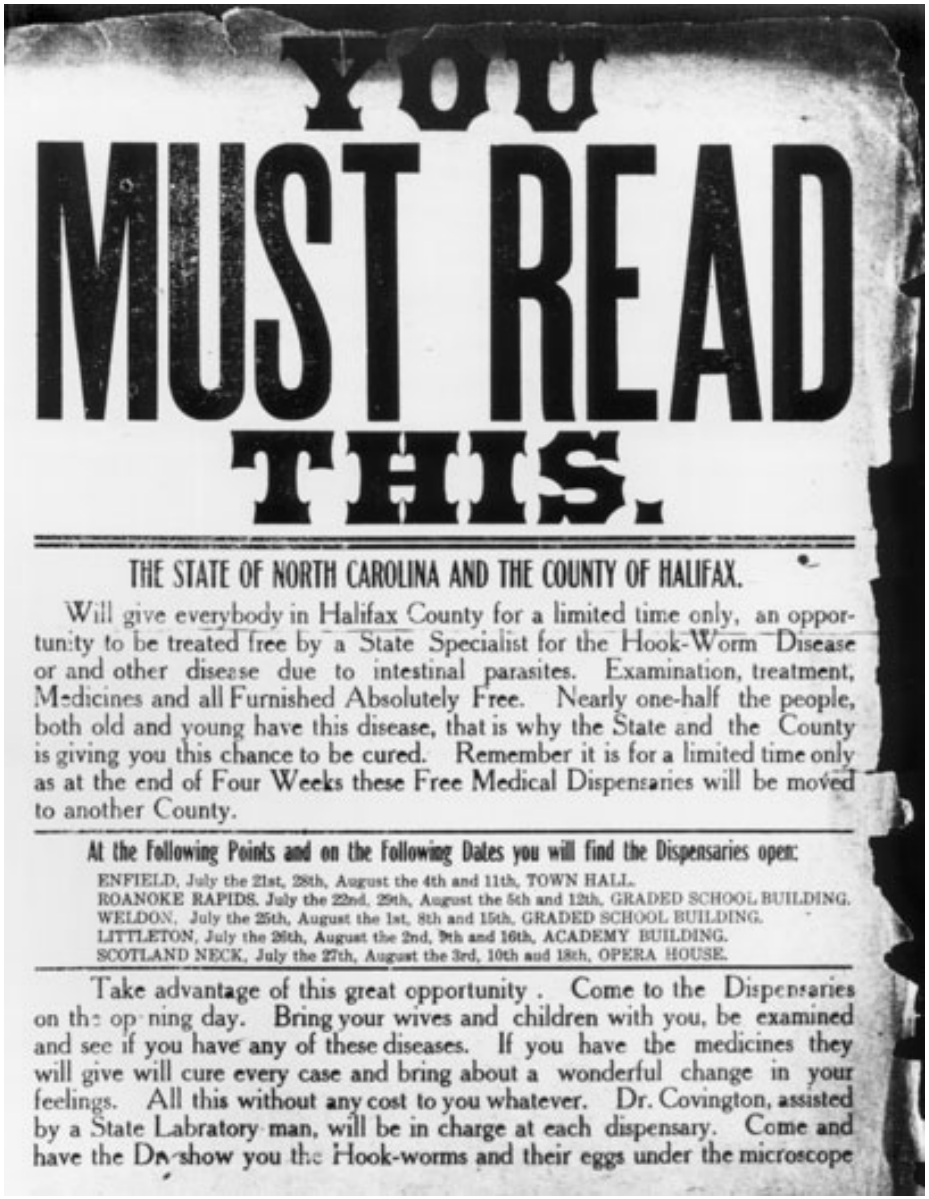
Almond and the Influenza Pandemic

Photo # NH 41731-A Influenza precaution sign at the Naval Aircraft Factory, Philadelphia, 19 Oct. 1918

Bleakley and Hookworm in the South



YOU
MUST READ
THIS.

THE STATE OF NORTH CAROLINA AND THE COUNTY OF HALIFAX.

Will give everybody in Halifax County for a limited time only, an opportunity to be treated free by a State Specialist for the Hook-Worm Disease or and other disease due to intestinal parasites. Examination, treatment, Medicines and all Furnished Absolutely Free. Nearly one-half the people, both old and young have this disease, that is why the State and the County is giving you this chance to be cured. Remember it is for a limited time only as at the end of Four Weeks these Free Medical Dispensaries will be moved to another County.

At the Following Points and on the Following Dates you will find the Dispensaries open:

ENFIELD, July the 21st, 28th, August the 4th and 11th, TOWN HALL.
ROANOKE RAPIDS, July the 22nd, 29th, August the 5th and 12th, GRADED SCHOOL BUILDING.
WELDON, July the 25th, August the 1st, 8th and 15th, GRADED SCHOOL BUILDING.
LITTLETON, July the 26th, August the 2nd, 9th and 16th, ACADEMY BUILDING.
SCOTLAND NECK, July the 27th, August the 3rd, 10th and 18th, OPERA HOUSE.

Take advantage of this great opportunity. Come to the Dispensaries on the opening day. Bring your wives and children with you, be examined and see if you have any of these diseases. If you have the medicines they will give will cure every case and bring about a wonderful change in your feelings. All this without any cost to you whatever. Dr. Covington, assisted by a State Labratory man, will be in charge at each dispensary. Come and have the Dr. show you the Hook-worms and their eggs under the microscope

Bleakley and Hookworm in the South

"As a result of your treatment for hookworm in our school...we have here in our school-rooms today about 120 bright, rosy-faced children, whereas had you not been sent here to treat them we would have had that many pale-faced, stupid children." – 1912 letter from Varnado, LA school board

Bleakley and Hookworm in the South

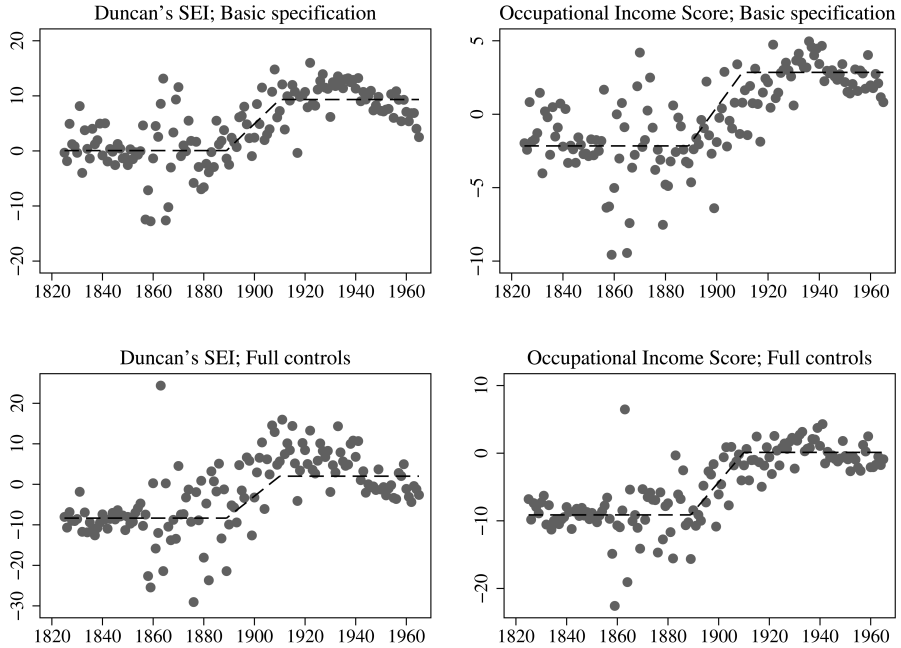


FIGURE III

Cohort-Specific Relationship Between Income and Pre-Eradication Hookworm

These graphics summarize regressions of income proxies on pre-eradication hookworm-infection rates by state of bith. The y axis for each graphic plots the estimated cohort-specific coefficients on the state-level hookworm measure. The x axis is the cohort's year of birth. Each year-of-birth cohort's point estimate is marked with a dot. The dashed lines measure the number of years of potential childhood exposure to the Rockefeller Sanitary Commission's activities. For the undertaking regressions, the dependent variables are constructed from the indicated income proxies (the Duncan Socioeconomic Indicator and the Occupational Income Score). For each year-of-birth cohort, OLS regression coefficients are estimated on the cross section of incomes by state of birth. In the basic specification, this state-of-birth average income is regressed onto hookworm infection, Lebergott's measure of 1809 wage levels, and regional dummies. The "full controls" specification contains in addition the various controls variables described in the Appendix. The regressions are estimated using weight equal to the square root of the cell size in the underlying microdata.

