

Econ 210a

Master

Brad DeLong

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<<https://github.com;braddelong/public-files/blob/master/econ-210a-lectures-master.pptx>>

Econ 210a

April 22, 2020 Class

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<<https://www.icloud.com/keynote/0Z2r-GEQD73BP9FRWMV6QA5bQ>>

<<https://github.com;braddelong/public-files/blob/master/econ-210a-lecture-12a.pptx>>

Inequality

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Readings

Inequality:

- **Branko Milanovic, Peter H. Lindert, & Jeffrey G. Williamson** (2010): *Pre-Industrial Inequality* <<https://github.com;braddelong/public-files/blob/master/readings/article-milanovic-%26-al-pre-industrial-inequality.pdf>>
- **Thomas Piketty & Gabriel Zucman** (2014): *Capital Is Back: Wealth-Income Ratios in Rich Countries 1700–2010* <<https://github.com;braddelong/public-files/blob/master/readings/article-piketty-zucman-capital-is-back.pdf>>

Milanovic & al.

Pre-Industrial Inequality:

- <<https://github.com;braddelong/public-files/blob/master/readings/article-milanovic-%26-al-pre-industrial-inequality.pdf>>
- “Is inequality largely the result of the Industrial Revolution? Or, were pre-industrial incomes as unequal as they are today? This article infers inequality across individuals within each of the 28 pre-industrial societies, for which data were available, using what are known as social tables. It applies two new concepts: the inequality possibility frontier and the inequality extraction ratio. They compare the observed income inequality to the maximum feasible inequality that, at a given level of income, might have been 'extracted' by those in power. The results give new insights into the connection between inequality and economic development in the very long run...”

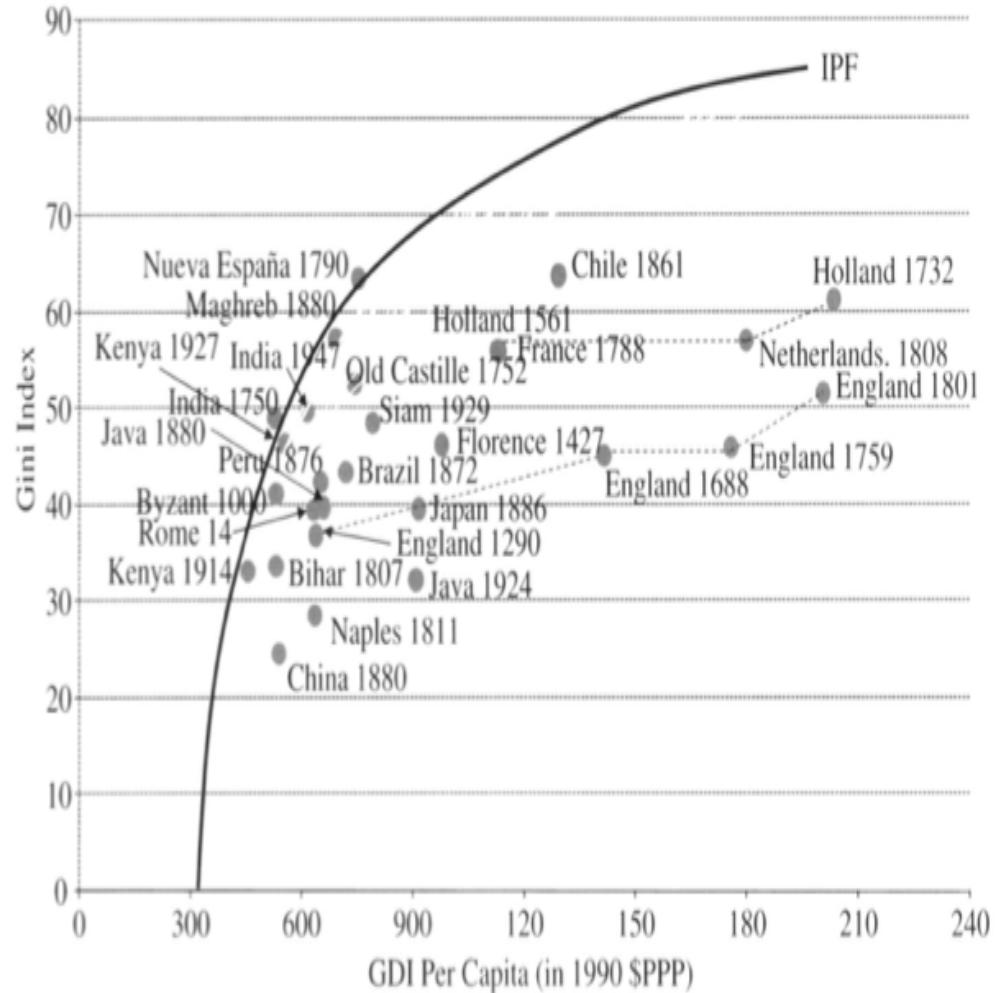


Fig. 2. Pre-industrial Inequalities: Estimated Gini Coefficients, and the Inequality Possibility Frontiers

Into the Modern Age...

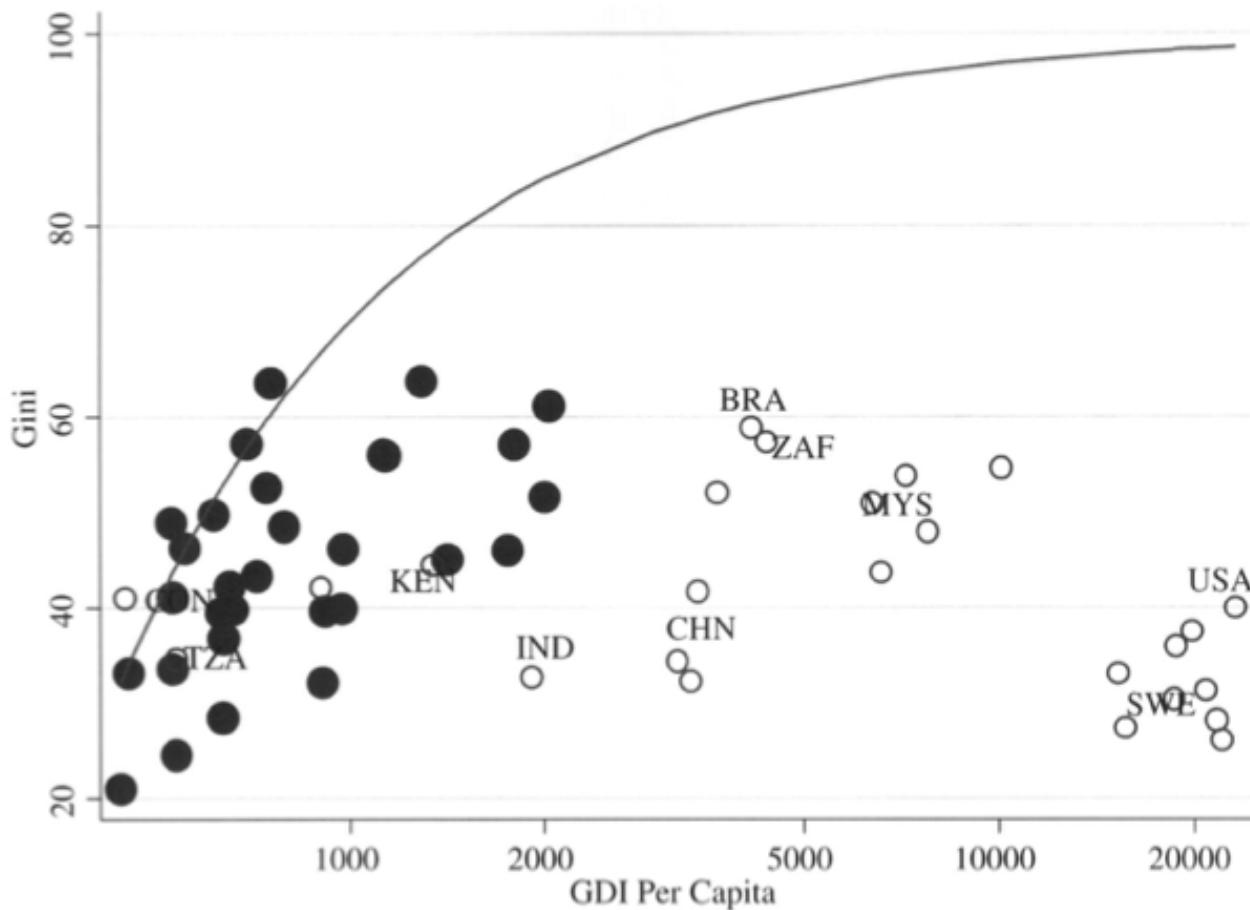


Fig. 3. *Ginis and the Inequality Possibility Frontier for the Pre-industrial Society Sample and Selected Modern Societies*

Note. Modern societies are drawn with hollow circles. IPF drawn on the assumption of $s = \$PPP\ 300$ per capita per year. Horizontal axis in logs.

