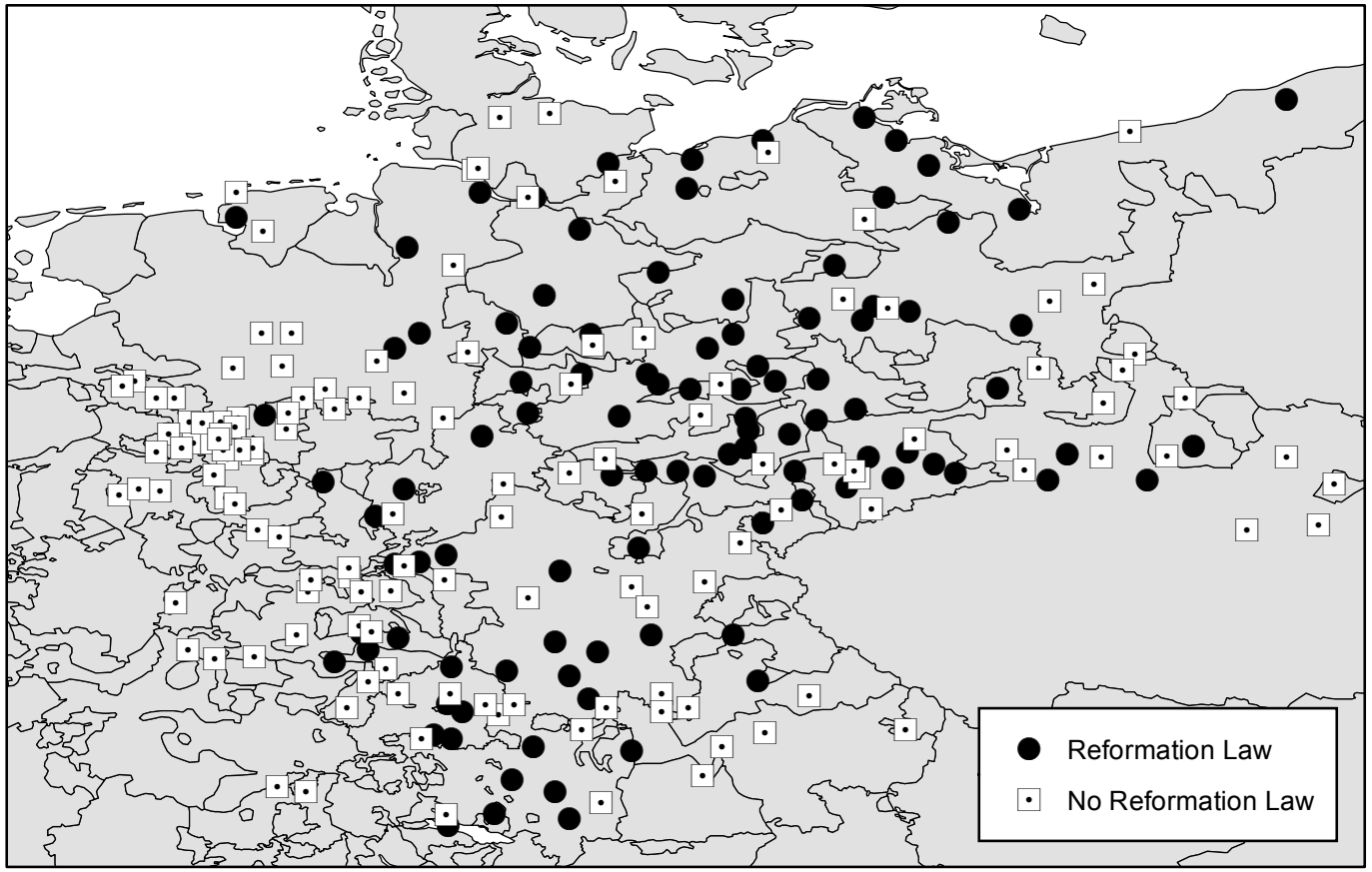
Figure 2: The Share of Cities with Reformation Laws



This graph shows the share of cities with a Reformation Law. Vertical lines mark the mass circulation of Luther's ideas in 1518, the Schmalkaldic War of 1546, and the Peace of Augsburg in 1555.

Evidence from Europe

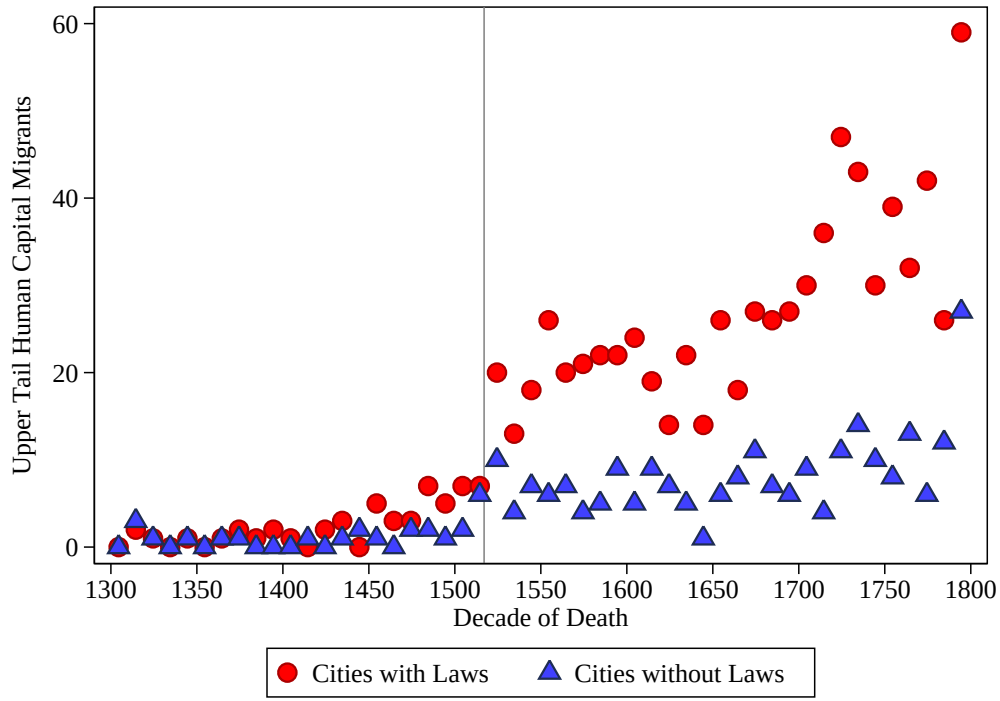
Figure 1: Cities With and Without Reformation Laws



This map shows cities with Reformation Laws (black circles) and without these laws (white squares).