Bleakley and Hookworm in the South

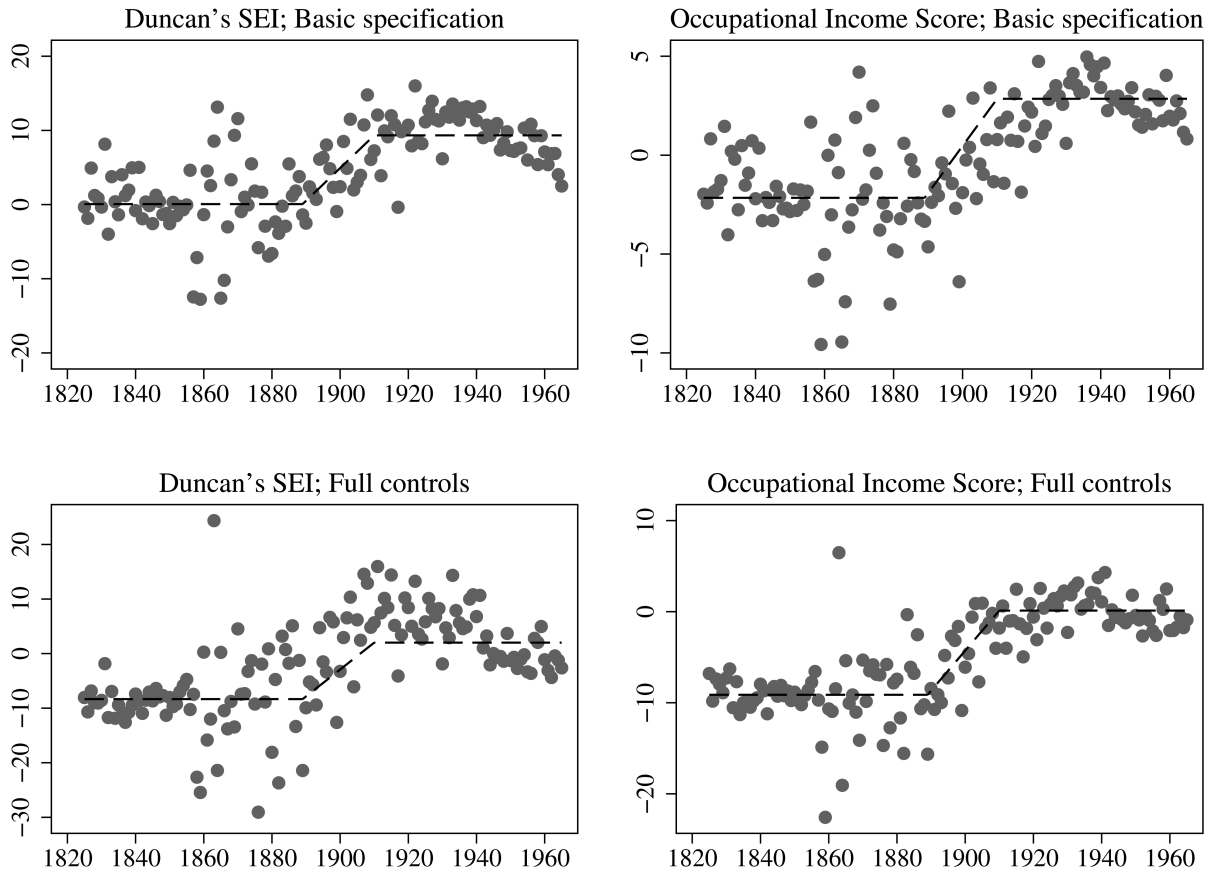
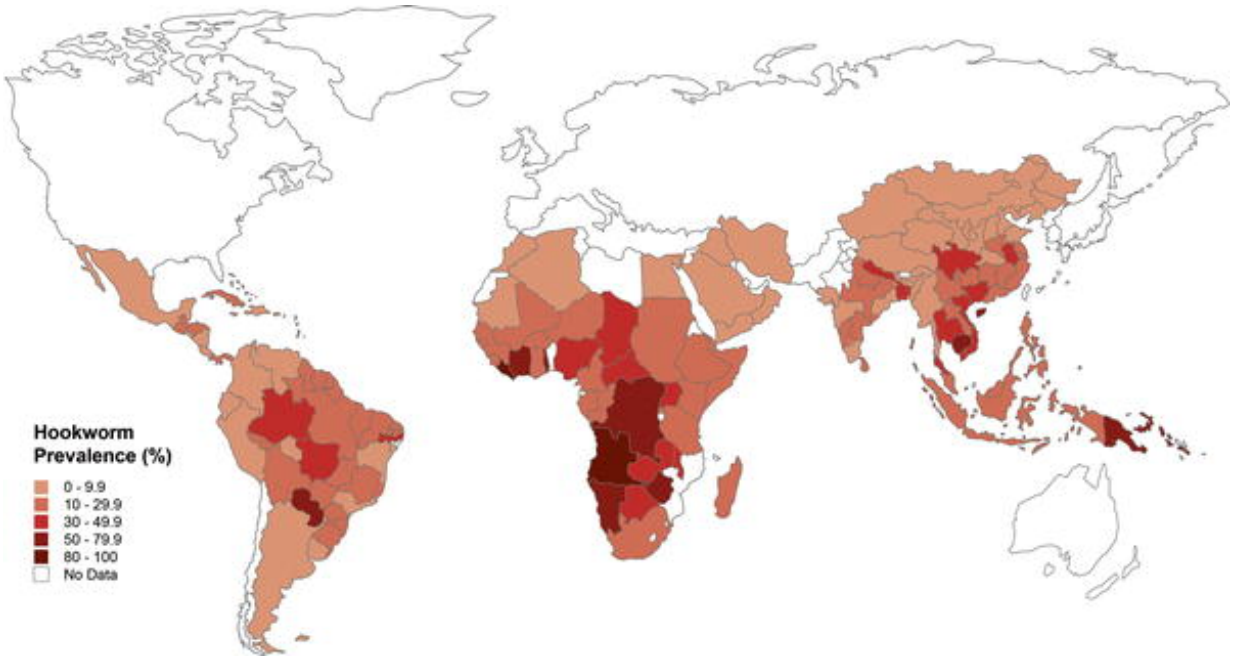


FIGURE III
Cohort-Specific Relationship Between Income and Pre-Eradication Hookworm

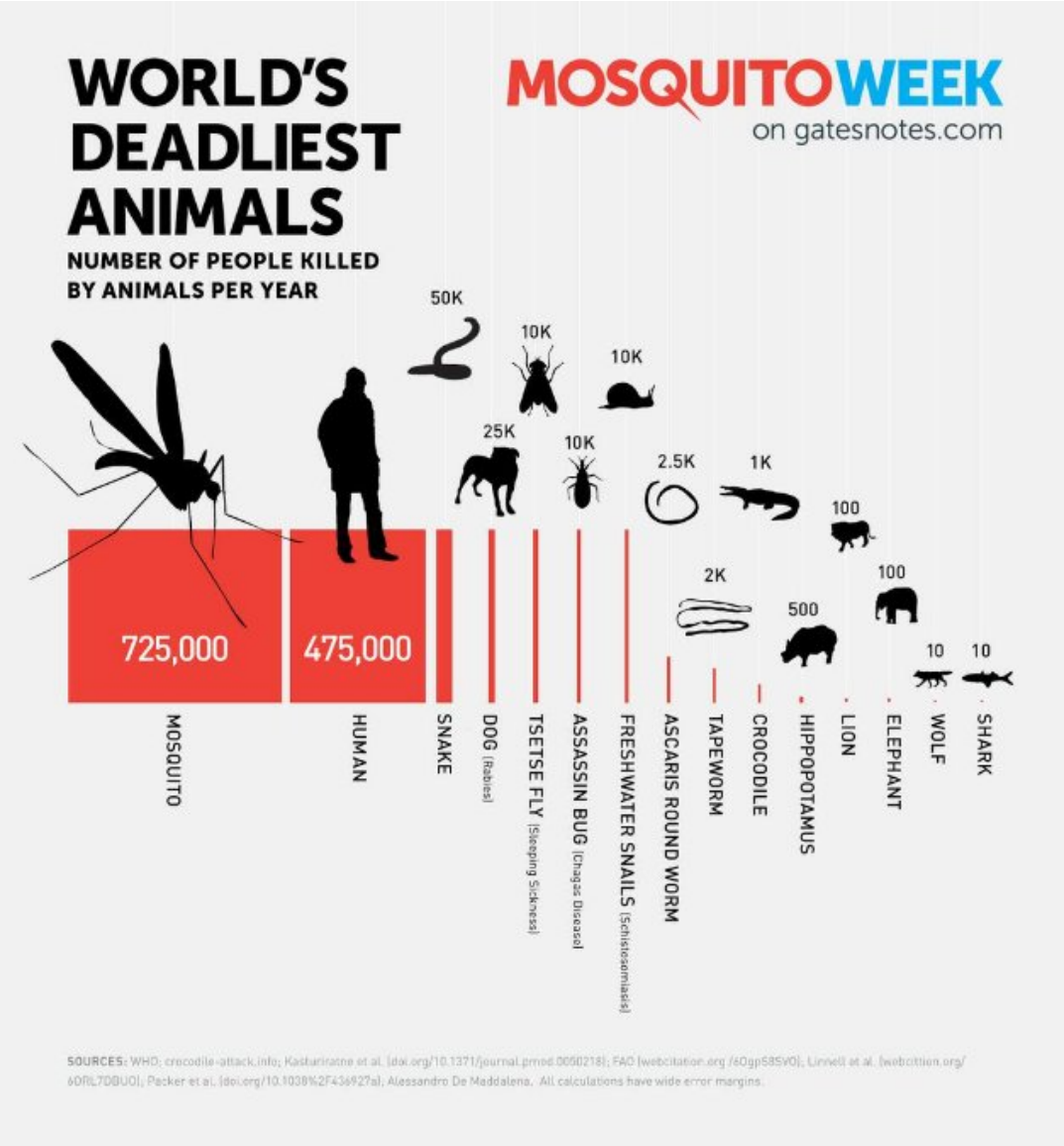
Bleakley and Hookworm in the South



Health and Human Capital

- We saw from Almond's work on influenza and Bleakley's work on hookworm that health has major impacts on worker productivity and economic development
- The influenza pandemic showed that individuals receiving a negative health shock in utero ended up with lower educational attainments, higher rates of disability and lower incomes
- When hookworm was eradicated in the South, school attendance, educational attainments, occupational status and incomes rose
- These were both American examples, maybe they only apply to America or the 1910s
- Let's quickly look at one more Bleakley paper dealing with eradication of malaria (Bleakley, AEJ: Applied, 2010)

The (Partial) Eradication of Malaria



The (Partial) Eradication of Malaria

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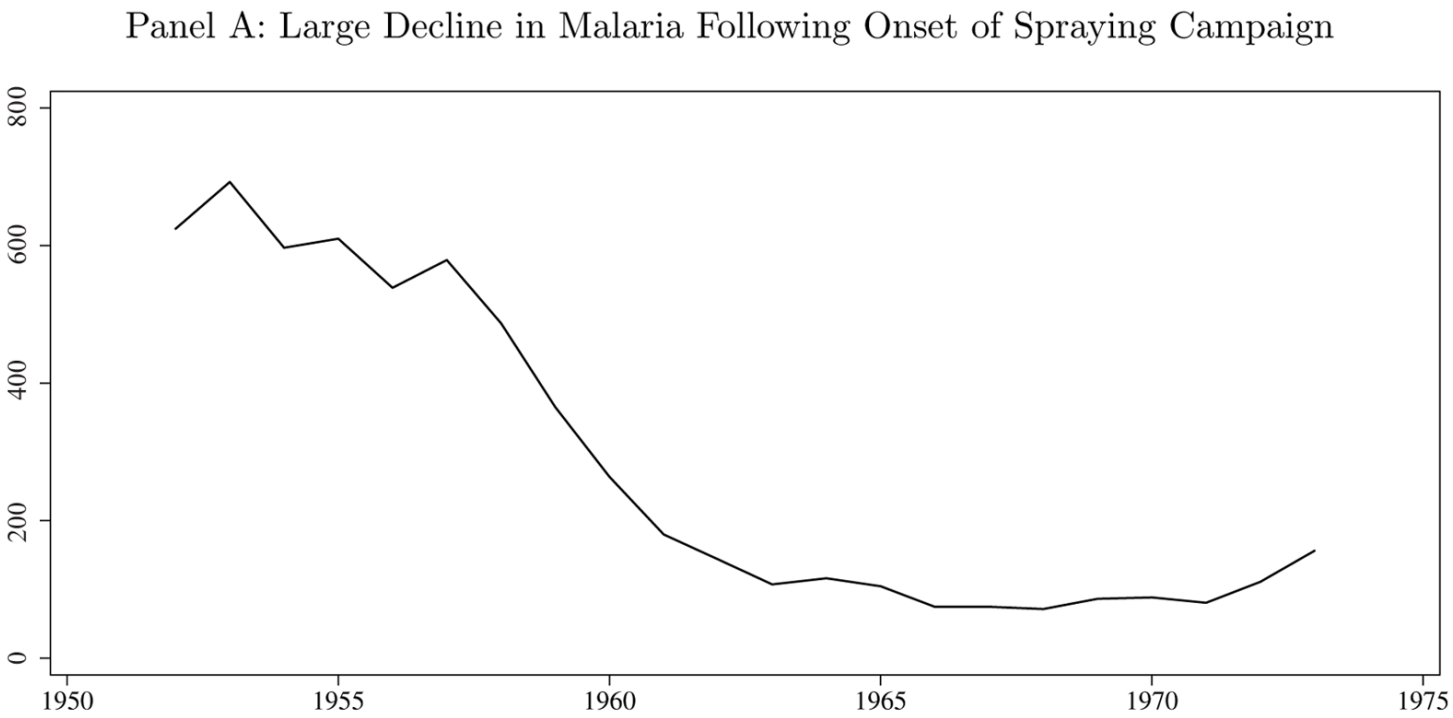