Inequality Extraction Ratios

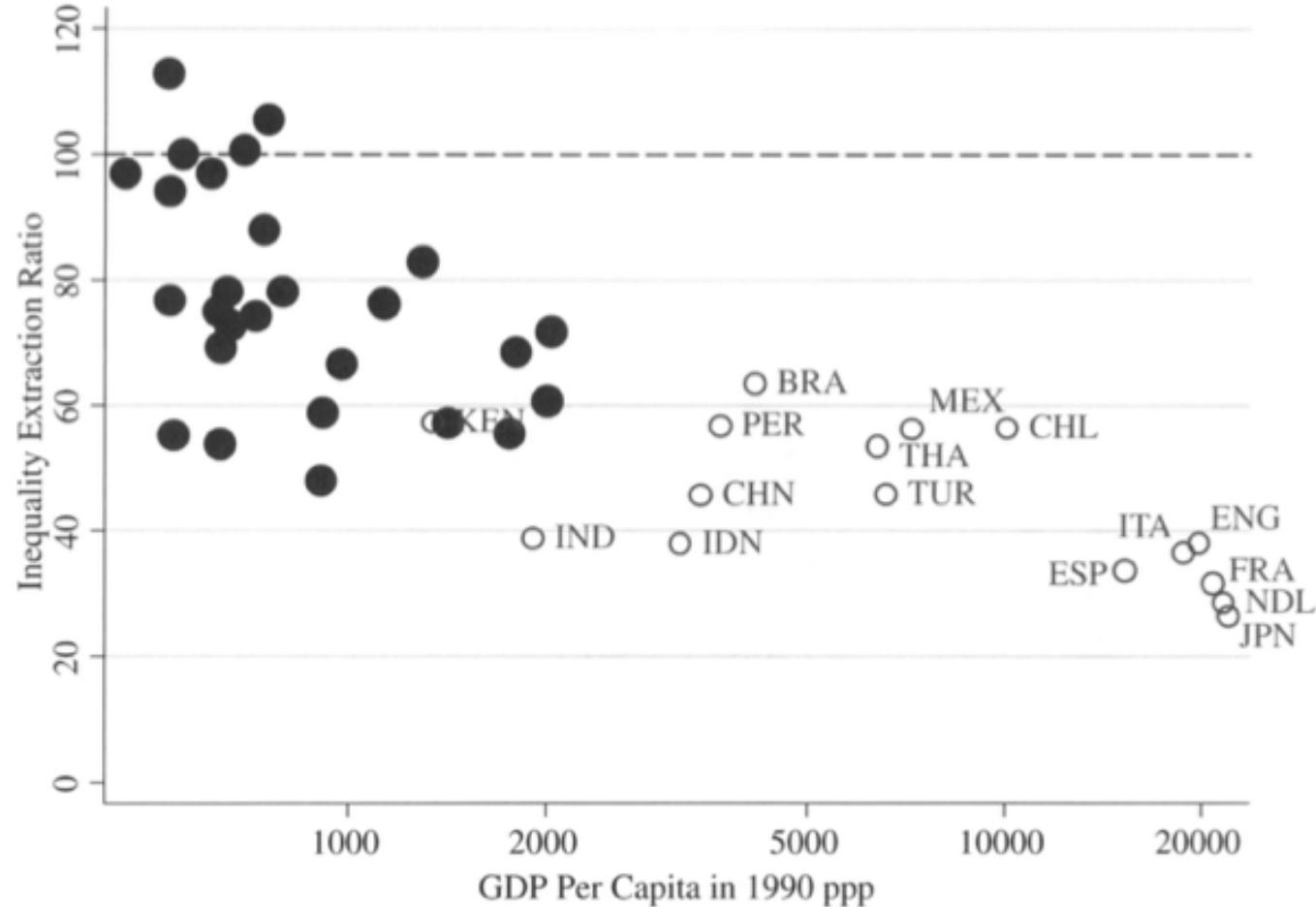


Fig. 4. *Inequality Extraction Ratio for the Pre-industrial Society Sample and their Counterpart Modern Societies*

Thomas Piketty & Gabriel Zucman

Capital Is Back: Wealth-Income Ratios in Rich Countries 1700–2010:

- <<https://github.com/braddelong/public-files/blob/master/readings/article-piketty-zucman-capital-is-back.pdf>>
- “How do aggregate wealth-to-income ratios evolve in the long run and why? We address this question using 1970–2010 national balance sheets recently compiled in the top eight developed economies. For the United States, United Kingdom, Germany, and France, we are able to extend our analysis as far back as 1700. We find in every country a gradual rise¹ of wealth-income ratios in recent decades, from about 200–300% in 1970 to 400–600% in 2010. In effect, today’s ratios appear to be returning to the high values observed in Europe in the eighteenth and nineteenth centuries (600–700%). This can be explained by a long-run asset price recovery (itself driven by changes in capital policies since the world wars) and by the slowdown of productivity and population growth, in line with the $\frac{1}{4}$ gs Harrod-Domar-Solow formula. That is, for a given net saving rate $s = 10\%$, the long-run wealth-income ratio is about 300% if $g = 3\%$ and 600% if $g = 1.5\%$. Our results have implications for capital taxation and regulation and shed new light on the changing nature of wealth, the shape of the production function, and the rise of capital shares...”

Since 1870 in the Global North

A common pattern in Europe:

- Divergence with much smaller moves in the United States—so far
- To what extent are these fluctuations in accumulated/improved productive asset stocks?
- To what extent are these fluctuations in valuation ratios?
- How are we to interpret fluctuations in valuation ratios?

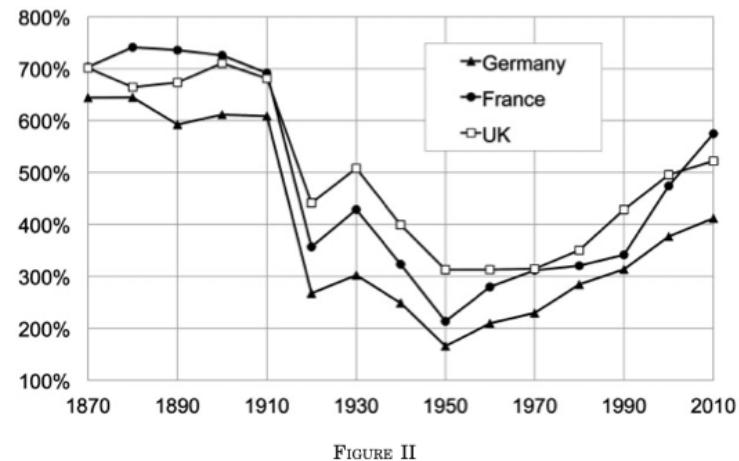


FIGURE II
Private Wealth-National Income Ratios in Europe, 1870–2010

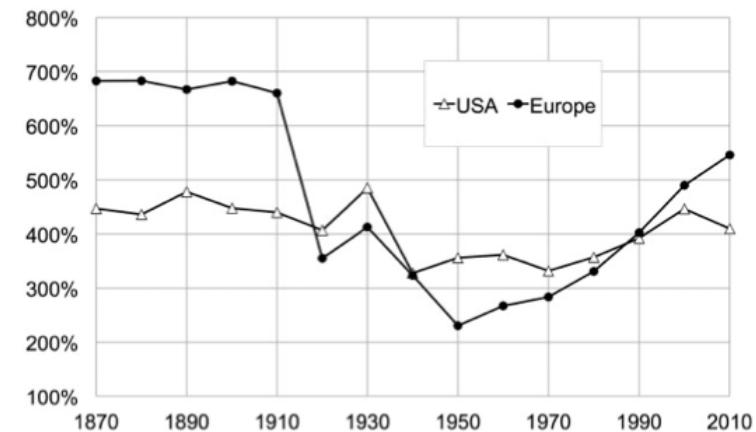


FIGURE IV
Private Wealth-National Income Ratios, 1870–2010: Europe versus United States

Housing vs. Other

How much of the rise in wealth/national income is housing?

- And how much of the end-of-First-Gilded-Age-decline was the fall in value of agricultural land?
- And how concentrated is housing/agricultural land relative to other forms of wealth?

TABLE II
DOMESTIC CAPITAL ACCUMULATION IN RICH COUNTRIES, 1970–2010: HOUSING VERSUS
OTHER DOMESTIC CAPITAL (%)

	1970 domestic capital/national income ratio		2010 domestic capital/national income ratio		1970–2010 rise in domestic capital/national income ratio	
	Incl. housing	Incl. other domestic capital	Incl. housing	Incl. other domestic capital	Incl. housing	Incl. other domestic capital
		United States	399	456	57	
Japan	142	257	182	274	41	17
	356		548		192	
Germany	131	225	220	328	89	103
	305		377		71	
France	129	177	241	136	112	-41
	340		618		278	
United Kingdom	104	236	371	247	267	11
	359		548		189	
Italy	98	261	300	248	202	-13
	247		640		392	
Canada	107	141	386	254	279	113
	325		422		97	
Australia	108	217	208	213	101	-4
	410		655		244	
	172	239	364	291	193	52

Great Depression: Recovery

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Readings

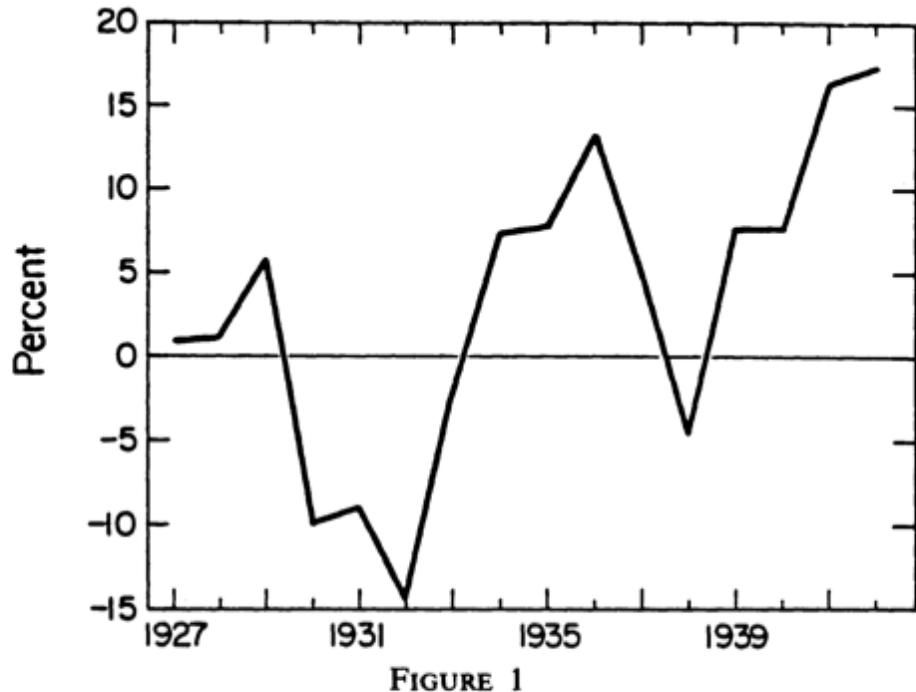
The Great Depression: Recovery:

- **Christina Romer** (1992): *What Ended the Great Depression?* <<http://www.jstor.org/stable/2123226>>
- **Gauti Eggertsson** (2008): *Great Expectations and the End of the Great Depression* <<http://www.jstor.org/stable/29730131>>
- **Joshua Hausman** (2016): *Fiscal Policy and Economic Recovery: The Case of the 1936 Veterans' Bonus* <<https://www.aeaweb.org/articles?id=10.1257/aer.20130957>>

Romer: What Ended the Great Depression?

<<http://www.jstor.org/stable/2123226>>:

- Between 1933 and 1937 real GNP in the United States grew at an average rate of over 8 percent per year
- Between 1938 and, 1941 it grew over 10 percent per year



PERCENTAGE CHANGES IN REAL GROSS NATIONAL PRODUCT, 1927-1942

Sources: The data for 1929-1942 are from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts*, table 1.2, p. 6. The data for 1927-1928 are from Romer, "World War I," table 5, p. 104.