Evidence from Europe

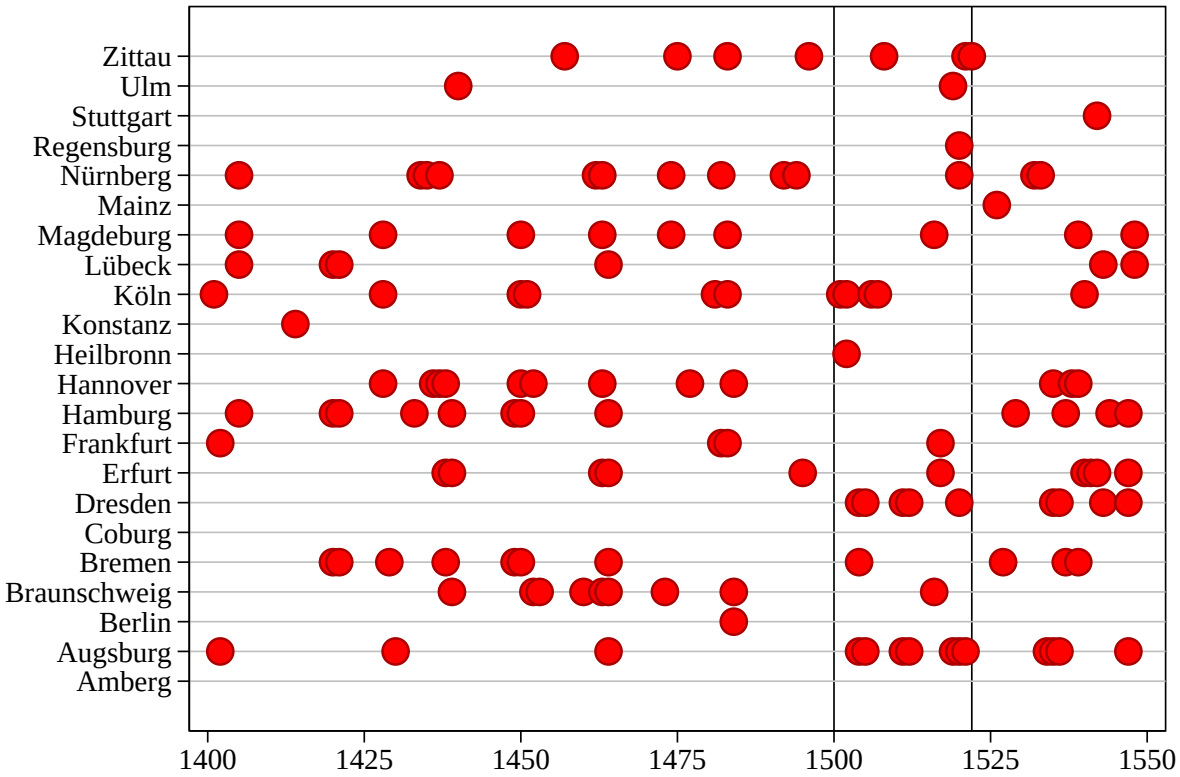
Figure 3: The Migration of Upper Tail Human Capital



This graph plots the number of migrants observed in the *Deutsche Biographie* at the decade level in cities with and without laws. Migrants are identified as people living and dying in town i but born in some other location j. The vertical line is at 1518, the year Luther's theses began circulating.

Evidence from Europe

Figure 5: City-Level Plague Outbreaks



This graph shows the timing of major plague outbreaks in selected cities between 1400 and 1550. Source: Biraben (1975). The vertical lines at 1500 and 1522 delimit the period used in our baseline instrumental variable analysis to construct the early 1500s plague exposure instrument.

Reconciling Institutions Stories

- So we have some quasi-experimental evidence that institutions matter
- This would then back up the North and Thomas story about the role of institutions in industrialization
- But there is a problem, North and Thomas emphasized people altering institutions when it made economic sense to do so
- If bad institutions led to bad economic outcomes in Africa, why not change them?
- Another issue with this experiment in institutions, why was Europe able to colonize Africa in the first place?

Reconciling Institutions Stories

- So new questions emerge from our attempts to answer our big question
- Why are some bad institutions persistent even when there are big economic incentives to change them?
- Where did this big differences emerge that led to Europe being in a position to alter African institutions?
- Is there some bigger picture long run process that the institutional story is just one piece of?
- To look at these questions, we'll consider work on comparative development by Nathan Nunn and Jared Diamond
- First, the question of persistent bad institutions

Persistent Bad Institutions

Mobutu Sese Seko, in power 1965 to 1997

Persistent Bad Institutions

Most corrupt leaders, Global Corruption Report 2004 (Transparency International)

Head of State	Country	Time Period	Funds Embezzled	GDP per capita (2001)
Mohamed Suharto	Indonesia	1967-1998	$15 to 35 billion	$695
Ferdinand Marcos	Philippines	1972-1986	$5 to 10 billion	$912
Mobutu Sese Seko	Zaire	1965-1997	$5 billion	$99
Sani Abacha	Nigeria	1993-1998	$2 to 5 billion	$319
Slobodan Milosevic	Serbia/Yugoslavia	1989-2000	$1 billion	n/a
Jean-Claude Duvalier	Haiti	1971-1986	$300 to 800 million	$460
Alberto Fujimori	Peru	1990-2000	$600 million	$2051
Pavlo Lazarenko	Ukraine	1996-1997	$114 to 200 million	$766
Arnoldo Aleman	Nicaragua	1997-2002	$100 million	$490
Joseph Estrada	Philippines	1998-2001	$78 to 80 million	$912

Persistent Bad Institutions

Imelda Marcos' shoe collection, 1986

Persistent Bad Institutions

- A corrupt leader might resist good institutions for personal gain
- Counterargument: potential personal gain is bigger if GDP is bigger
- Counter-counterargument: not if embezzled funds come out of aid (see our most recent Nobel laureate)
- Another counterargument: this level of corruption creates strong incentives for revolt
- This fits in with North and Thomas (and the writers' strike)
- Institutional change is costly but at some point benefits exceed the costs

Back to Mobutu

Laurent-Desire Kabila and the Alliance of Democratic Forces for the Liberation of Congo