The (Partial) Eradication of Malaria

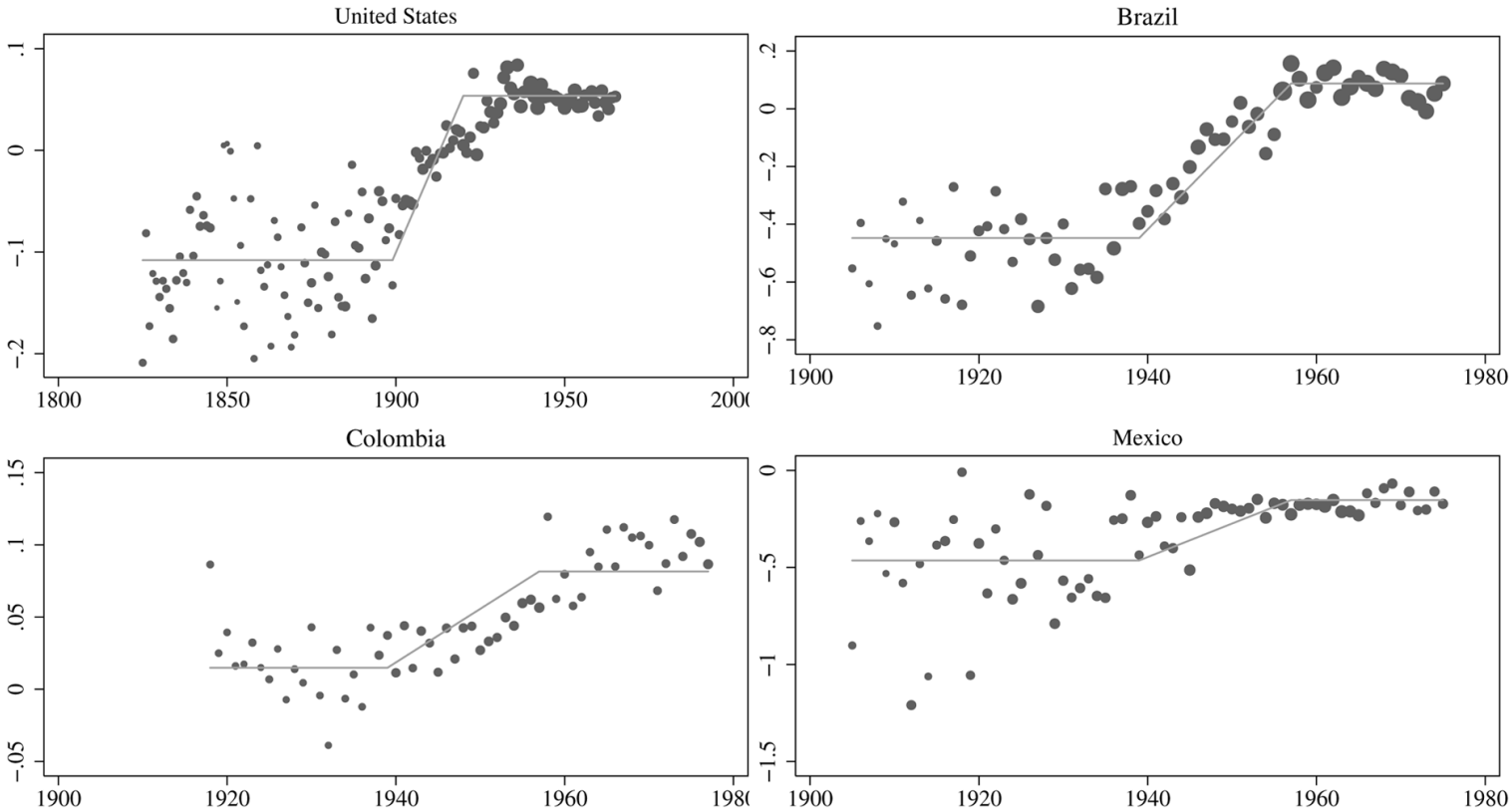
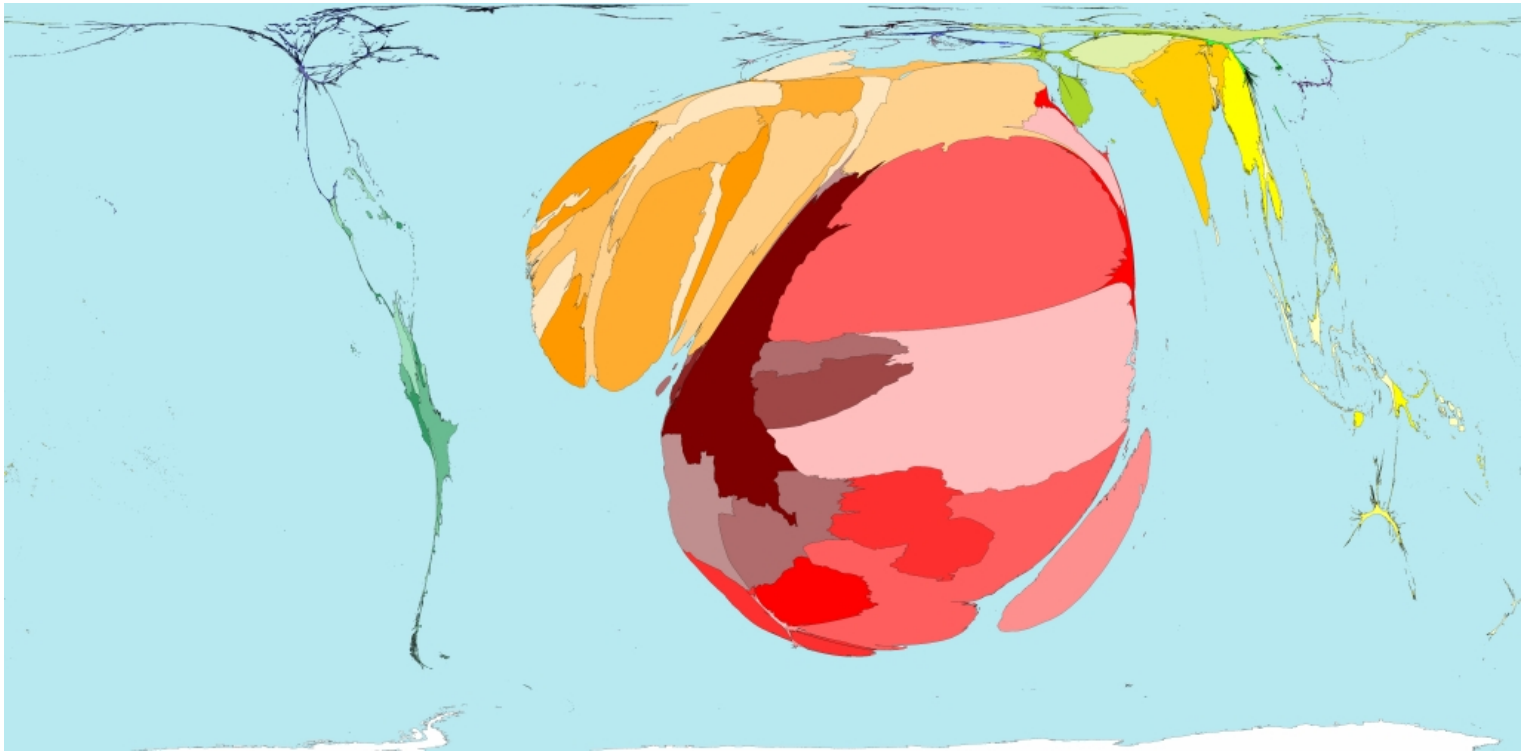


Figure 4.
Cohort-Specific Relationships: Income and Pre-Campaign Malaria

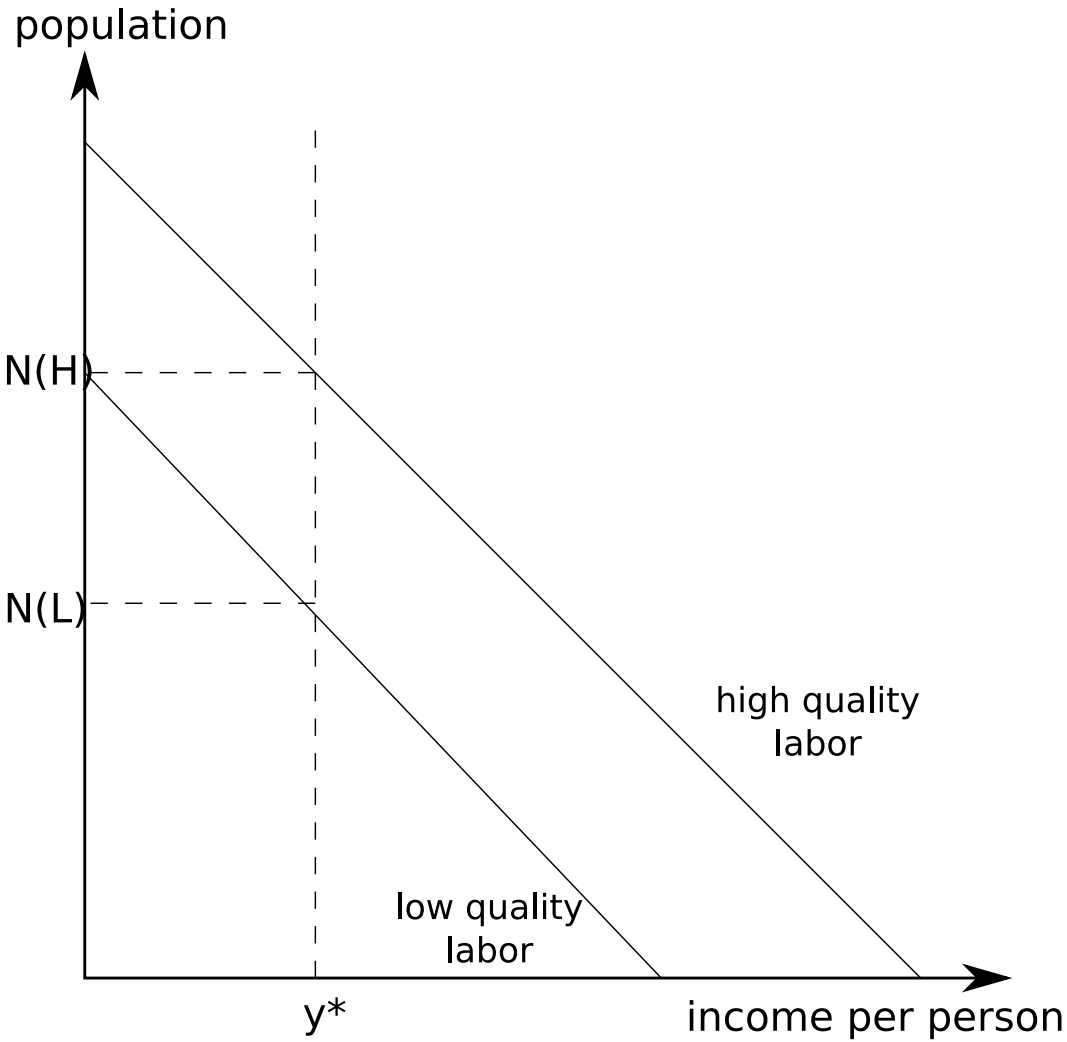
Malaria Cases Around the World Today



Why Divergence?