Romer: What Ended the Great Depression? II

<<http://www.jstor.org/stable/2123226>>:

- This paper examines the role of aggregate-demand stimulus in ending the Great Depression. Plausible estimates of the effects of fiscal and monetary changes indicate that nearly all the observed recovery of the U.S. economy prior to 1942 was due to monetary expansion. A huge gold inflow in the mid- and late 1930s swelled the money stock and stimulated the economy by lowering real interest rates and encouraging investment spending and purchases of durable goods. That monetary developments were crucial to the recovery implies that self-correction played little role in the growth of real output between 1933 and 1942...

Assume a Monetarist Model

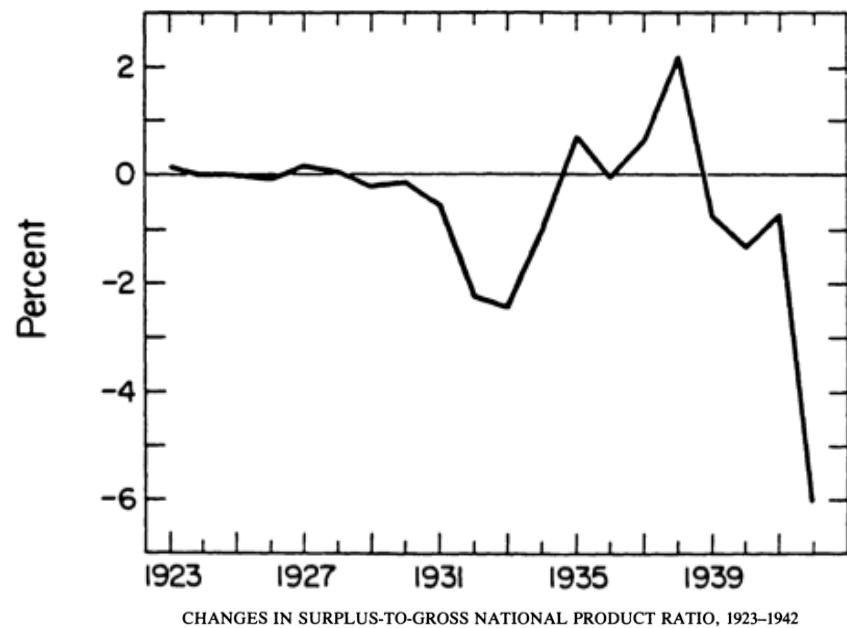
Use policy multipliers based on the experience of 1921 and 1938:

- $\beta_m = 0.823$ %-point to %-point
- $\beta_f = -0.233$ %-point to %-point
- Real GNP would have been approximately 25 percent lower in 1937 if the money supply had continued to grow at its historical average rate
- Real GNP would have been nearly 50 percent lower in 1942 than it actually was if the money supply had continued to grow at its historical average rate
- Changes in the government budget surplus played little role in generating the recovery
 - But what is the counterfactual here?

Why Doesn't Fiscal Policy Matter?

Because the Roosevelt administration did not raise the deficit (much):

- Hence you multiply a small number by 0.23, and get a small number
- But what if the government had strained every nerve to balance the budget, instead of letting the deficit roll at its 1933 share of national income?



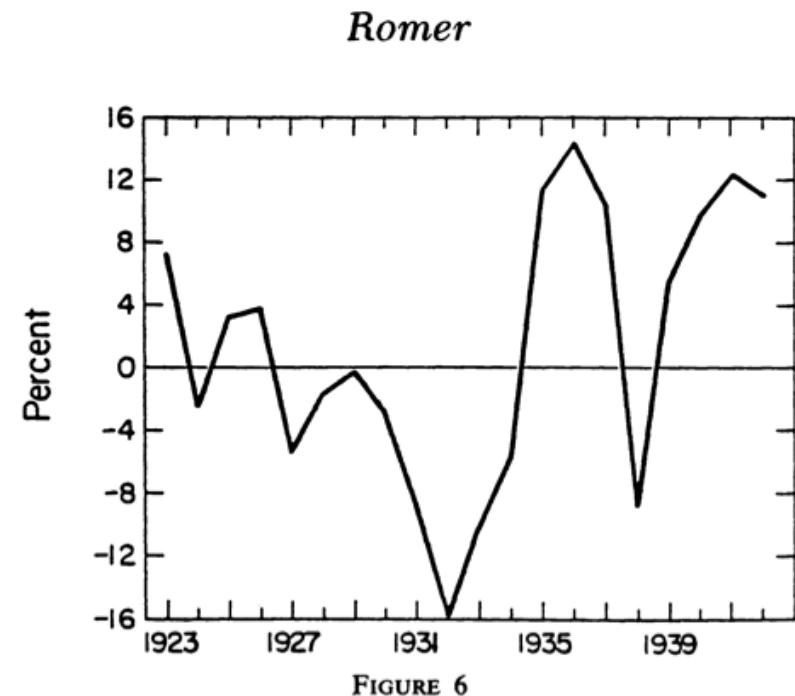
Note: The changes are shown lagged one year because this is the form in which they enter my calculation.

Sources: The surplus data are from the U.S. Department of the Treasury, *Statistical Appendix*, table 2, pp. 4–11. The text describes adjustments that I made to the base data. The source for real GNP is the same as in Figure 1.

Why Does Monetary Policy Matter?

Because the money stock bounced back after 1933:

- And the calibration assumes that changes in the money stock cause big changes in nominal spending
- Even if interest rates are at or near there zero lower bound
- This is something that we believe in much much much less strongly than we believed in it back in 1992



DEVIATIONS OF MONEY GROWTH RATE FROM NORMAL, 1923–1942

Notes: The normal money growth rate is defined as the average growth rate of M1 between 1923 and 1927. The deviations are shown lagged one year because this is the form in which they enter my calculation.

Source: The data on M1 are from Friedman and Schwartz, *Monetary History*, table A-1, column 7, pp. 704–34.

Gold & the Money Supply

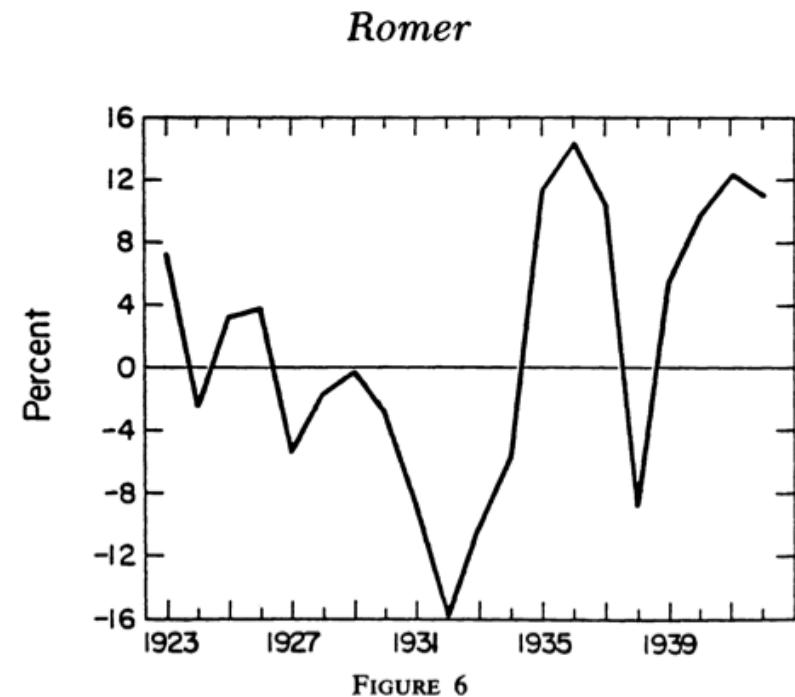
Gold inflows then expanded the month stock:

- A gold inflow due to devaluation in 1933
- A gold inflow to capital flight from Europe because of political instability after 1934
- Coincident with this gold inflow, real interest rates fell precipitously in 1933
- Real interest rates remained low or negative throughout most of the second half of the 1930s
 - A strong rebound in interest-sensitive spending

What Determines the Money Supply?

The monetary base and the money multiplier:

- Money multiplier components:
 - D/R: $8.86 \rightarrow 4.67$
 - D/C: little action until WWII imminent
- Would the D/R ratio have fallen much less if there had been much less of a gold-reserve inflow?
 - Maybe...



Notes: The normal money growth rate is defined as the average growth rate of M1 between 1923 and 1927. The deviations are shown lagged one year because this is the form in which they enter my calculation.

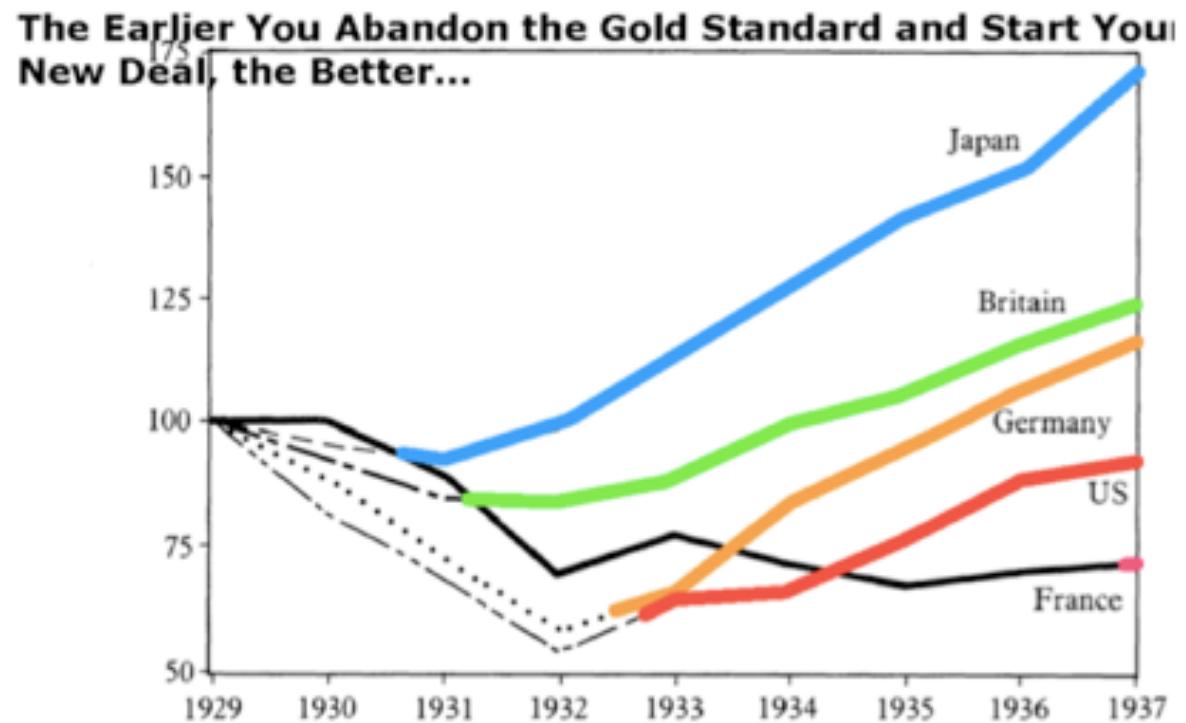
Source: The data on M1 are from Friedman and Schwartz, *Monetary History*, table A-1, column 7, pp. 704-34.