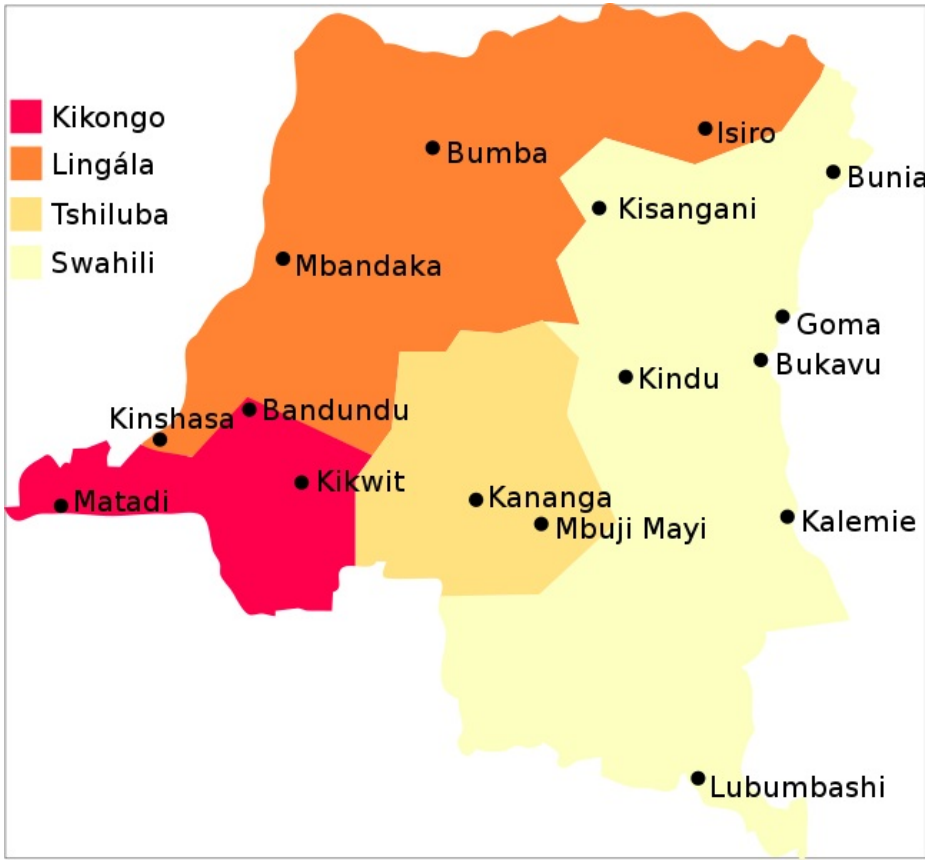
Back to Mobutu

Fall of the Berlin Wall, 1989

Back to Mobutu

Rwandan refugee camp in East Zaire

Back to Mobutu



Languages in the Democratic Republic of the Congo

The Persistence of Bad Institutions

- In the case of Mobutu, bad institutions seemed to persist for a couple of reasons
- A big one was the backing of more powerful governments
- A second was the nature of the sources of wealth
- When conditions changed, revolt finally happened
- However, this revolt didn't automatically lead to good institutions and economic prosperity for all
- The Democratic Republic of the Congo still had major issues stemming from ethnic fractionalization, highlighting the important role of social institutions

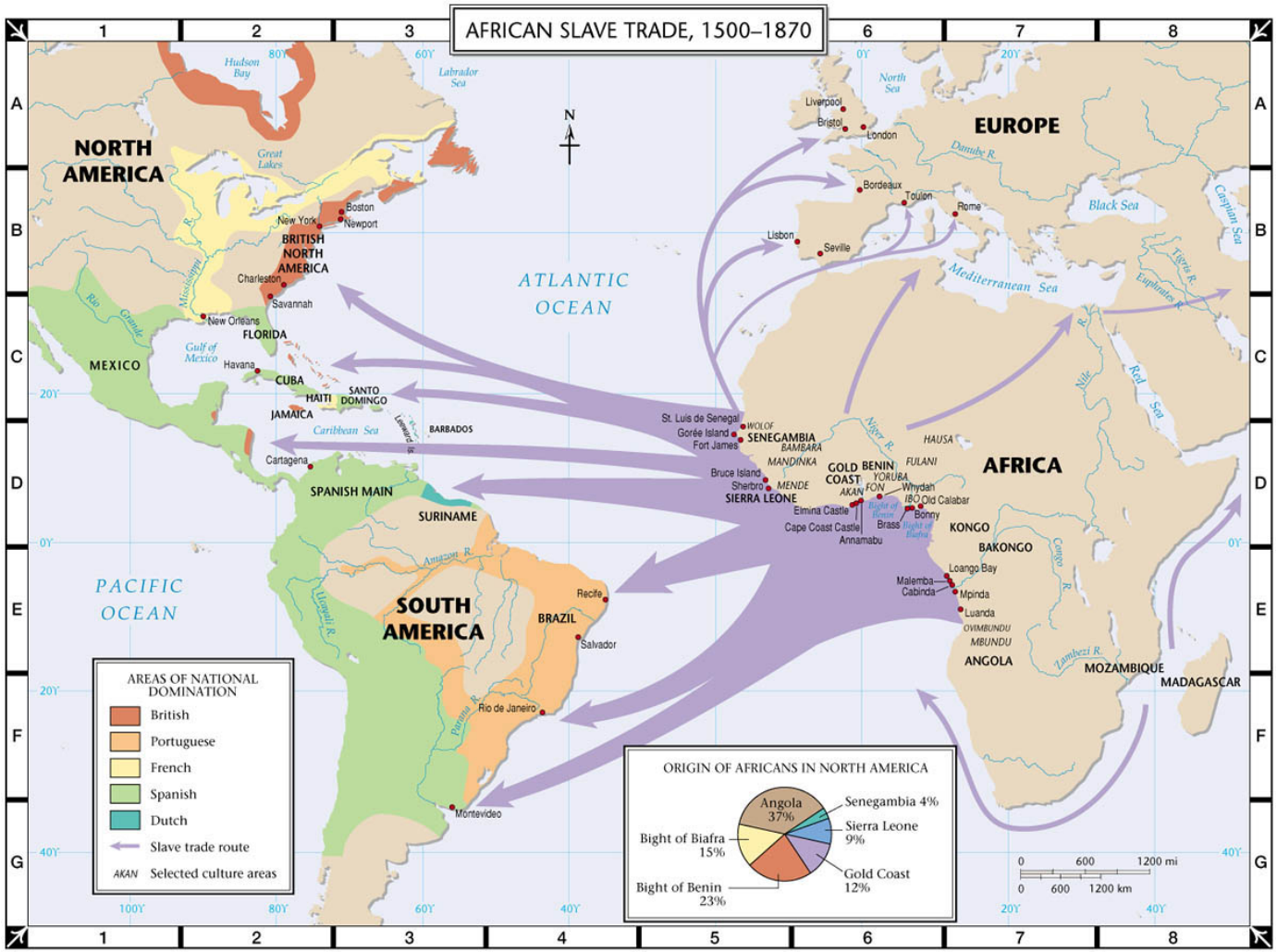
A Slightly Different Take on African Development