- If labor efficiency is the problem, why did that lead to divergence after the Industrial Revolution?
- Three reasons why differences in labor efficiency leads to more divergence today than in preindustrial world:
  1. In the Malthusian world, labor efficiency affected population, not income per person
  2. Modern medicine has allowed for lower income per person levels than in preindustrial times
  3. New production techniques may have raised the wage premium for high-quality labor

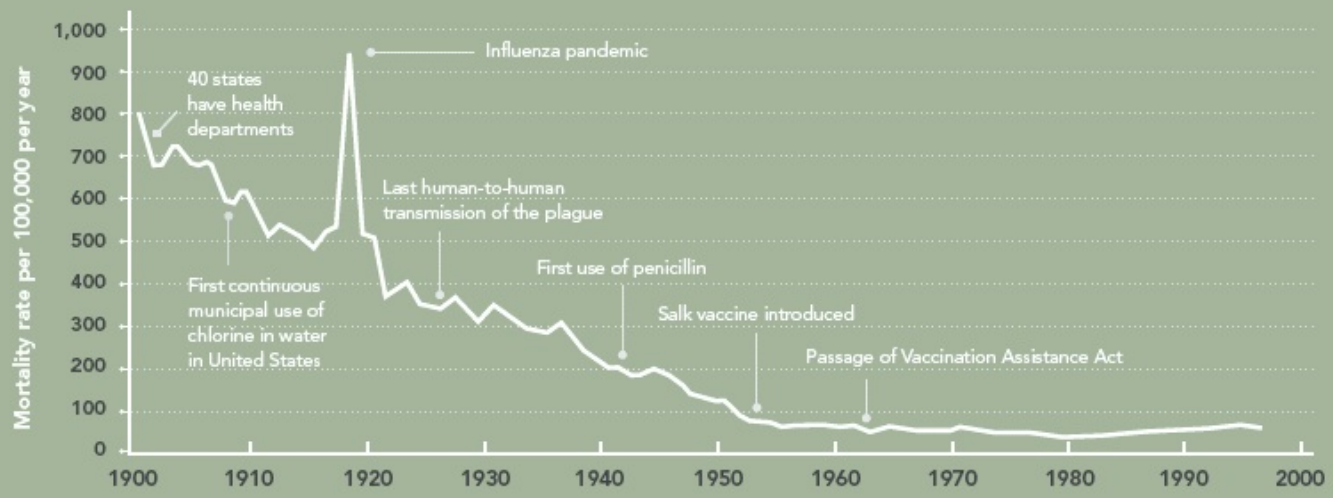
Labor Efficiency in a Malthusian World



A Partial Break from the Malthusian World

FIGURE 1.1

Crude infectious disease mortality rate in the United States, 1900–1996



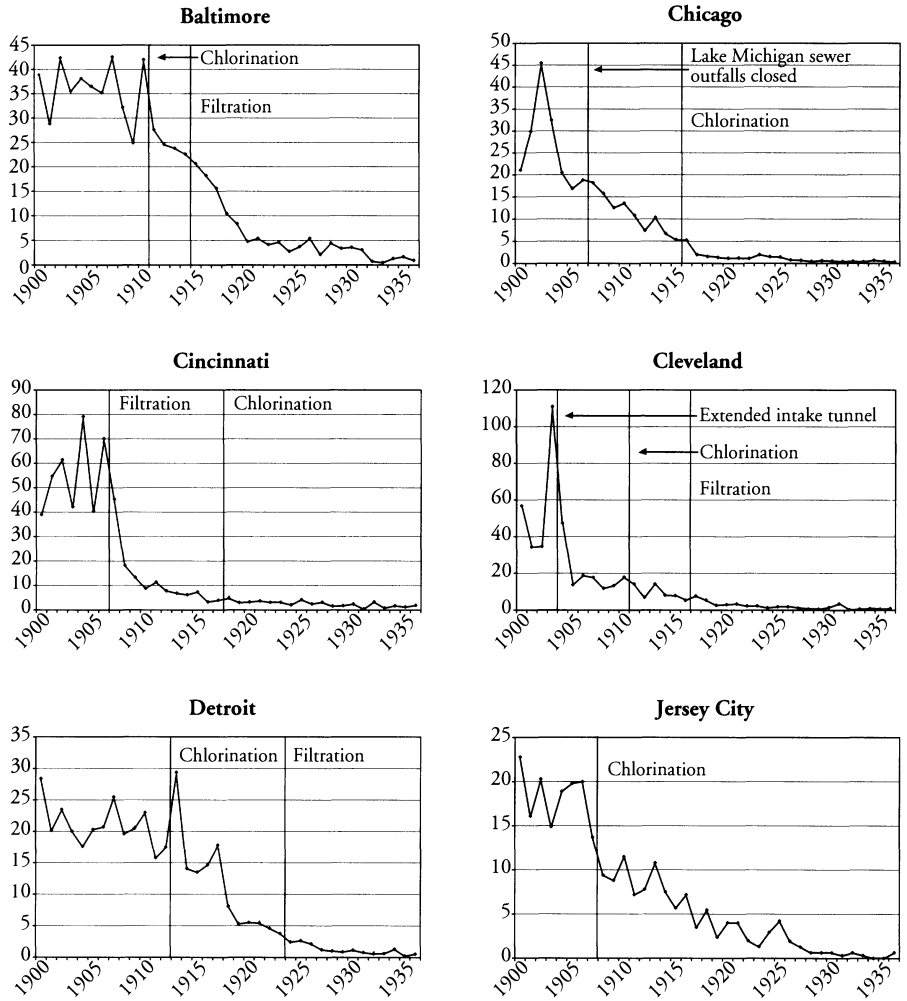
Source: Adapted from Armstrong, Conn et al. (1999).

CDDEP THE CENTER FOR Disease Dynamics, Economics & Policy RESOURCES FOR THE FUTURE

A Partial Break from the Malthusian World

A Partial Break from the Malthusian World

Figure 2. Typhoid Fever Trends (Mortality per 100,000) and Sanitary Interventions, 1900–1936



From Cutler and Miller (2005)

A Partial Break from the Malthusian World

Last month Mrs. Franklin D. Roosevelt, who loves few things better than a big family feast, gave up Thanksgiving dinner at Hyde Park to rush to Boston where Son Franklin Jr. lay abed with what was described to the press as 'sinus trouble.' The young man did have infected sinuses, and he was in the capable, Republican hands of Dr. George Loring Tobey Jr., a fashionable and crackerjack Boston ear, nose and throat specialist. He also had a graver affliction, septic sore throat, and there was danger that the Streptococcus haemolyticus might get into his blood stream. Once there the germs might destroy the red cells in his blood. In such a situation, a rich and robust Harvard crewman is no safer from death than anybody else.

A Partial Break from the Malthusian World

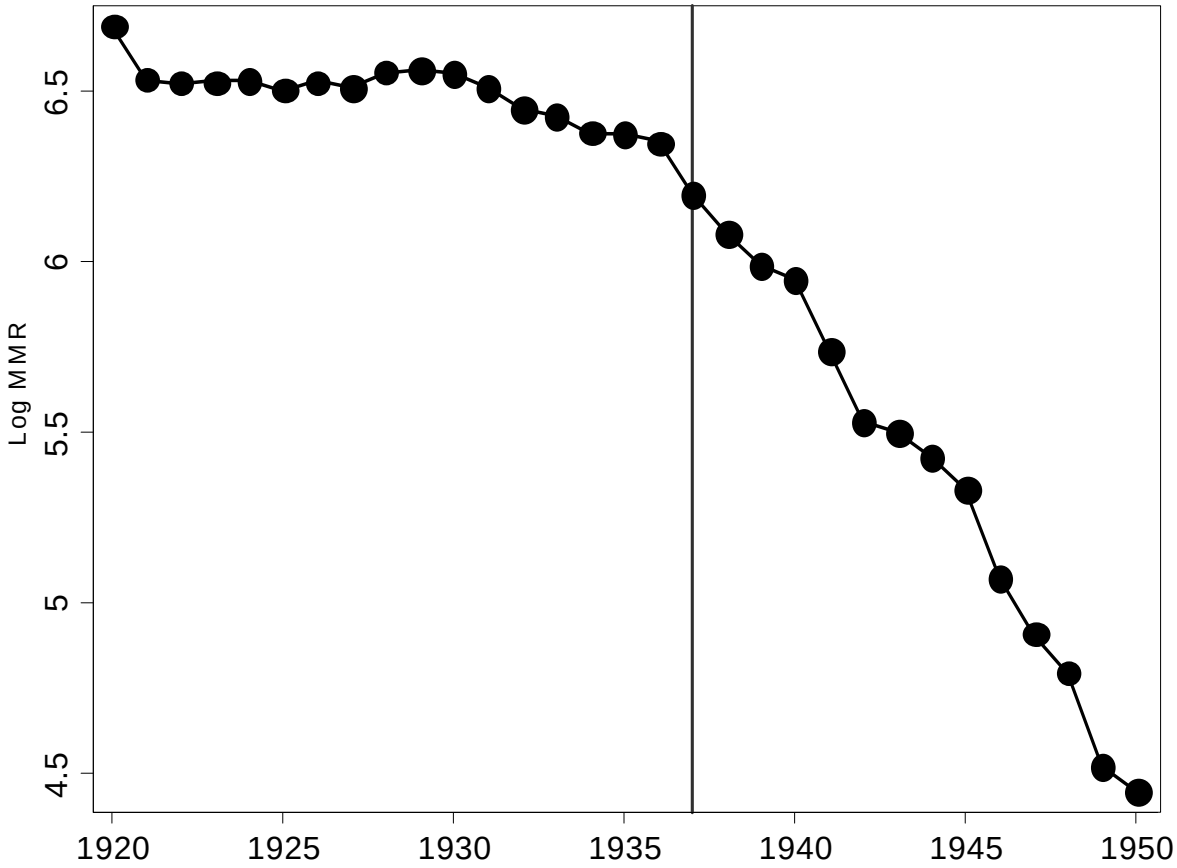
When Franklin Roosevelt's throat grew swollen and raw and his temperature rose to a portentous degree. Dr. Tobey gave him hypodermic injections of Prontosil, made him swallow tablets of a modification named Prontylin. Under its influence, young Roosevelt rallied at once, thus providing an auspicious introduction for a product about which U. S. doctors and laymen have known little. – Time Magazine, 12/28/1936