Regime Change and Policy

The devaluation of 1933:

- Replaced a deflationary monetary-contraction regime by an inflationary monetary expansion regime
- The cross-country pattern is, once again, convincing...

Recovery in the Great Depression Does Not Begin Until the Gold Standard Is Abandoned



Eggertsson: Great Expectations and the End of the Great Depression

<<http://www.jstor.org/stable/29730131>>:

- It is hard to overstate how radical the regime change was.
- "This is the end of Western civilization," declared Director of the Budget Lewis Douglas.
- During Roosevelt's first year in office, Douglas and Acting Treasury Secretary Dean Acheson resigned in protest...
- Despite the fact that neither the nominal interest rate nor the money supply changed... the elimination of the policy dogmas drastically changed the systematic part of monetary policy...

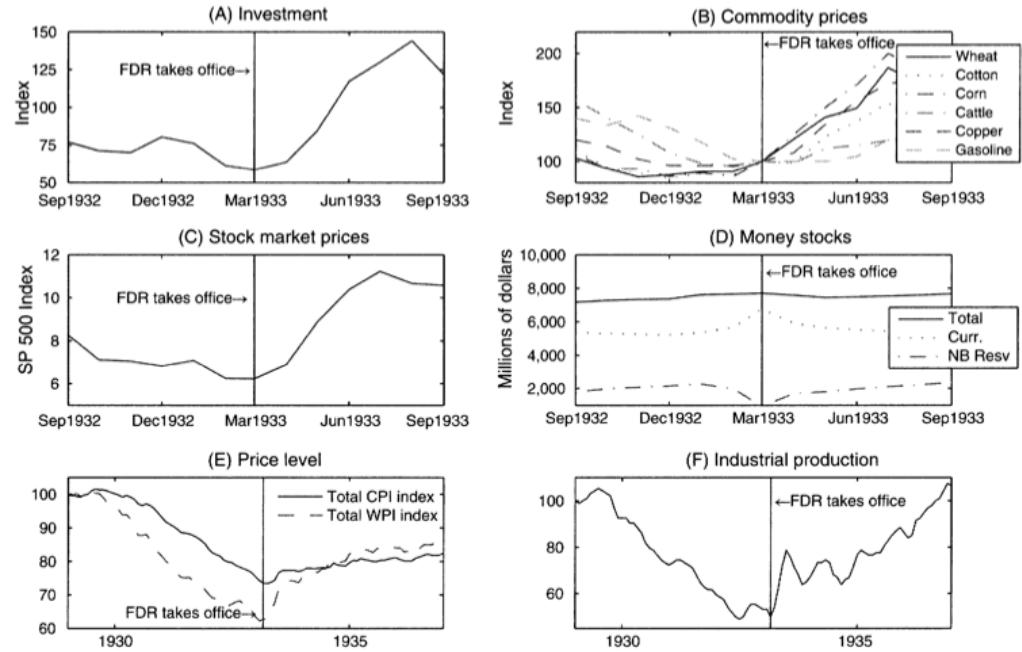


FIGURE 1

Notes: Investment, commodity prices, and the stock market rebounded once FDR took office. The large change in these forward-looking variables cannot be explained by contemporaneous changes in the money supply, which did not change around the turning point. Similarly, prices and industrial production reversed their three-year downward trend when FDR took office.

Eggertson: Great Expectations II

<<http://www.jstor.org/stable/29730131>>:

- This paper suggests that the US recovery from the Great Depression was driven by a shift in expectations. This shift was caused by President Franklin Delano Roosevelt's policy actions. On the monetary policy side, Roosevelt abolished the gold standard and?even more importantly?announced the explicit objective of inflating the price level to pre-Depression levels. On the fiscal policy side, Roosevelt expanded real and deficit spending, which made his policy objective credible. These actions violated prevailing policy dogmas and initiated a policy regime change as in Sargent (1983) and Temin and Wigmore (1990). The economic consequences of Roosevelt are evaluated in a dynamic stochastic general equilibrium model with nominal frictions...

How Does Money Affect Output?

The mechanical quantity theory:

- Money burns a hole in your pocket and drops out, thus being spent on currently-produced goods and services
- The mechanical quantity theory is not in good odor today:
 - Instead, it has to work through interest rates
 - Present and future interest rates
 - Which means that monetary expansion at the ZLB today has effects only to the extent that it raises the expected money stock at some point in the future at which the economy is expected to be no longer at the ZLB
 - Hence the money stock has to be “sticky” in some sense...
 - Krugman: credibly promise not to be responsible...

Moving to a NK DSGE Model...

I still do not understand the attraction:

- The point is to get an “IS curve”: real spending on currently-produced goods and services as a downward-sloping function of the expected real interest rate
- The point is to get a “Phillips curve”: a relationship of price-level changes to expectations and to the level of spending
- And to allow policy to show itself through the choice of the interest rate by the central bank

Hoover Policy Dogmas

Eggertson sees three:

- The perceived need for small government to foster a recovery: Hoover's claim that "every additional" government expenditure would cause "intolerable pressures"
- Hoover's second dogma was to balance the budget.
- Eggertson: "The most important aspect of the Roosevelt regime change is that it implies a commitment to lower future nominal interest rates relative to the Hoover regime, a higher future price level, and hence a permanent increase in the money supply..."

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Race, the American South, & the American North

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Readings

Race, the American South, & the American North:

- **Gavin Wright** (1987): *The Economic Revolution in the American South* <<https://www.aeaweb.org/articles?id=10.1257jep.1.1.161>>
- **Taylor Jaworski** (2017): *World War II and the Industrialization of the American South* <<http://www.nber.org/papers/w23477>>
- **Ellora Derenocourt** (2018): *Can You Move to Opportunity? Evidence from the Great Migration* <<https://scholar.harvard.edu/elloraderenocourt/publications>>

Convergence & Its Absence

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Last Edited: 2020-04-13

Readings

Convergence & Its Absence

- **Lant Pritchett** (1997): Divergence, Big Time <<http://tinyurl.com/dl20090112o>>
- **Dev Patel, Justin Sandefur, & Arvind Subramanian** (2018): *Everything You Know about Cross-Country Convergence Is (Now) Wrong* <<https://www.piie.com/blogs/realtime-economic-issues-watch/everything-you-know-about-cross-country-convergence-now-wrong>>
- **Paul Johnson & Chris Papageorgiou**: *What Remains of Cross-Country Convergence?* <<https://delong.typepad.com/files/johnson-papageorgiou.pdf>>

Lant Pritchett (1997): Divergence, Big Time

Questions:

1. What is your reasonable lower bound as to what national income per capita could have been in any country in 1870 or before? How did you arrive at this lower bound?
2. What distinguishes the countries that have converged to relative (and absolute!) wealth since 1870?
3. What common factors do the “other” countries that have not converged to relative wealth since 1870 share?
4. What was the ratio of the national income of the richest to the poorest country in 1870?
5. What was the ratio of the national income of the richest to the poorest country in 1990?
6. What is the role of international price structures in relative income comparisons?

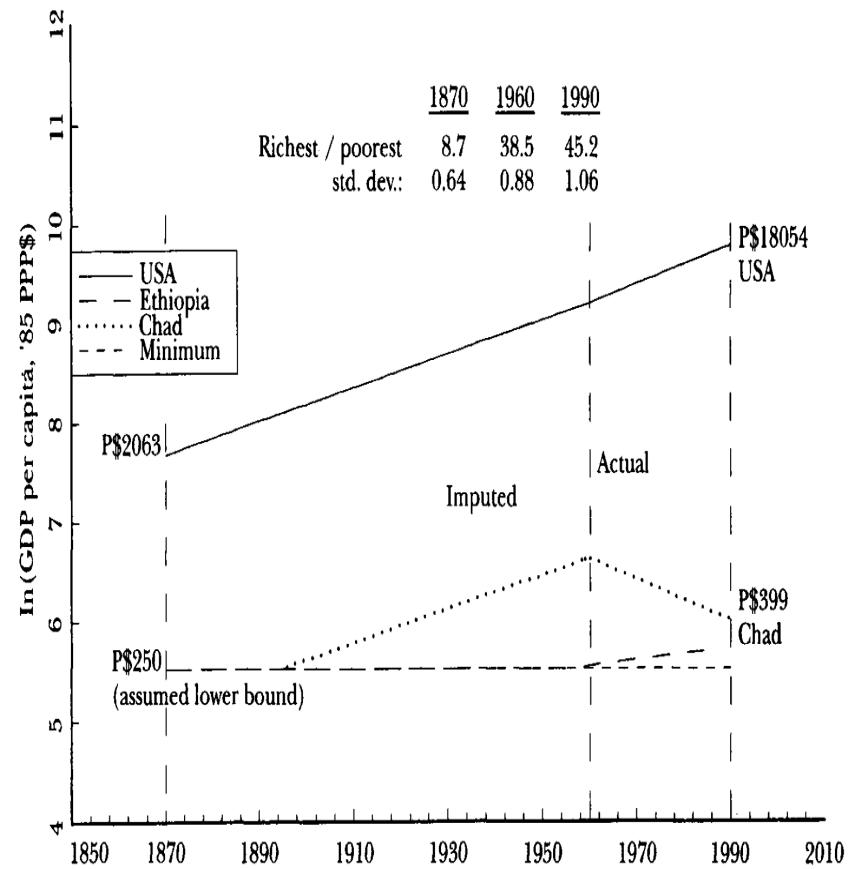
<<http://tinyurl.com/dl20090112o>>

The Necessity of Divergence

Place a reasonable lower bound on what GDP per capita could have been in 1870 in any country:

- Using the purchasing power adjustments for exchange rates has an especially important effect in poor countries...
- Tradable goods will have generally the same prices across countries because of arbitrage...
- Nontradable goods are typically much cheaper in poorer countries because of their lower income levels
- A country with a per capita GDP level of \$70 (1997) in U.S. dollars, measured in market exchange rates, will have a *per capita* GDP of P\$250 (1997)...
- The lowest five-year average level of per capita GDP reported for any country in the Penn World Tables (Mark 5) is P\$275 (1997) for Ethiopia in 1961–65...
- Maddison (1991) gives estimates of GDP per capita of some less developed countries as early as 1820: P\$531 (1997) for India, P\$523 (1997) for China and P\$614 (1997) for Indonesia. His earliest estimates for Africa begin in 1913: P\$508 (1997) for Egypt and P\$648 (1997) for Ghana
- If you accept: a) the current estimates of relative incomes across nations; b) the estimates of the historical growth rates of the now-rich nations; and c) that even in the poorest economies incomes were not below P\$250 (1997) at any point—then you cannot escape the conclusion that the last 150 years have seen divergence, big time...