- This brings us to another economist's approach to the issues of institutions and African development
- Nathan Nunn and "The Long Term Effects of Africa's Slave Trade"
- Nunn looks at the effects of slave trading in Africa on modern economic outcomes of African countries
- He explores the argument of whether slave trades and colonialism are an explanation of African underdevelopment
- This argument has elements of governmental institutions but also social institutions and helps explain the persistence of bad institutions

Quick Overview of the Slave Trade

- Slave trade lasted from roughly 1400 to 1900
- Colonial rule in Africa lasted between 1885 to 1960
- Four different slave trades:
  - Trans-Atlantic: slaves taken from West Africa, West-Central Africa and Eastern Africa to European colonies in the New World
  - Trans-Saharan: slaves taken from south of the Saharan desert to Northern Africa
  - Red Sea: slaves taken from inland Africa and shipped to Middle East and India
  - Indian Ocean: slaves taken from Eastern Africa and shipped to Middle East, India and plantation islands in the Indian Ocean

Quick Overview of the Slave Trade



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Quick Overview of the Slave Trade

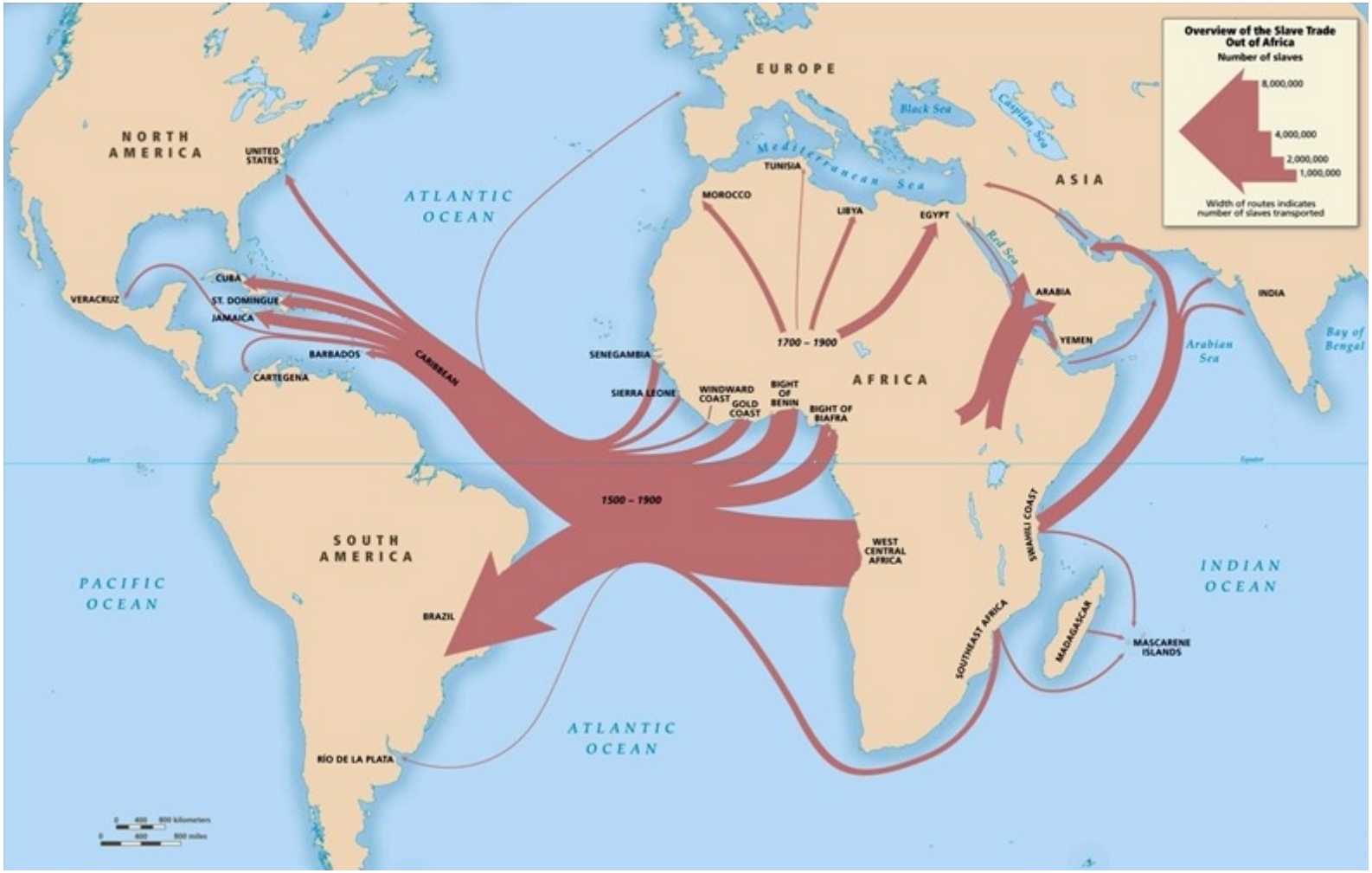
- Over 18 million slaves were exported (12 million were through trans-Atlantic trade)
- Estimated that by 1850, Africa's population was half of what it would have been without the slave trade
- Slave trade led to social and ethnic fragmentation, political instability, weakening of states, corruption of judicial institutions