A Partial Break from the Malthusian World

Leofis34 www.delcampe.net

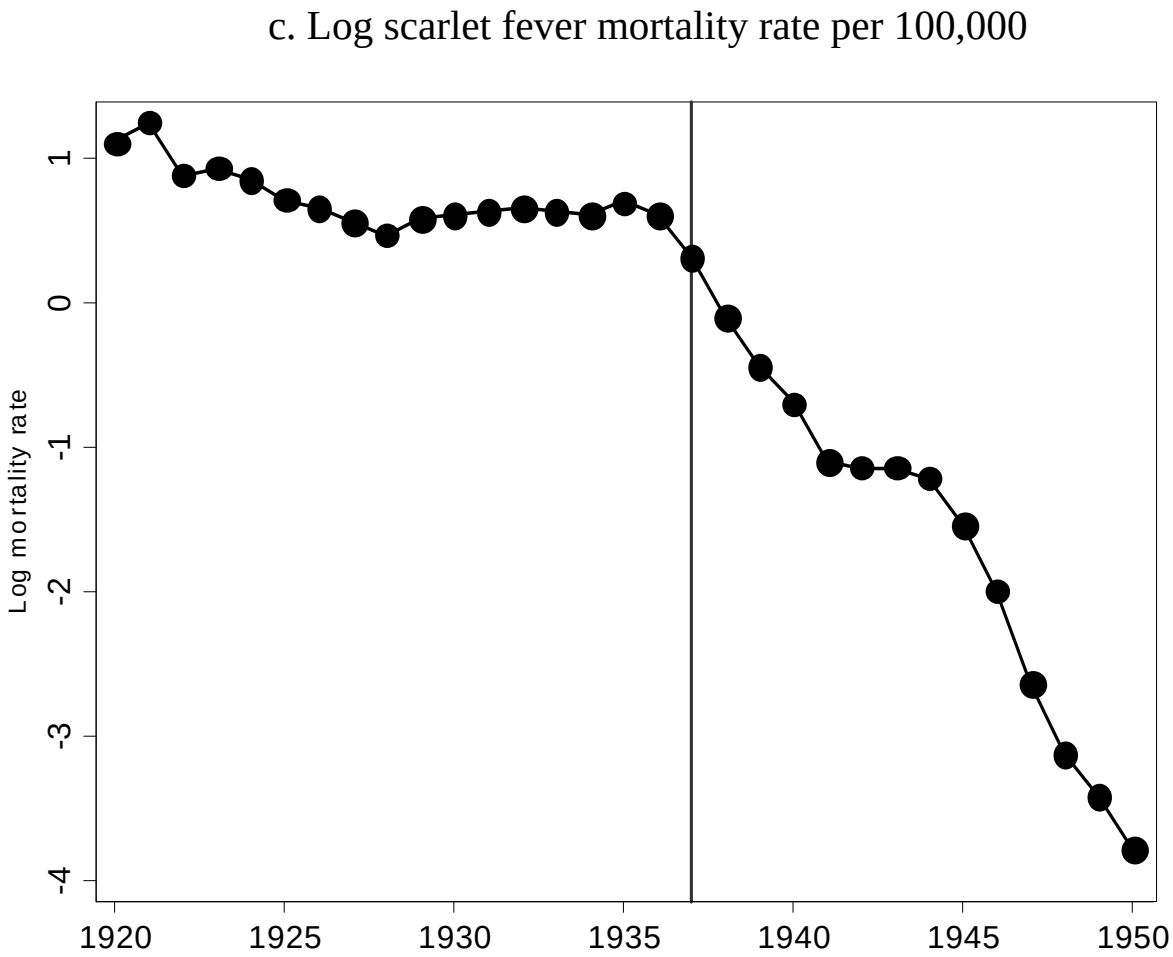
A Partial Break from the Malthusian World

a. Log maternal mortality ratio (deaths per 100,000 live births)



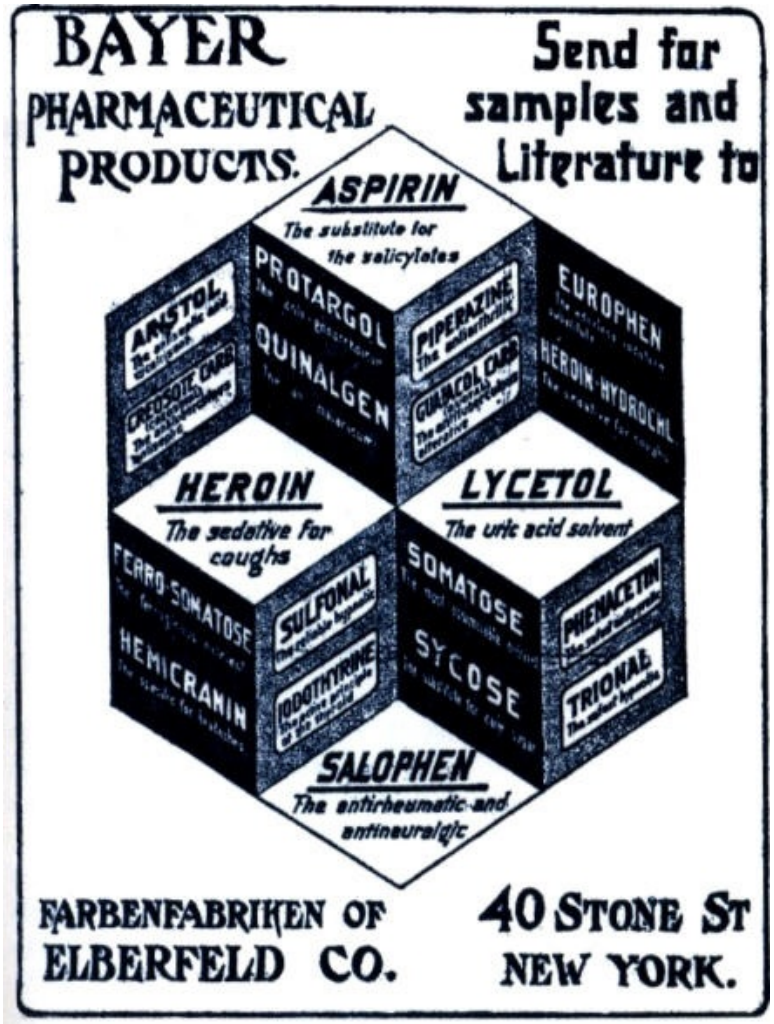
From Jayachandran, Lleras-Muney and Smith (2009)

A Partial Break from the Malthusian World



From Jayachandran, Lleras-Muney and Smith (2009)

A Partial Break from the Malthusian World



A Partial Break from the Malthusian World

- Advances in medicine, agriculture and nutrition have dramatically improved our ability to keep people alive
- This is mostly a good thing for the people and the economy
- Generally, better health has allowed us to live longer, more productive lives: good for our happiness, good for the economy
- Consider the social returns estimated by Cutler and Miller (2005)

A Partial Break from the Malthusian World

Table 10. Social Rates of Return

	Point Estimate	95% CI Low	95% CI High
% Mortality Reduction Due to Clean Water	0.1326	0.0373	0.2280
1915 Mortality Reduction per 100,000 Population	208	58	357
1915 Deaths Averted	1,484	418	2,551
1915 Person-Years Saved	57,922	16,301	99,543
1915 Annual Benefits in Millions of 2003 Dollars	679	191	1,167
1915 Annual Costs in Millions of 2003 Dollars	29		
Social Rate of Return	23:1	7:1	40:1
Cost per Person-Year Saved in 2003 Dollars	500	1,775	291

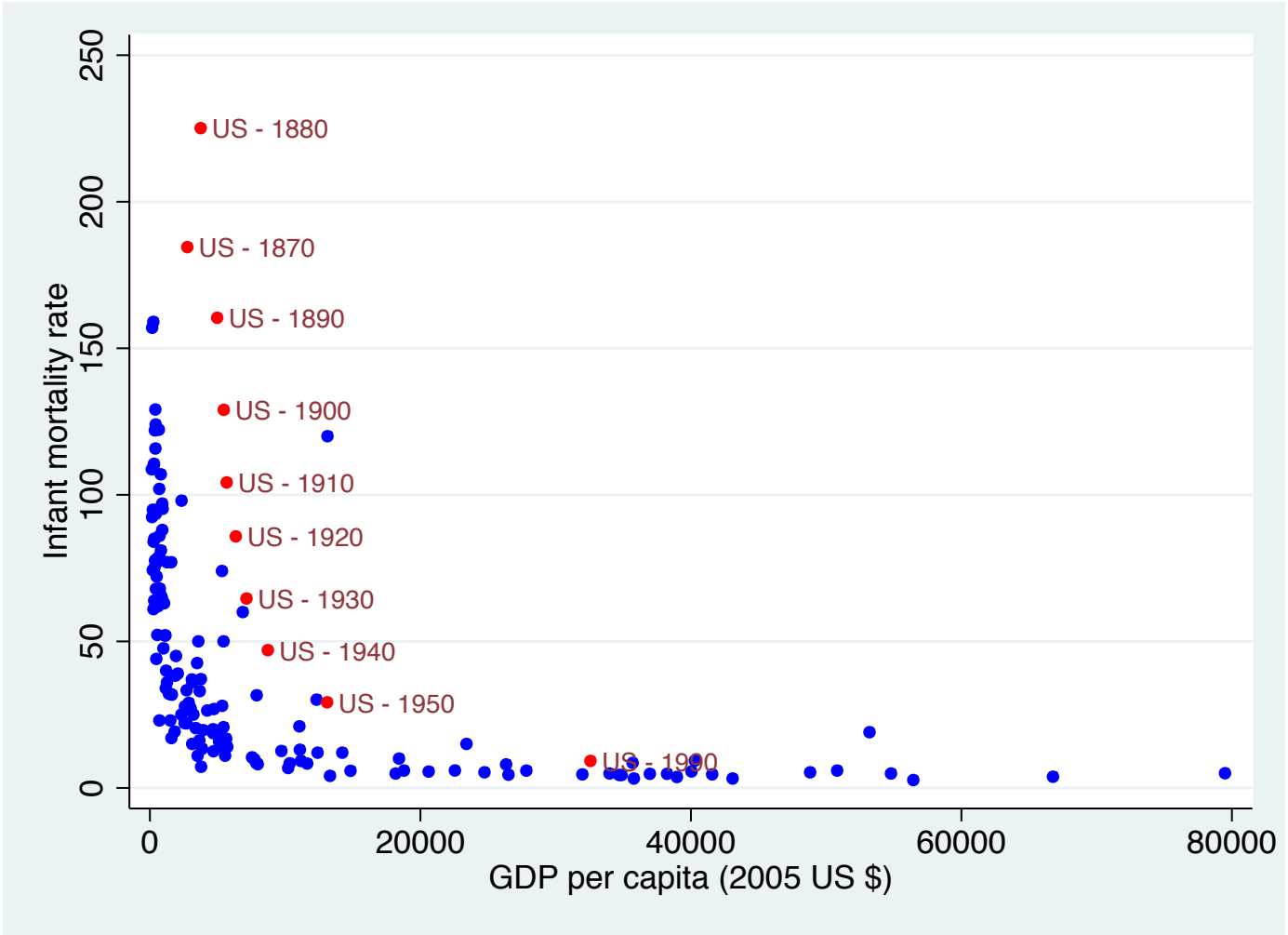
A Partial Break from the Malthusian World

- So modern medicine medicine has made us much, much healthier and more productive
- Why is this related to the Great Divergence?
- If you are still in a somewhat Malthusian economy, better health isn't good from an income standpoint
- Health improvements effectively lower the subsistence income floor
- You end up with more people living at a lower income, leading to bigger gaps relative to rich countries
- Compounding this are modern gains in food production