Figure 1
Simulation of Divergence of Per Capita GDP, 1870–1985
(showing only selected countries)



Pritchett Divides the World into Two

Two sets of countries: one clear:

- The "developed" or the "advanced capitalist" ... or the "high income OECD" ... European countries and their offshoots plus Japan.
- Since 1870, the long-run growth rates of these countries have been:
 - rapid (by previous historical standards) ...
 - remarkably similar
 - the poorer members ... grew sufficiently faster to produce considerable convergence ...
- Sample selection problems here?

Table 1

Average Per Annum Growth Rates of GDP Per Capita in the Presently High-Income Industrialized Countries, 1870–1989

Country	Level in 1870 (1985 P\$)	Per annum growth rates		
		1870–1960	1960–80	1980–94
Average	1757	1.54	3.19	1.51
Std. dev. of growth rates		.33	1.1	.51
Australia	3192	.90	2.43	1.22
Great Britain	2740	1.08	2.02	1.31
New Zealand	2615	1.24	1.39	1.28
Belgium	2216	1.05	3.70	1.52
Netherlands	2216	1.25	2.90	1.29
USA	2063	1.70	2.48	1.52
Switzerland	1823	1.94	2.07	.84
Denmark	1618	1.66	2.77	1.99
Germany	1606	1.66	3.03	1.56
Austria	1574	1.40	3.81	1.58
France	1560	1.56	3.53	1.31
Sweden	1397	1.85	2.74	.81
Canada	1360	1.85	3.32	.86
Italy	1231	1.54	4.16	1.62
Norway	1094	1.81	3.78	2.08
Finland	929	1.91	3.77	1.09
Japan	622	1.86	6.28	2.87

Source: Maddison, 1995.

Notes: Data is adjusted from 1990 to 1985 P\$ by the U.S. GDP deflator, by a method described later in this article. Per annum growth rates are calculated using endpoints.

The Global North “Developed” Economies

There is strong convergence in per capita incomes within this set of countries...

- The narrow range of the growth rates over the 1870-1960 period is striking. The United States, the richest country in 1960, had grown at 1.7 percent per annum since 1870, while the overall average was 1.54. Only one country, Australia, grew either a half a percentage point higher or lower than the average, and the standard deviation of the growth rates was only 0.33...
- At least since 1870 there has been no obvious acceleration of overall growth rates over time...
- Jones (1995) uses this basic fact of the constancy of growth to good effect in creating a compelling argument that the steadiness of U.S. growth implies that endogenous growth models that make growth a function of nonstationary variables, such as the level of R&D spending or the level of education of the labor force, are likely incorrect: they imply an accelerating growth rate (unless several variables working in opposite directions just happen to offset each other)...

Pritchett on the Global South

Two sets of countries: The second:

- The other... awkwardly, defined only as "the other set of countries," as they have nothing else in common...
- [Experiences have] been strikingly different... with some converging rapidly on the leaders while others stagnate; and over time, with a mixed record of takeoffs, stalls and nose dives...
- From 1870 to 1990 the ratio of per capita incomes between the richest and the poorest countries increased by roughly a factor of five...

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Estimates of Divergence

Table 2

Estimates of the Divergence of Per Capita Incomes Since 1870

	1870	1960	1990
USA (P\$)	2063	9895	18054
Poorest (P\$)	250	257	399
	(assumption)	(Ethiopia)	(Chad)
Ratio of GDP per capita of richest to poorest country	8.7	38.5	45.2
Average of seventeen “advanced capitalist” countries from Maddison (1995)	1757	6689	14845
Average LDCs from PWT5.6 for 1960, 1990 (imputed for 1870)	740	1579	3296
Average “advanced capitalist” to average of all other countries	2.4	4.2	4.5
Standard deviation of natural log of per capita incomes	.51	.88	1.06
Standard deviation of per capita incomes	P\$459	P\$2,112	P\$3,988
Average absolute income deficit from the leader	P\$1286	P\$7650	P\$12,662

Notes: The estimates in the columns for 1870 are based on backcasting GDP per capita for each country using the methods described in the text assuming a minimum of P\$250. If instead of that method, incomes in 1870 are backcast with truncation at P\$250, the 1870 standard deviation is .64 (as reported in Figure 1).

The “Other” Economies

Poverty Traps, Takeoffs and Convergence:

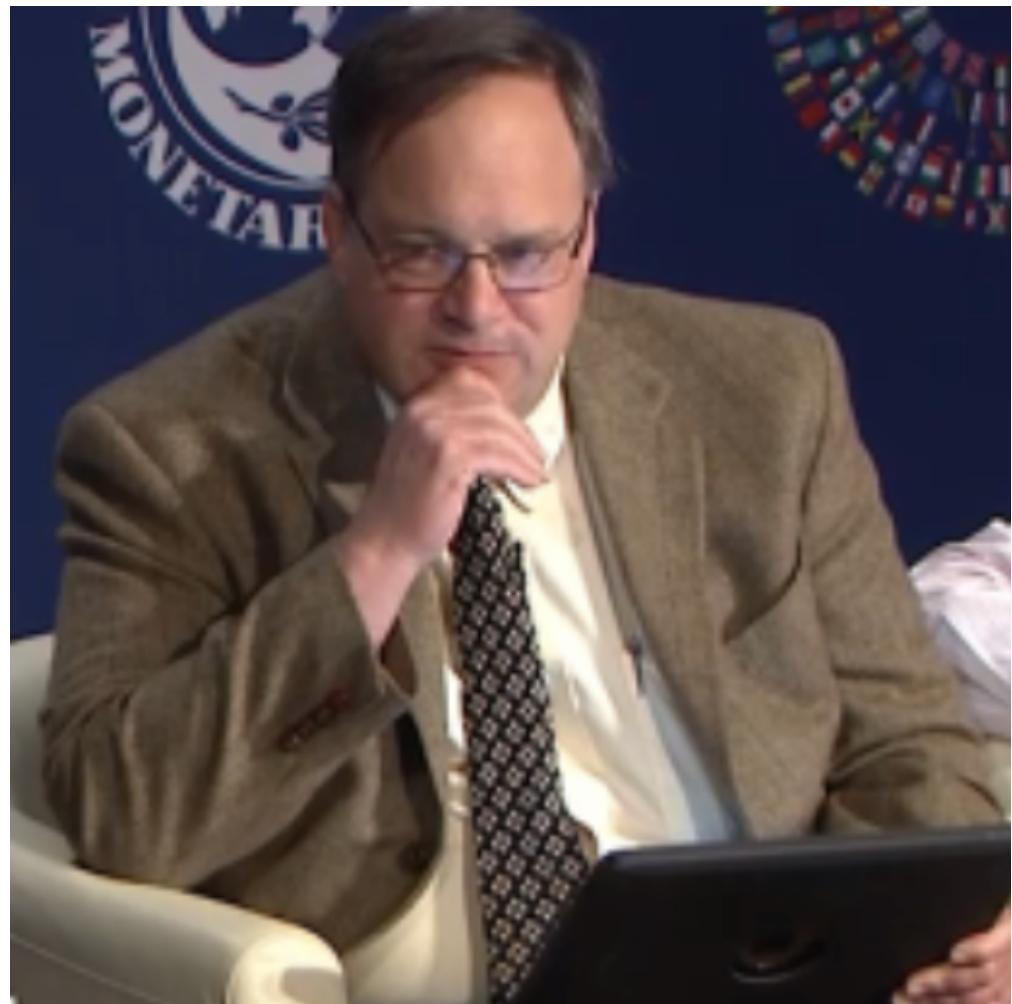
- Sixteen developing countries had negative growth over the 1960–1990 period, including Mozambique (2.2 percent per annum) and Guyana (.7 percent per annum)
...
- As Ben-David and Papell (1995) emphasize, many developing countries have seen their economies go into not just a slowdown, but a “meltdown”...
- If we calculate the growth rates in the Penn World Tables and allow the data to dictate one break in the growth rate over the whole 1960–1990 period, then of the 103 developing countries, 81 have seen a deceleration of growth over the period, and the average deceleration is over 3 percentage points...
- From 1980–1994, growth in per capita GDP averaged 1.5 percent in the advanced countries and .34 percent in the less developed countries...
- These facts about growth in less developed countries highlight its enormous variability and volatility. The range of annual growth rates in per capita GDP across less developed economies from 1960 to 1990 is from 2.7 percent to positive 6.9 percent...

Further Reading

- **Dan Ben-David and David Papell** (1995): *Slowdowns and Meltdowns: Post-War Growth Evidence from 74 Countries*
- **Charles Jones** (1995): *R&D-Based Models of Economic Growth* <<https://delong.typepad.com/files/jones-r--d.pdf>>
- **Fabio Canova and Albert Marcet** (1995): *The Poor Stay Poor: Non-Convergence Across Countries and Regions*
- **J. Bradford DeLong** (1988): *Productivity Growth, Convergence, and Welfare: Comment*
- **William Easterly, Michael Kremer, Lant Pritchett, and Lawrence Summers** (1993): *Good Policy or Good Luck? Country Growth Performance and Temporary Shocks*
- **Alexander Gerschenkron** (1962): *Economic Backwardness in Historical Perspective, a Book of Essays*
- **John R. Hanson** (1988): *Third World Incomes before World War I: Some Comparisons*
- **John R. Hanson** (1991): *Third World Incomes before World War I: Further Evidence*
- **Charles Jones** (1995): *R&D Based Models of Economic Growth*
- **N. Gregory Mankiw, David Romer, and David Weil** (1992): *A Contribution to the Empirics of Economic Growth*

Catch Our Breath...

- Ask a couple of questions?
- Make a couple of comments?
- Any more readings to recommend?