Countries Exporting the Most Slaves, 1400-1900

ESTIMATED TOTAL SLAVE EXPORTS BETWEEN 1400 AND 1900 BY COUNTRY

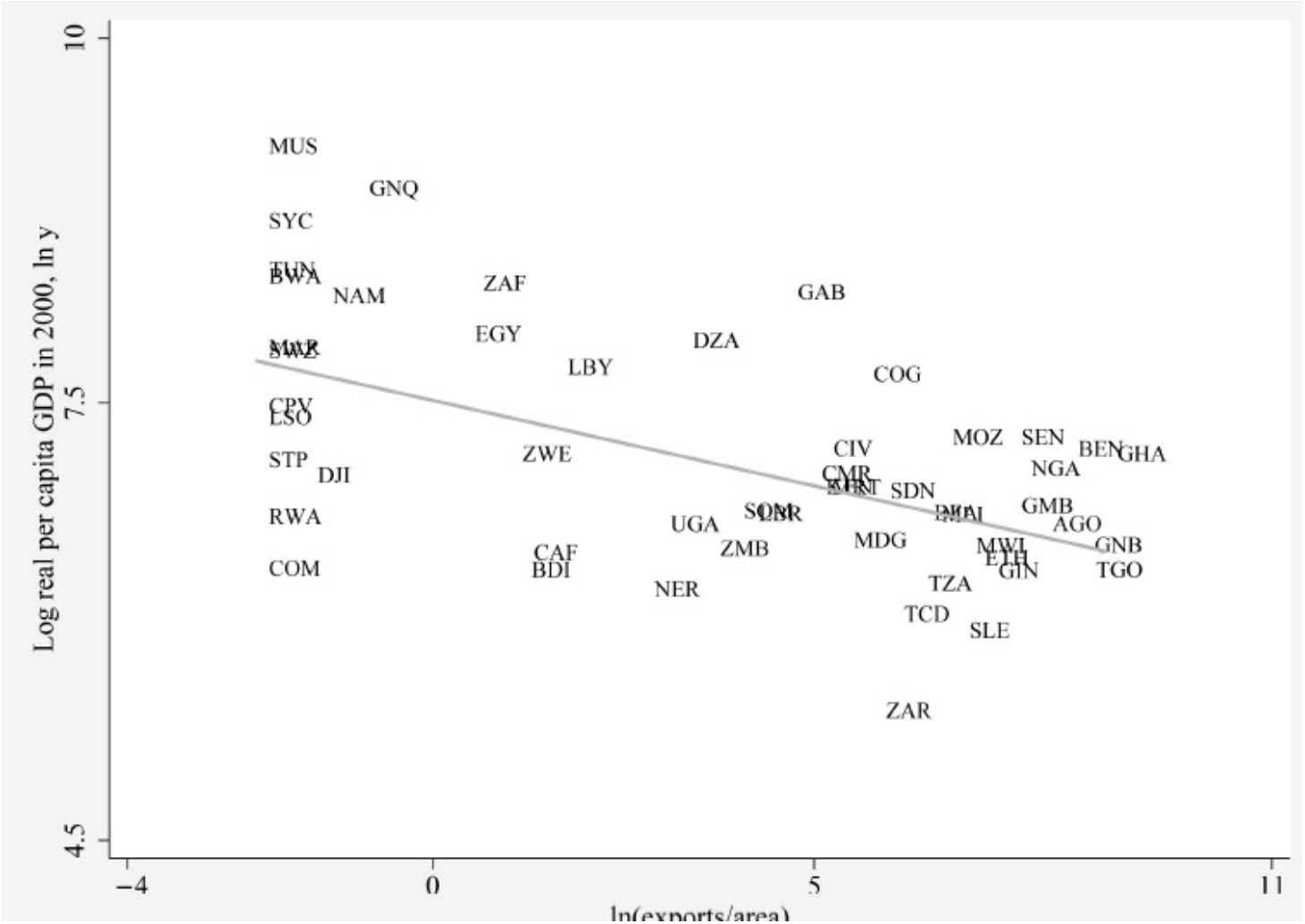
Isocode	Country name	Trans-Atlantic	Indian Ocean	Trans-Saharan	Red Sea	All slave trades
AGO	Angola	3,607,020	0	0	0	3,607,020
NGA	Nigeria	1,406,728	0	555,796	59,337	2,021,859
GHA	Ghana	1,614,793	0	0	0	1,614,793
ETH	Ethiopia	0	200	813,899	633,357	1,447,455
SDN	Sudan	615	174	408,261	454,913	863,962
MLI	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