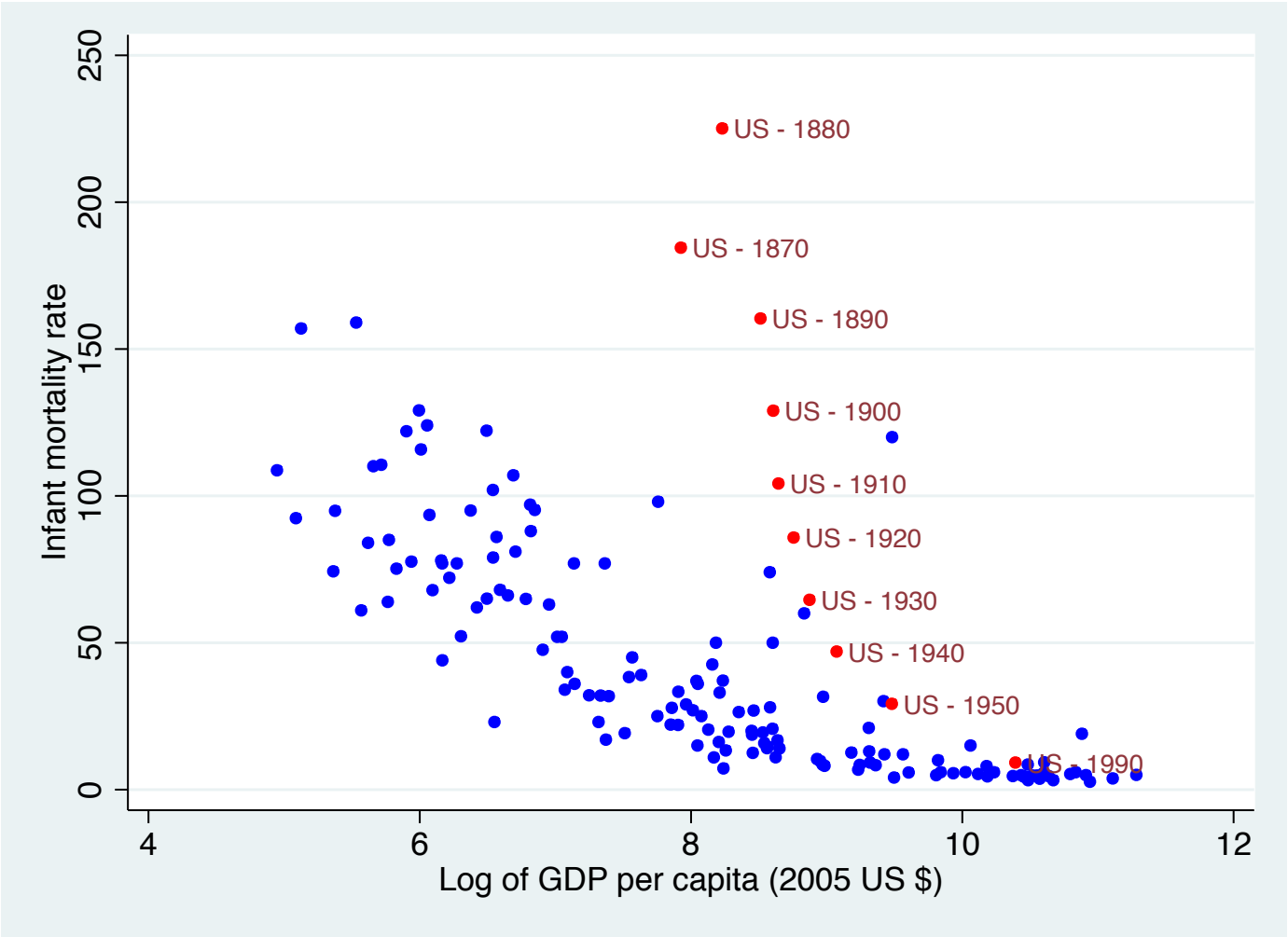
A Partial Break from the Malthusian World