Paul Johnson & Chris Papageorgiou: What Remains of Cross-Country Convergence?

Questions:

1. Do the regions as Johnson and Papageorgiou define them make sense?
2. Do the stratifications as JP define them make sense?
3. Are there historical factors and episodes that we can use to understand the MIC trap that they fell in in the 1980s and 1990s?
4. And why did this MIC trap come, apparently, to an end when the millennium came?
5. Is there a definition of “fragile” LICs other than that people have decided to fight wars in them, and that they have done badly in terms of growth?
6. Why should being “fragile” not matter until the 1990s?
7. Should we compare MICs and LICs to a HIC growth benchmark? Or is whatever is happening to the HICs in a particular decade substantially irrelevant to MIC and LIC expectations?

<<https://delong.typepad.com/files/johnson-papageorgiou.pdf>>

No Convergence since 1965

Abstract:

- We examine the record of cross-country growth over the past 50 years and ask if developing countries have made progress on closing income gap between their per capita incomes and those in the advanced economies.
- We conclude that, as a group, they have not and then survey the literature on absolute convergence with particular emphasis on that from the last decade or so. That literature supports our conclusion of a lack of progress in closing the income gap between countries.
- We close with a brief examination of the recent literature on cross-individual distribution of income which finds that, despite the lack of progress on cross country convergence, global inequality has tended to fall since 2000.
- Wait a minute? How has global equality been falling since 2000?

Table 1: Decadal average per capital GDP growth (%) by geographical region

Geographical Region	1960s	1970s	1980s	1990s	2000s
East Asia & Pacific	3.9	3.3	3.2	3.0	3.6
Europe & Central Asia	4.7	3.5	1.8	0.5	3.6
Latin America & Caribbean	2.2	2.7	-0.6	1.5	2.2
Middle East & North Africa	3.7	2.7	-0.9	2.0	2.0
North America	3.1	2.5	1.9	1.8	0.9
South Asia	1.6	1.4	2.1	0.5	4.5
Sub-Saharan Africa	1.8	1.3	-0.2	-0.4	1.8
World	2.8	2.4	0.6	0.9	2.7

Source: Penn World Tables version 7.1

Table 2: Decadal average per capita GDP growth (%) by income and exporter groups

	1960s	1970s	1980s	1990s	2000s
Income Group					
HIC	4.7	3.3	2.4	2.1	1.7
MIC	2.8	3.4	0.4	1.4	3.4
LIC (all)	1.4	0.7	-0.2	-0.5	2.4
LIC (fragile)	1.7	0.7	-0.5	-1.5	1.3
LIC (non-fragile)	1.1	0.7	0.2	0.6	3.6
Exporter Group					
Commodity Exporters	2.1	2.0	-0.8	-0.4	3.0
Others	3.0	2.5	1.1	1.3	2.7
World	2.8	2.4	0.6	0.9	2.7

Source: Penn World Tables version 7.1.

Top Performers

Is there a pattern in “top performers” & “bottom performers”:

- Not really...
- Some bounce-backs
- Some drives to global north status
- “Convergence clubs”?
 - Countries with similar cultures/institutions
 - What convergence clubs would one have selected ex ante?

Table 3: Country rankings for each decade by per capita GDP growth (%)

Decade	rank	country	decade avg gdp (per Capita) growth (%)	rank	country	decade avg gdp (per Capita) growth (%)
1960s	1	Japan	8.98	93	China	-0.32
	2	Mauritania	8.16	94	Rwanda	-0.74
	3	Greece	7.75	95	Algeria	-0.79
	4	Romania	7.73	96	Mauritius	-0.96
	5	Morocco	7.68	97	Haiti	-1.51
	6	Hong Kong	7.48	98	Guinea	-1.58
	7	Spain	6.92	99	Senegal	-1.76
	8	Iran	6.51	100	Nigeria	-2.13
	9	Cyprus	6.47	101	Bangladesh	-2.14
	10	Portugal	5.92	102	Mali	-2.25
1970s	1	Botswana	10.85	111	Madagascar	-1.44
	2	Romania	8.99	112	Central Africai	-1.69
	3	Singapore	7.76	113	Liberia	-1.85
	4	Iraq	7.75	114	Congo, Dem. F	-1.94
	5	Korea	7.19	115	Chad	-3.32
	6	Malaysia	7.1	116	Uganda	-3.84
	7	Swaziland	6.82	117	Zambia	-3.88
	8	Hong Kong	6.71	118	Nicaragua	-4.25
	9	Bulgaria	6.51	119	Lebanon	-5.2
	10	Indonesia	6.34	120	Cambodia	-6.52
1980s	1	China	7.34	116	Togo	-3.27
	2	Botswana	6.93	117	Venezuela	-3.33
	3	Korea	6.54	118	Iraq	-4.17
	4	Egypt	5.61	119	Nigeria	-4.19
	5	Hong Kong	5.25	120	Libya	-4.38
	6	Thailand	5.11	121	Bahrain	-4.6
	7	Cyprus	4.61	122	Niger	-4.72
	8	Singapore	4.55	123	Iran	-5.11
	9	Kuwait	4.22	124	Lebanon	-5.13
	10	Lao	4.08	125	Trinidad &Tob	-5.16
1990s	1	China	8.64	138	Azerbaijan	-4.63
	2	Lebanon	7.22	139	Russia	-5.27
	3	Ireland	6.02	140	Moldova	-5.93
	4	Armenia	5.96	141	Ukraine	-6.72
	5	Vietnam	5.39	142	Liberia	-7.11
	6	Eritrea	5.31	143	Sierra Leone	-7.23
	7	Chile	5.11	144	Serbia	-7.93
	8	Korea, Republ	4.94	145	Afghanistan	-9.1
	9	Malaysia	4.88	146	Tajikistan	-9.9
	10	Singapore	4.31	147	Congo, Dem. F	-10.85
2000s	1	Azerbaijan	13.19	139	Guinea	-0.35
	2	Kazakhstan	9.2	140	Congo, Repub	-0.45
	3	China	9.13	141	Madagascar	-1.09
	4	Armenia	8.26	142	Togo	-1.14
	5	Trinidad &Tob	8.25	143	Gabon	-1.48
	6	Afghanistan	8.08	144	Central Africai	-1.53
	7	Belarus	7.81	145	Timor-Leste	-1.73
	8	Angola	7.65	146	Cote d'Ivoire	-1.82
	9	Albania	7.22	147	Zimbabwe	-3.4
	10	Lao	6.59	148	Eritrea	-4.62

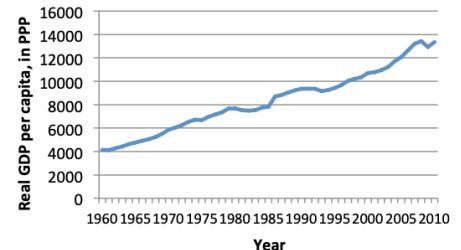
Source: Penn World Tables version 7.1

Individual Income Distribution

China & India are two very large countries:

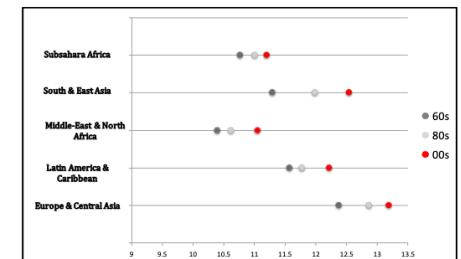
- China and Indian have done very well recently
- Yet they are only two data points in the cross-country sample
- Thus they have next to no influence on “convergence” regressions
- Yet they are 40% of the human race
 - Question: is there any deeper logic to their sudden post-1980 ascent other than “they were lucky, and had good leaders”?

Figure 1. Average global per capita GDP (1960-2010)



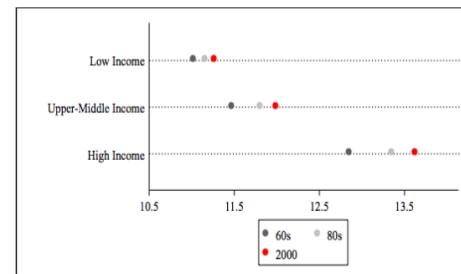
Source: Penn World Tables version 7.1.

Figure 2a. Log of per capita income by region (1960-2010)



Source: Penn World Tables version 7.1 based on balanced sample of countries. Countries with population below 1 million were dropped from the sample.

Figure 2b. Log of per capita income by income group (1960-2010)



Source: Penn World Tables version 7.1 based on balanced sample of countries. Countries with population below 1 million were dropped from the sample.

Catch Our Breath...

- Ask a couple of questions?
- Make a couple of comments?
- Any more readings to recommend?



Dev Patel, Justin Sandefur, & Arvind Subramanian (2018): Everything You Know about Cross-Country Convergence Is (Now) Wrong

Questions:

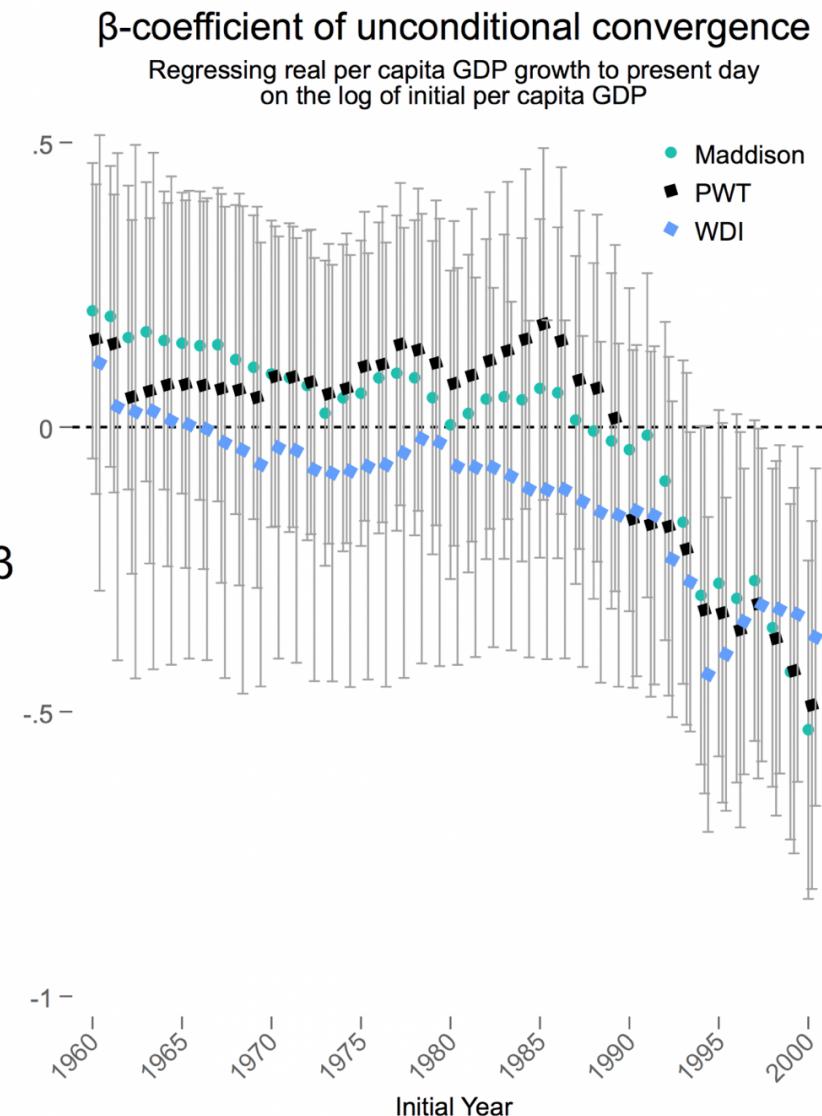
1. What historical pattern about divergence/convergence on the global level since 1960 are PSS describing?
2. What do we think of the log specification here?
3. Can we map their changing estimated β coefficient to what we think we know about the economic history of the past 70 years?
4. Tell me again about why we should be interested in studies that take each country to be a single equal-weighted data point?
5. What do we think of Johnson and Papageorgiou's response?