Countries Exporting the Most Slaves, 1400-1900

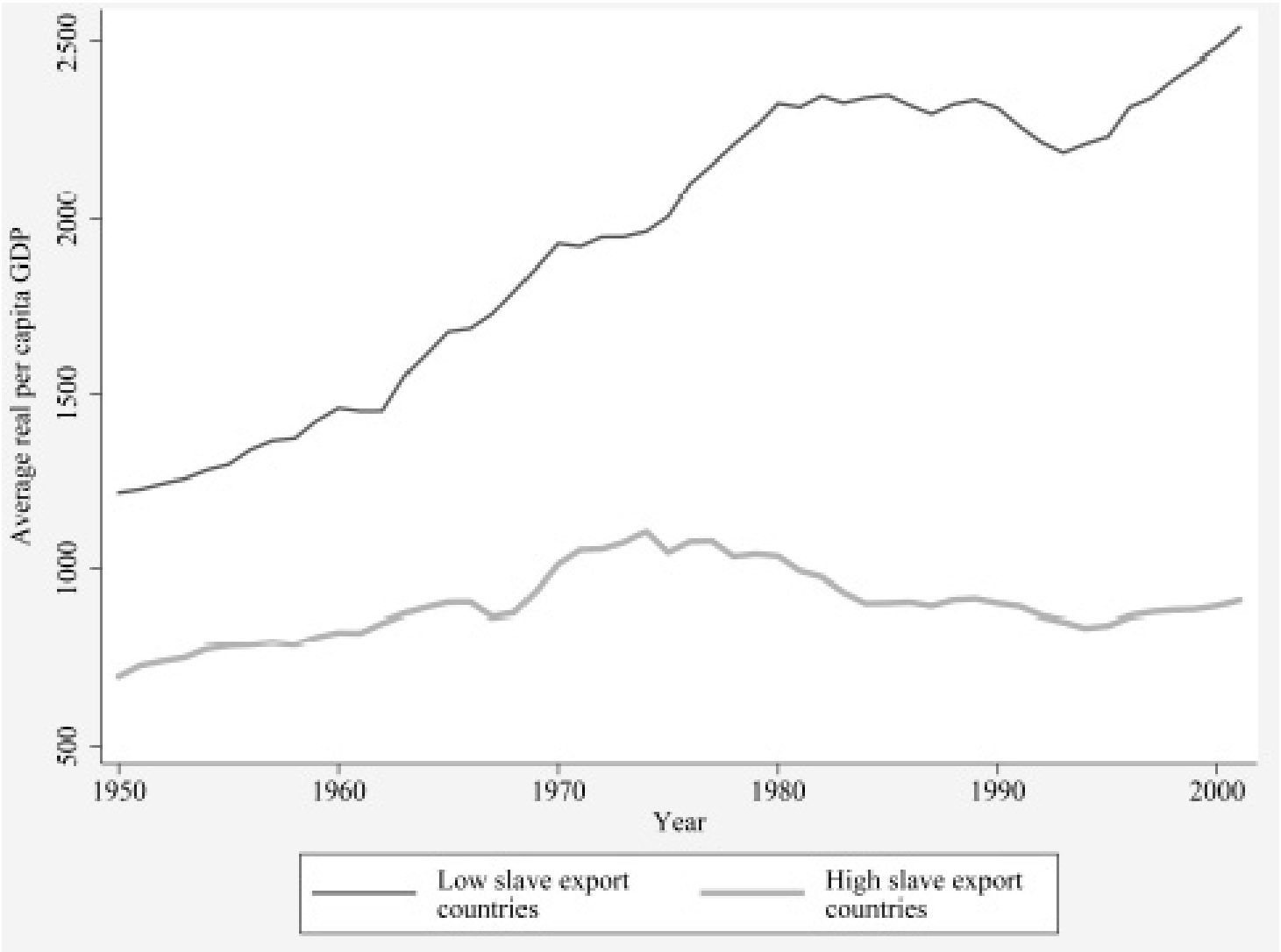


Countries Exporting the Most Slaves, 1400-1900

Slaves Exports and Modern GDP per Capita



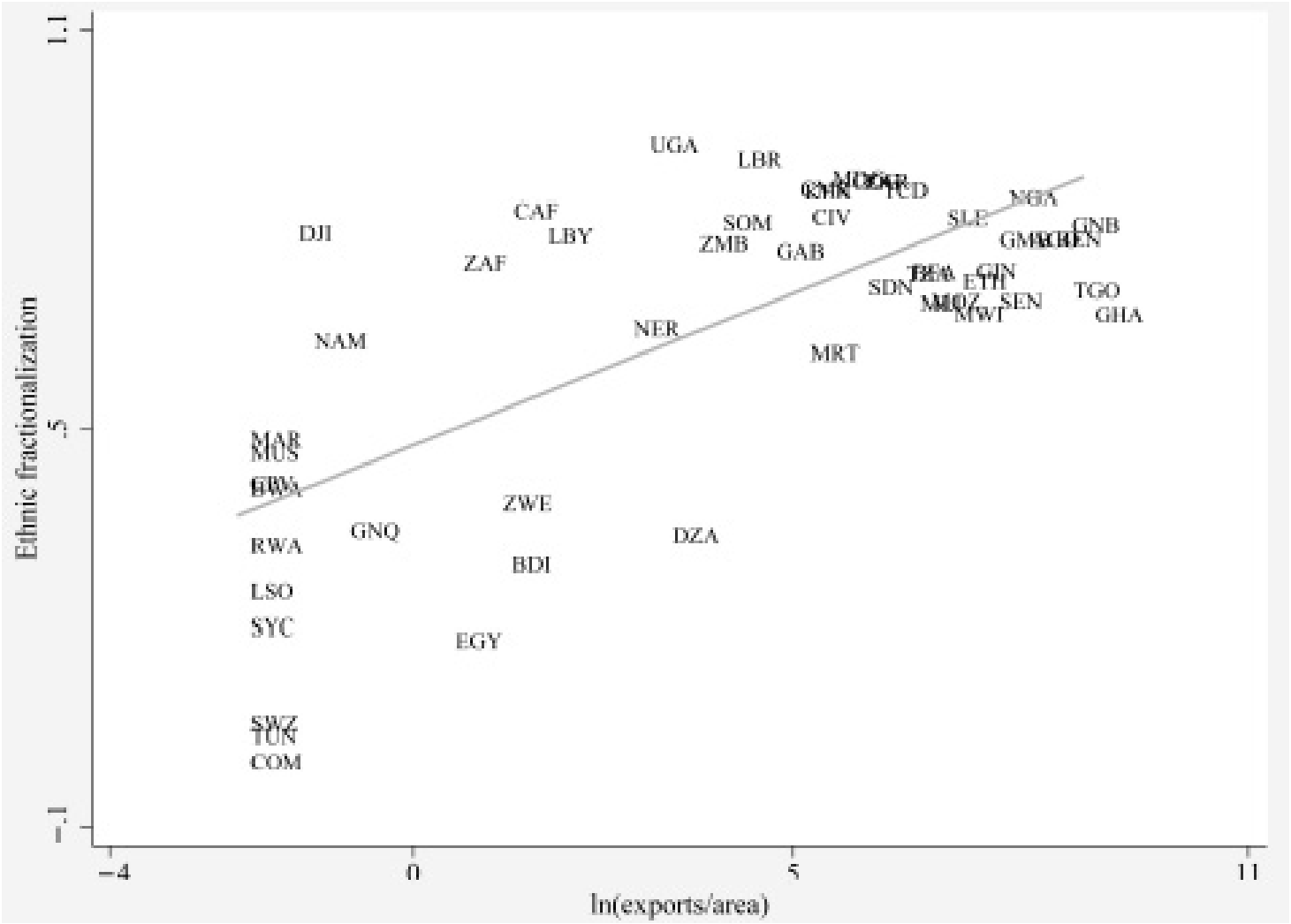
Economic Growth for Countries with the Lowest and Highest Slave Exports