A Partial Break from the Malthusian World

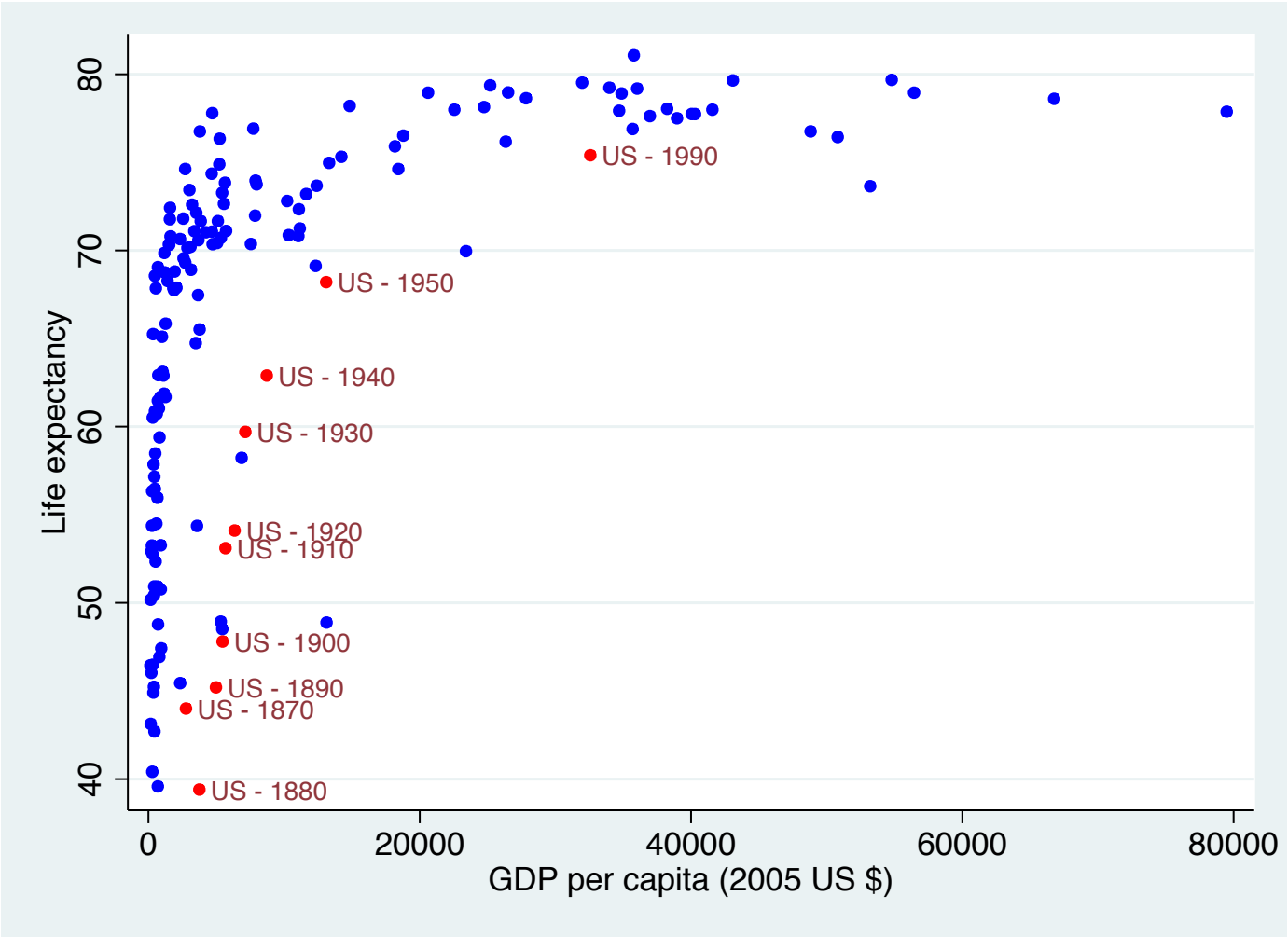
Modern Medicine



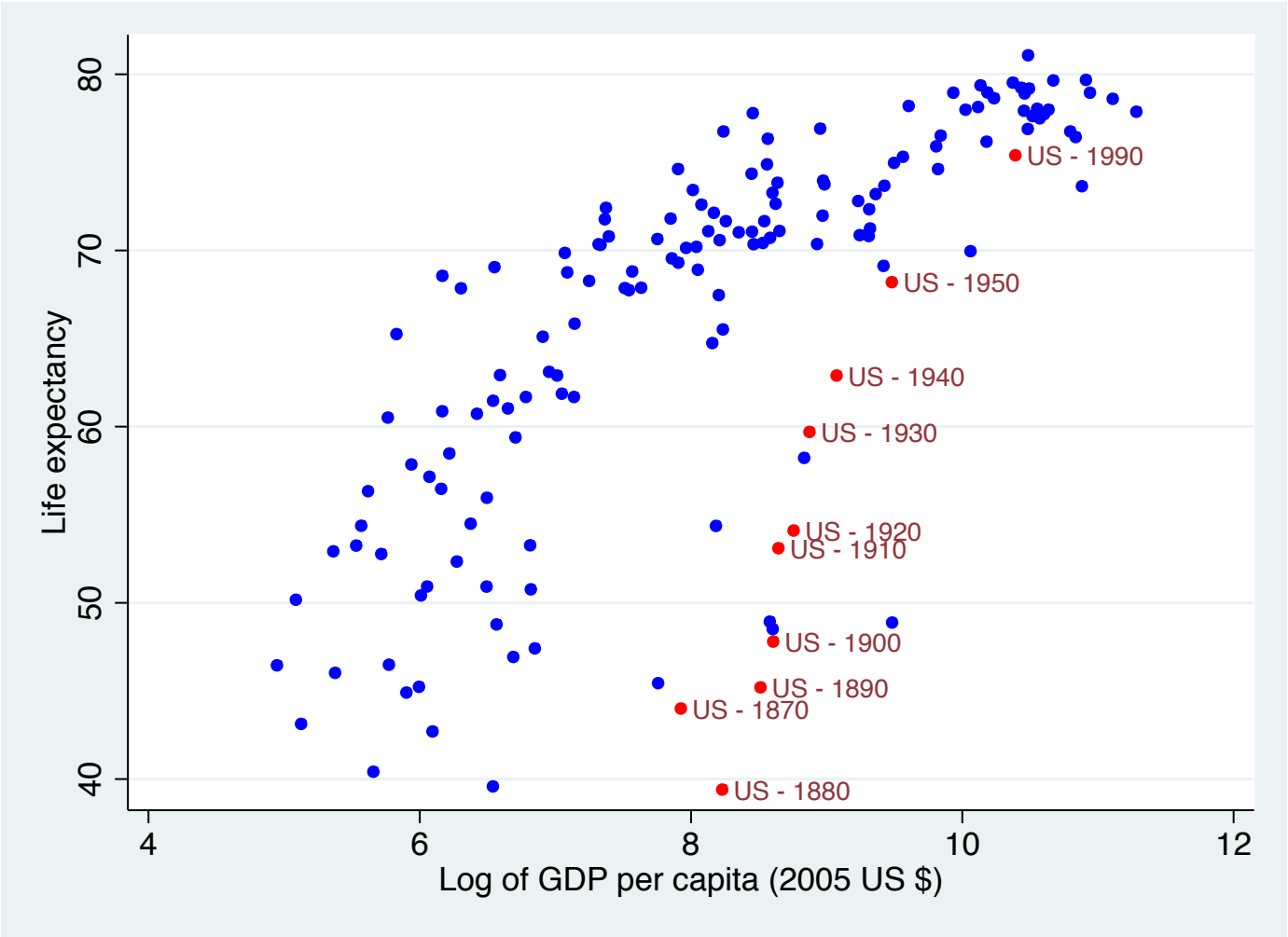
Modern Medicine



Modern Medicine



Modern Medicine



Technology-Skill Complementarities

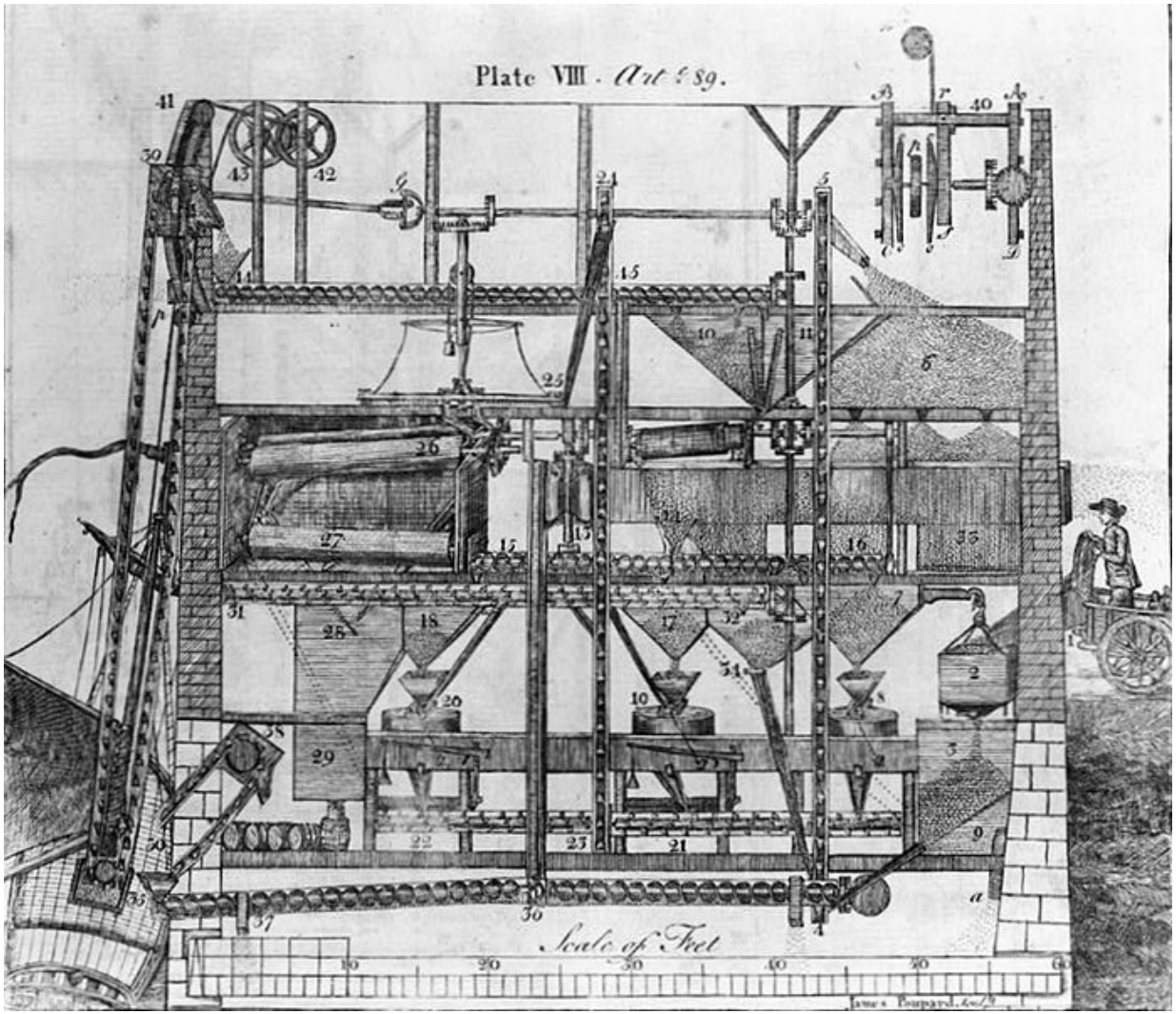
- A final component of divergence is skill-biased technological change
- The early industrialization we've talked about replaced skilled workers with machines and unskilled workers
- However, technological change since then hasn't necessarily benefited unskilled workers
- The technological change in the 20th century in particular seems to be more *skill-biased*

Artisanal Production

Factory Production

Assembly Line Production

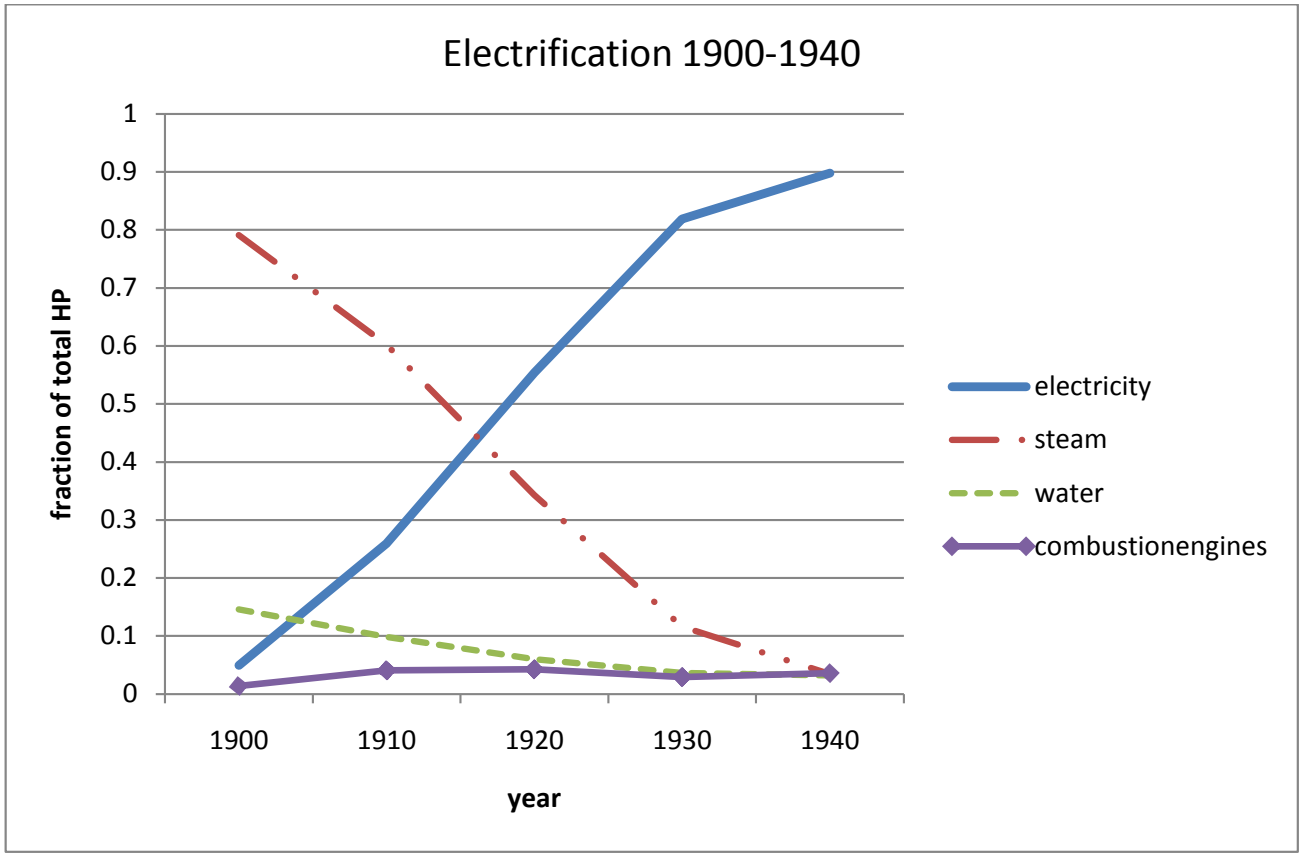
Batch/Continuous Process Production



Batch/Continuous Process Production

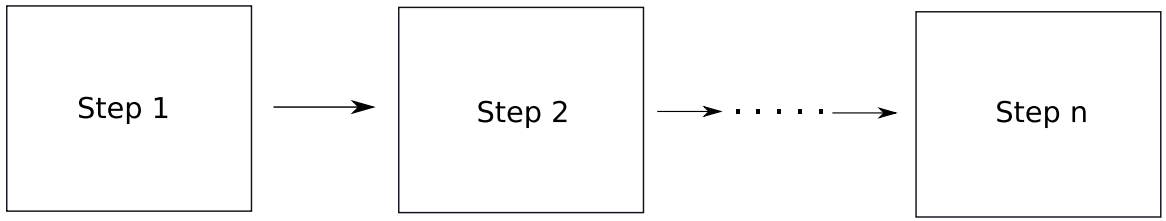
These five machines perform every necessary movement of the grain, and meal, from one part of the mill to another, and from one machine to another, through all the various operations, from the time the grain is emptied from the wagoner's bag until completely manufactured into flour without the aid of manual labor, excepting to set the different machines in motion. – Oliver Evans, 1848

Batch/Continuous Process Production



Notes: The data are from the Censuses of Manufactures, 1900-1939. Water refers to power created at the firm level with their own water wheels, steam refers to power created at the firm level in steam engines, and electricity refers to power created either at the firm level and that was converted to electricity, or purchased electricity.