<<https://www.piie.com/blogs/realtime-economic-issues-watch/everything-you-know-about-cross-country-convergence-now-wrong>>

A Somewhat Strange Way of Presenting the Data...

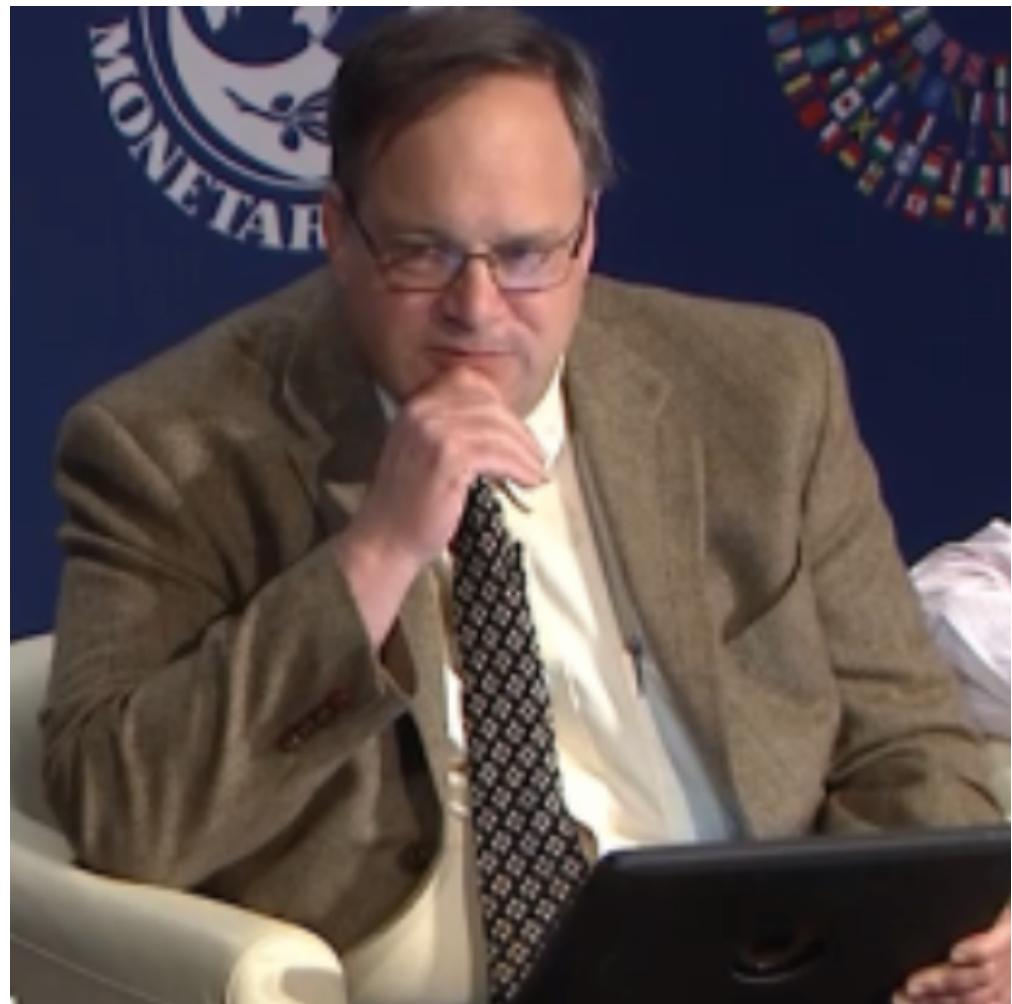
PWT has been in this business longest:

- WDI has made some significantly different choices than have others
- Let's stick to PWT:
 - Seems to say that world (with each country counting for one) about as unequal in 1985 as it was in 1960.
 - Then between 2000 and today half of the dependence on initial level has been removed
 - But between 1985 and 2000 initial conditions amplified themselves by 1.2
- So in the PWT, 1960-1985, 1985-2000, 2000-2018 gives us:
 - x 1.0
 - x 1.2
 - x 0.5



Catch Our Breath...

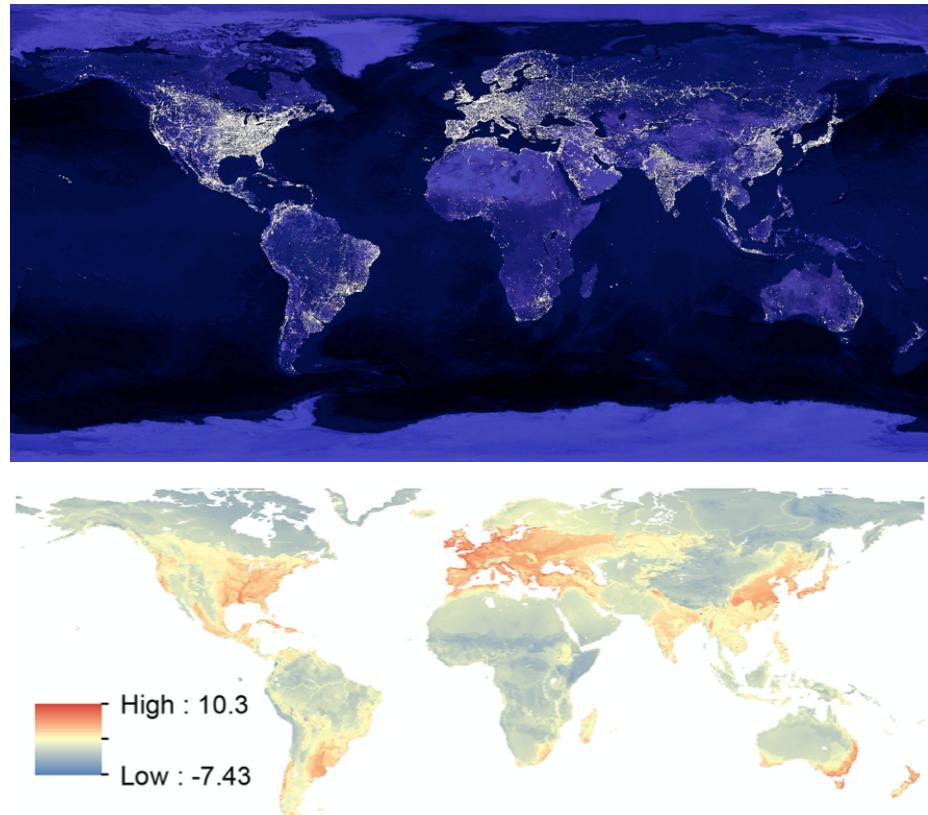
- Ask a couple of questions?
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- Any more readings to recommend?



The “Deep Roots” Literature

Lights from outer space at night:

- This reveals the global geographical distribution of human economic activity
- Bottom is what is predicted from a regression of lights on geographical variables:
 - Base (ruggedness & malaria)
 - Soil & climate (suitability for agriculture)
 - Trade (ease of communication and transport by water)
- “Geography” accounts for half of the global land variation in lights from space *today*

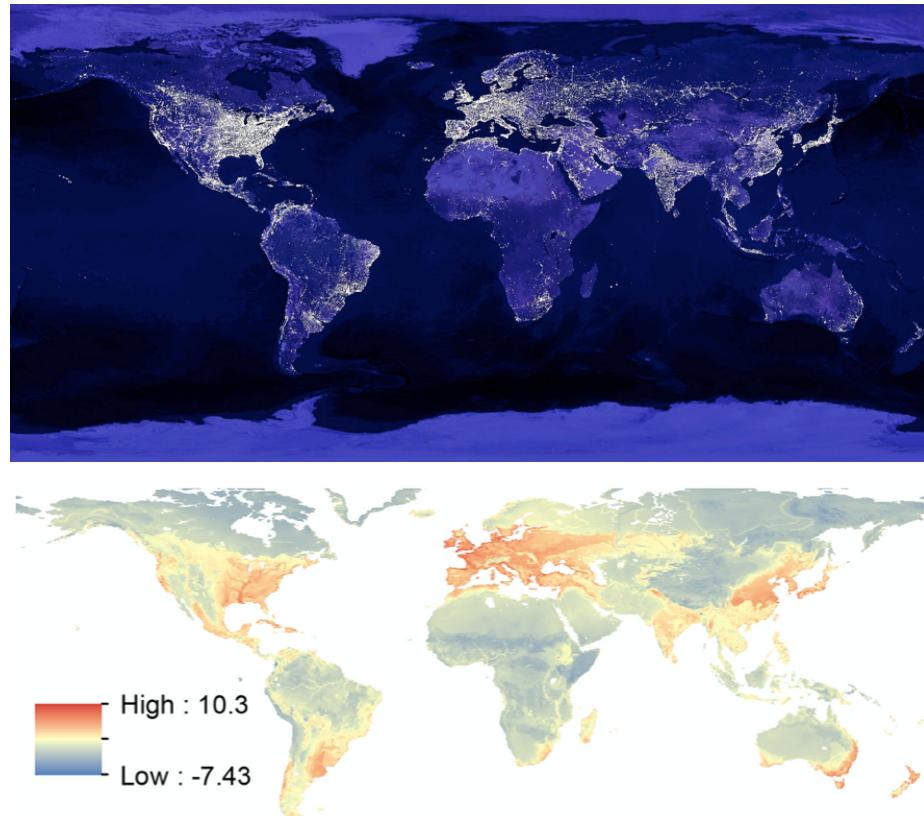


Vernon Henderson, Tim Squires, Adam Storeygard, and David Weil: The Global Distribution of Economic Activity: Nature, History, & the Role of Trade <<https://github.com/braddelong/public-files/blob/master/readings/article-henderson-geography.pdf>> <<https://github.com/braddelong/public-files/blob/master/readings/article-henderson-geography-ii.pdf>>

“Geography” Accounts for Half of Global Variation Today

Ruggedness & malaria, soil & climate, water access:

- It has been a long time—500 years?—since humanity was tied in its location to where the most productive farms were
- It has been a shorter but still substantial time—200 years—since humanity was bound in its location by the essential need for cheap water transport
- Yet those factors are the “deep roots” of relative economic development, even though there is no geographical necessity today
- And humanity’s geographical distribution of economic activity exhibits “path dependence”: the places where people settled and produced for reasons of trade and agriculture 500 and more years ago are still the places where people settle and produce.