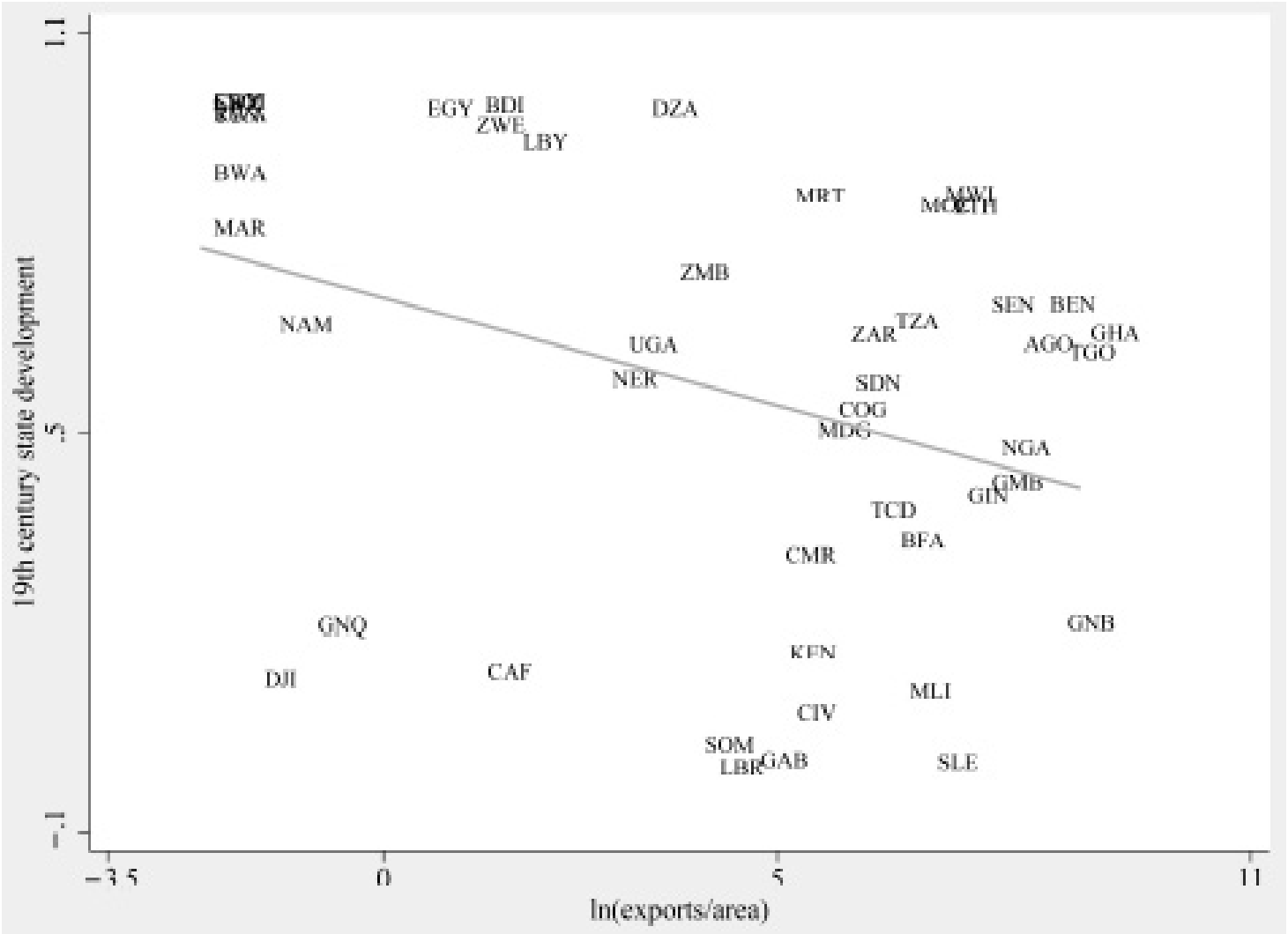
The Long Term Effects of Conquest

- Clearly some areas of Africa were far more affected by slavery than others
- Today, those areas that exported the most slaves are less economically developed
- So why is this an institutions story?
- Nunn's answer is that the slave trade had profound impacts on several features of institutional development:
  - Ethnic fractionalization
  - State development
  - Levels of distrust

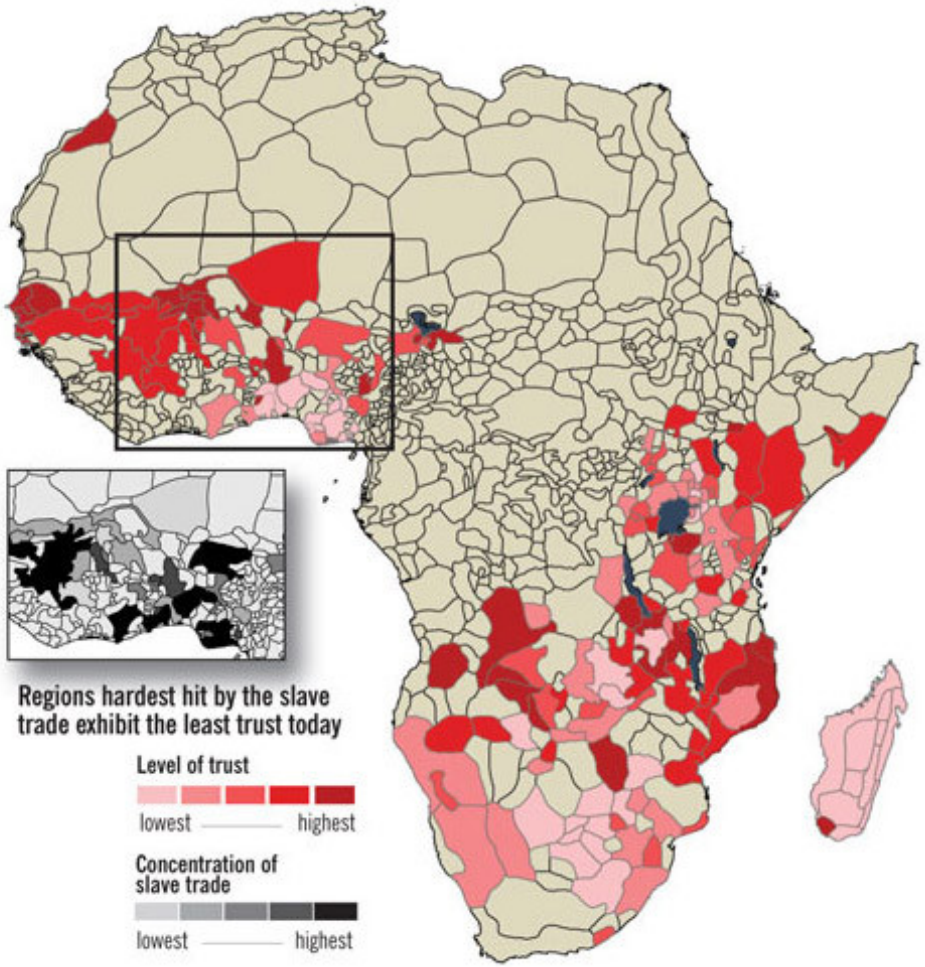
Slaves Exports and Modern Ethnic Fractionalization