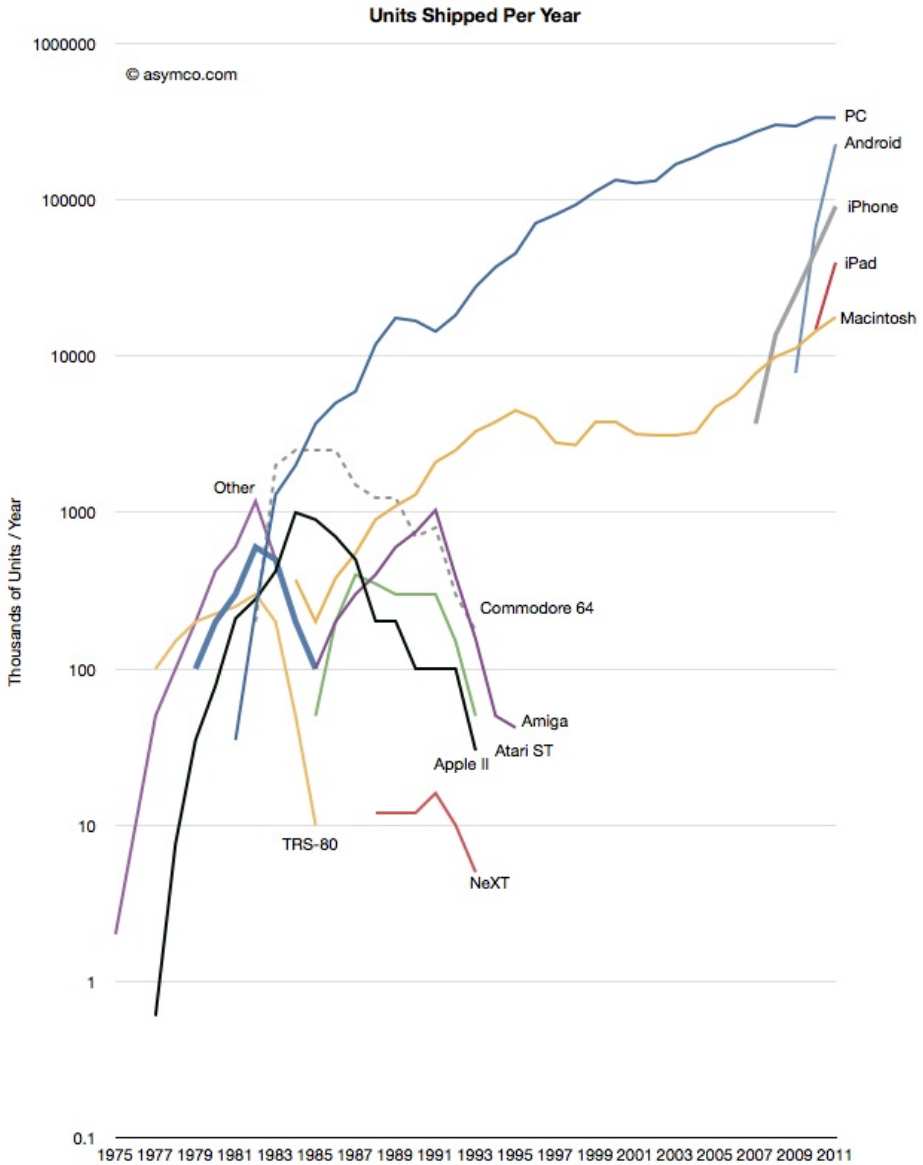
Modern Production Processes



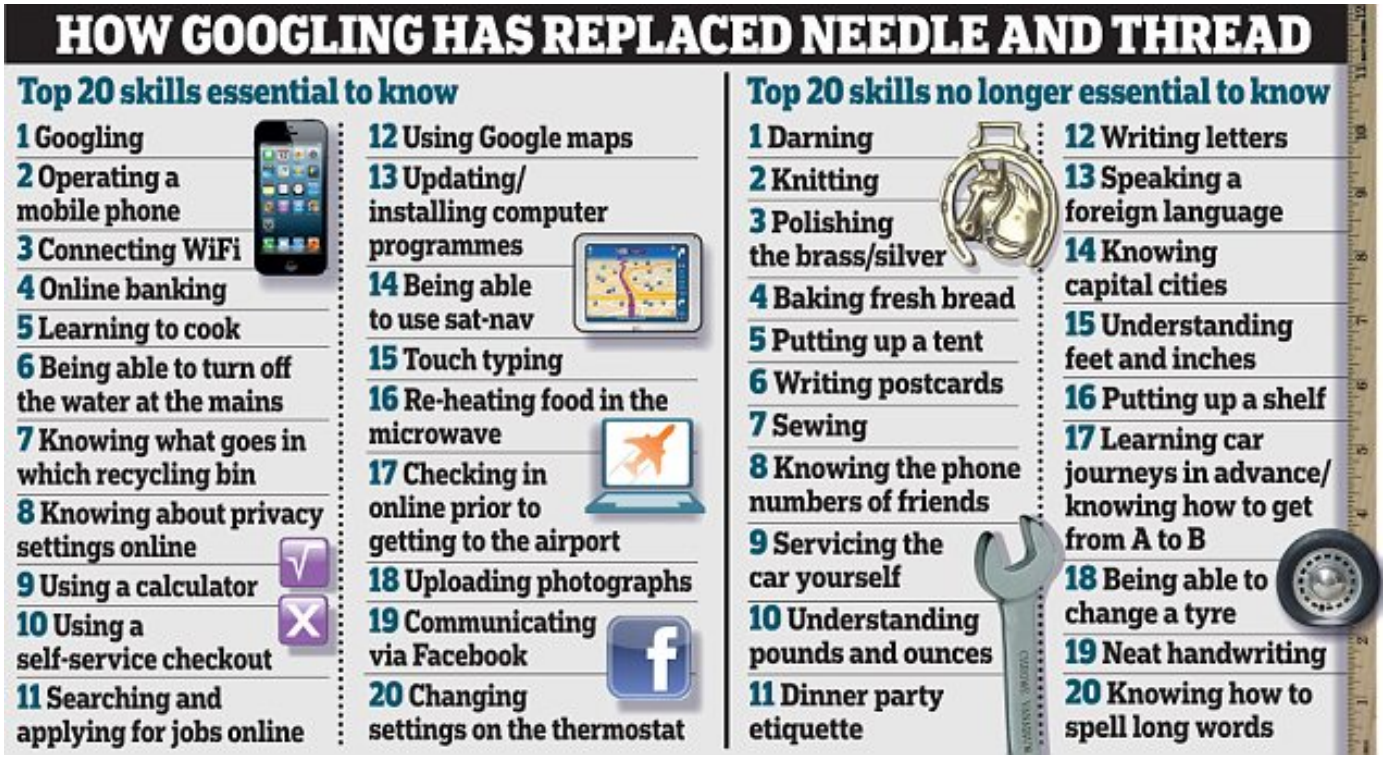
(1-p) (1-p)^2 · · · · · (1-p)^n

Success Rate

Technology-Skill Complementarities



Technology-Skill Complementarities



HOW GOOGLING HAS REPLACED NEEDLE AND THREAD

Top 20 skills essential to know

1 Googling
2 Operating a mobile phone
3 Connecting WiFi
4 Online banking
5 Learning to cook
6 Being able to turn off the water at the mains
7 Knowing what goes in which recycling bin
8 Knowing about privacy settings online
9 Using a calculator
10 Using a self-service checkout
11 Searching and applying for jobs online
12 Using Google maps
13 Updating/ installing computer programmes
14 Being able to use sat-nav
15 Touch typing
16 Re-heating food in the microwave
17 Checking in online prior to getting to the airport
18 Uploading photographs
19 Communicating via Facebook
20 Changing settings on the thermostat

Top 20 skills no longer essential to know

1 Darning
2 Knitting
3 Polishing the brass/silver
4 Baking fresh bread
5 Putting up a tent
6 Writing postcards
7 Sewing
8 Knowing the phone numbers of friends
9 Servicing the car yourself
10 Understanding pounds and ounces
11 Dinner party etiquette
12 Writing letters
13 Speaking a foreign language
14 Knowing capital cities
15 Understanding feet and inches
16 Putting up a shelf
17 Learning car journeys in advance/ knowing how to get from A to B
18 Being able to change a tyre
19 Neat handwriting
20 Knowing how to spell long words

http://www.dailymail.co.uk/news/article-2413664/Forget-darning-baking-fixing-car–skills-REALLY-need-21st-century-setting-satnav-putting-rubbish-right-bin.html

Technology-Skill Complementarities

TABLE I
PREDICTIONS OF THE FRAMEWORK

Technological change	K/Q	$K/(L_s + L_u)$	$L_s/(L_s + L_u)$
(a) Shift from artisanal or hand trades (H) to factory production (F)	$\uparrow$[a]	?[b]	$\downarrow$[c]
(b) Shift from factory (F) to assembly-line (A) production (Hicks-neutral technical change)	$\downarrow$	$\rightarrow$	$\rightarrow$
(c) Shift from assembly-line (A) to continuous-process (or batch) methods (C)	$\uparrow$	$\uparrow$	$\uparrow$

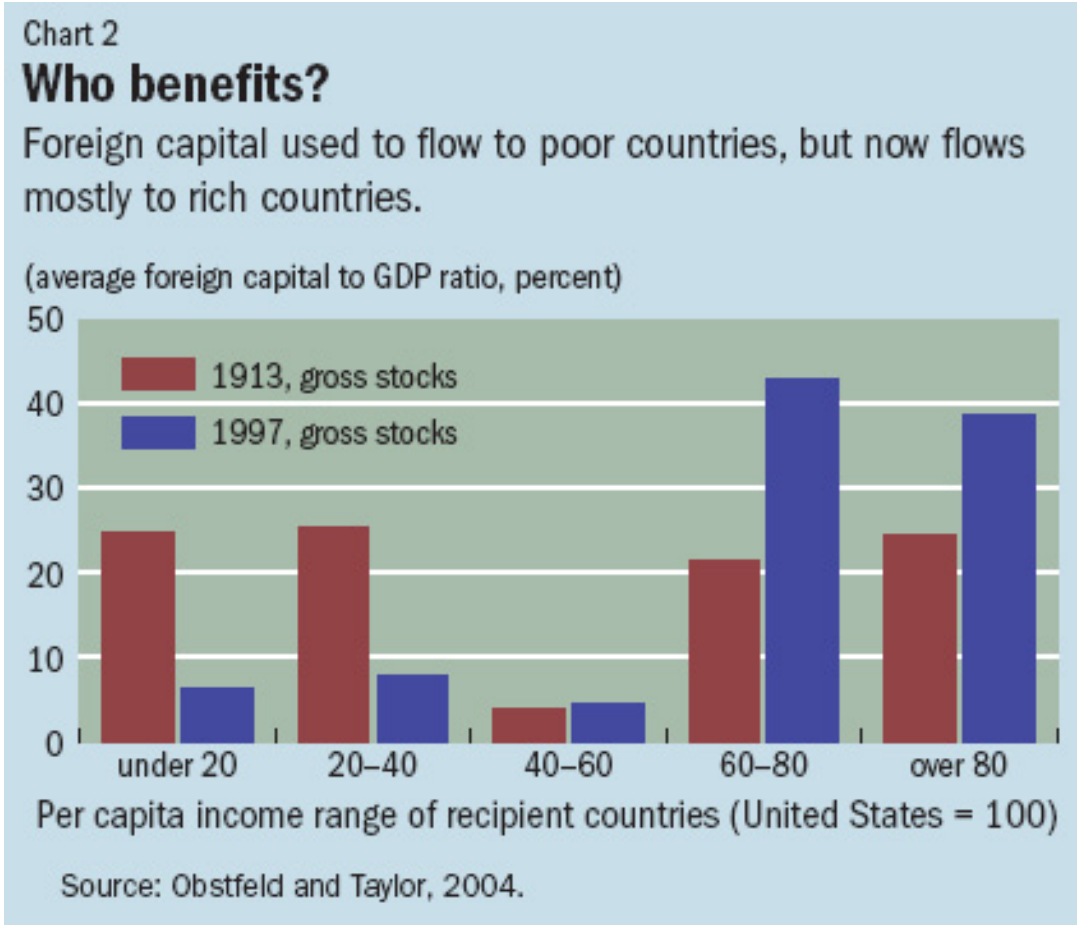
K = capital stock.
L_s = skilled or more-educated labor.
L_u = unskilled or less-educated labor.

a. The prediction is obtained when $(\lambda_F^k/\lambda_H^k) < [(1-\alpha_F)/(1-\alpha_H)] \cdot (r_H^*/r_F^*)$. That is, considering the restrictive case discussed in the text of equal r^* for H and F, the prediction is correct only if the higher K^*-intensity for the H technology is outweighed by the greater use of K in the creation of K^* in the F technology.

b. The impact of (a) on $[K/(L_s + L_u)]$ is ambiguous in the case when $[L_s/(L_s + L_u)]$ declines.

c. The prediction holds in the restrictive case of equal r^* for H and F. When the r^*s differ, the condition is $(r_H^*/r_F^*) < [(\alpha_F/\alpha_H)] \cdot [(1-\alpha_H)/(1-\alpha_F)] \cdot (\lambda_F^1/\lambda_H^1)$.

Technology-Skill Complementarities



Technology and the Great Divergence

- So why is a low-skilled labor force problematic with modern technology?
- Modern production process are complex
- One worker messing up can have dramatic impact on output
- Technology has also evolved in ways that favor high skill workers
- This isn't just about engineering skill, many sectors now require computer and communication skills
- So the path of technological change has created bigger benefits for high-skilled countries and potentially left low-skilled countries behind