Slaves Exports and 19th Century State Development

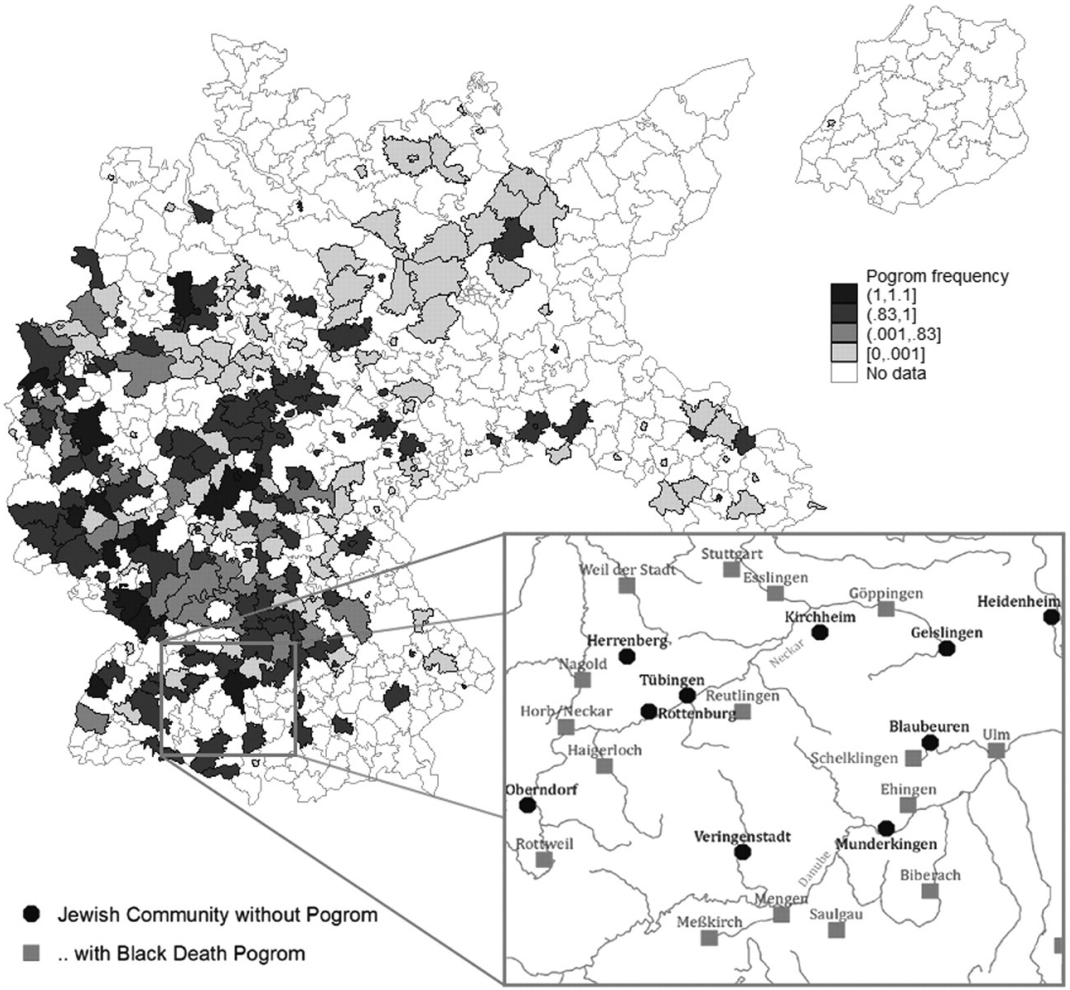


Slaves Exports and Modern Distrust

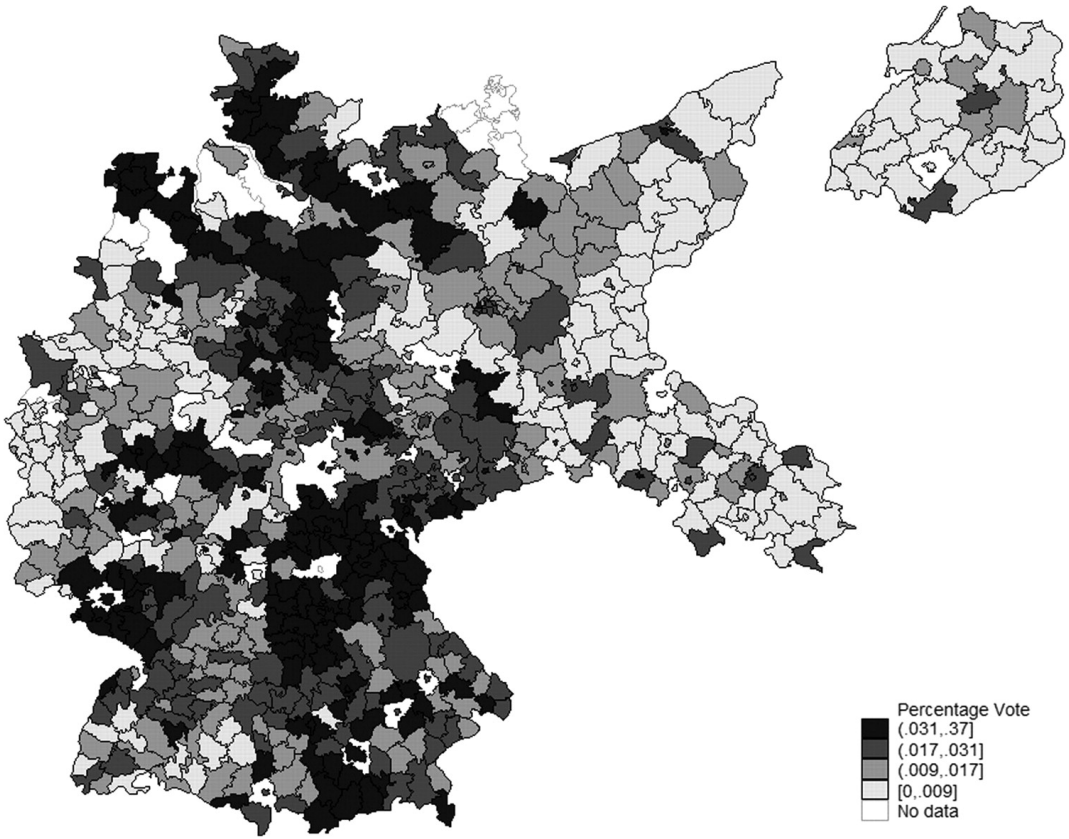


Returning to Europe

Returning to Europe



Returning to Europe



Percentage of votes for the NSDAP in the German National Election of 1928 (Voigtlander and Voth, 2012)

Institutions as an Explanation

- So Nunn's work gives us insight into why a bad shock to institutions may have persistence
- These social dimensions of the effects of slavery can make it difficult for good government institutions to take hold and be effective
- These issues were compounded by the political boundaries drawn by colonial powers
- One takeaway from Nunn: dropping in good institutions may not be sufficient
- One question remaining from Nunn and AJR: why were Europeans able to alter African institutions?
- Why wasn't it Africa colonizing Europe?