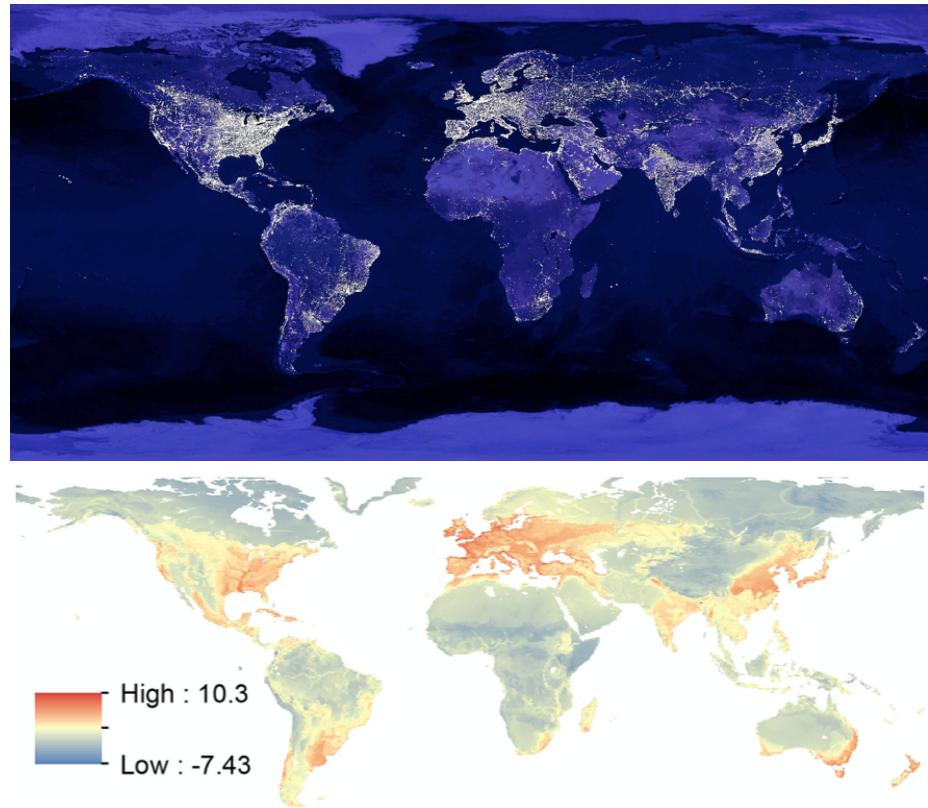


Vernon Henderson, Tim Squires, Adam Storeygard, and David Weil: The Global Distribution of Economic Activity: Nature, History, & the Role of Trade <<https://github.com/braddelong/public-files/blob/master/readings/article-henderson-geography.pdf>> <<https://github.com/braddelong/public-files/blob/master/readings/article-henderson-geography-ii.pdf>>

What Does This Get Right? Wrong?

It gets a lot very right:

- But it is not a perfect fit
- Regions that are surprisingly prosperous?
 - Johannesburg & surroundings
 - India
 - The Persian Gulf
 - Northwest Europe/eastern USA
 - Coastal Brazil
 - Malaya and Java
- Reasons that are not as prosperous as expected?
 - The lower Mississippi basin
 - The Boomerang Coast & New Zealand



Vernon Henderson, Tim Squires, Adam Storeygard, and David Weil: The Global Distribution of Economic Activity: Nature, History, & the Role of Trade <<https://github.com/braddelong/public-files/blob/master/readings/article-henderson-geography.pdf>> <<https://github.com/braddelong/public-files/blob/master/readings/article-henderson-geography-ii.pdf>>

Technological Persistence

Take a look at what relative level of technological development economies were at in 1500:

- Half of the relative technological level in 1500 is predicted by the relative technological level in -1000
- When people move, they tend to carry their technologies with them
- Across economies, half of the variation in log income per capita today is accounted for by the migration-adjusted level of technology back in 1500
- Biggest outliers:
 - Vietnam, Laos, Cambodia, India—and Moldavia
 - Burkina Faso, Mali, Niger, Ethiopia, Guinea Bissau, Tanzania, Sierra Leone, and Madagascar
 - Tonga, Botswana, South Africa, Saudi Arabia, and Mexico
- Most influential observations:
 - the global north in the upper right, and much of sub-Saharan tropical Africa in the lower left

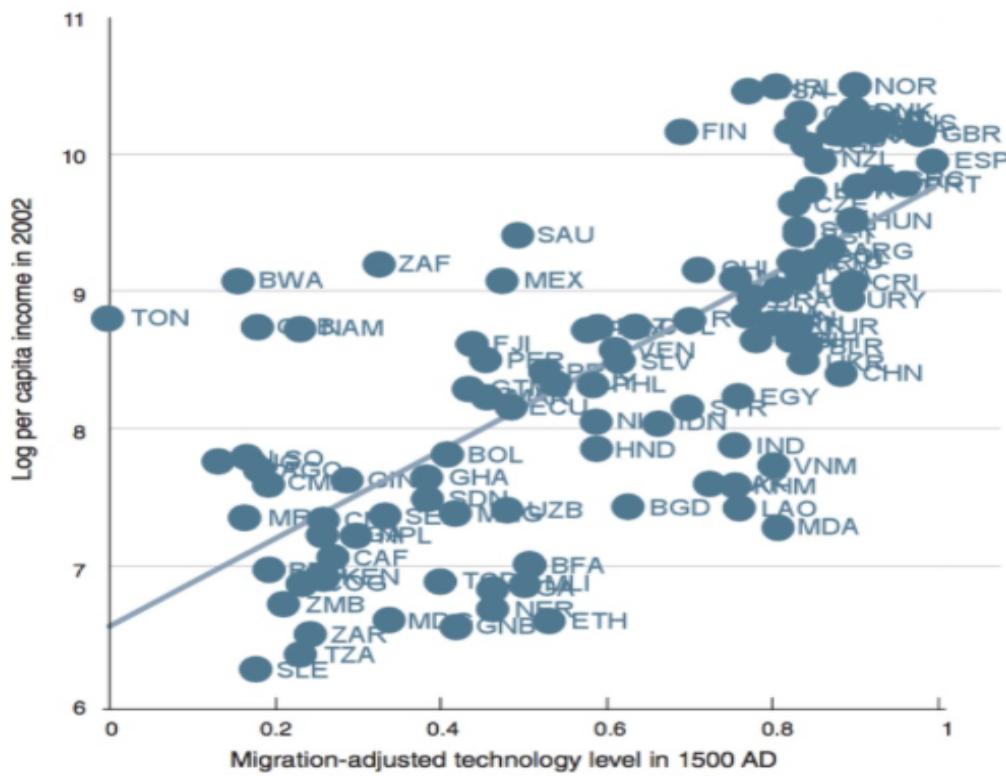


FIGURE 2. SCATTERPLOT OF PER CAPITA INCOME IN 2002 AGAINST MIGRATION-ADJUSTED TECHNOLOGY HERITAGE FROM 1500 AD

Diego Comin, William Easterly, and Erick Gong: Was the Wealth of Nations Determined in 1000 BC?
<https://github.com/braddelong/public-files/blob/master/readings/article-comin-wealth-of-nations.pdf>

Catch Our Breath...

- Ask a couple of questions?
- Make a couple of comments?
- Any more readings to recommend?



Growth Speedups & Slowdowns

Brad DeLong

U.C. Berkeley

Last Edited: 2020-04-13

Readings

Growth Speedups & Slowdowns:

- **Nicholas Crafts** (2002): *The Solow Productivity Paradox in Historical Perspective* <<http://www.cepr.org/pubs/dps/DP3142.asp>>
- **Dani Rodrik** (1995): *Getting Interventions Right: How South Korea and Taiwan Grew Rich* <<http://tinyurl.com/dl20090112t>>
- **Peter J. Klenow & Andres Rodriguez-Clare** (1997): *The Neoclassical Revival in Growth Economics: Has It Gone too Far?* <<https://delong.typepad.com/klenow-rodriguez-clare.pdf>>

For May 6 Class: Readings

The Great Compression:

- **Claudia Goldin & Robert Margo** (1992): *The Great Compression: The U.S. Wage Structure at Midcentury* <<https://academic.oup.com/qje/article/107/1/1/1925779>>
- **Claudia Goldin** (2001): *The Human-Capital Century and American Leadership: Virtues of the Past* <<http://www.nber.org/papers/w8239>>

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American Exceptionalism:

- **Kenneth Sokoloff** (1984): *Was the Transition from the Artisanal Shop to the Non-Mechanized Factory Associated with Gains in Efficiency?* <<http://www.nber.org/papers/w1386>>
- **Daniel Gross** (2017): *Scale versus Scope in the Diffusion of New Technology: Evidence from the Tractor* <<https://www.nber.org/papers/w24125>>
- **Dave Donaldson & Richard Hornbeck** (2016): *Railroads and American Economic Growth: A ‘Market Access’ Approach* <<https://academic.oup.com/qje/article/131/2/799/2606976>>

Econ 210a

May 6, 2020 Class

Brad DeLong

U.C. Berkeley

Last Edited: 2020-04-29

Readings

The Great Compression:

- **Claudia Goldin & Robert Margo** (1992): *The Great Compression: The U.S. Wage Structure at Midcentury* <<https://academic.oup.com/qje/article/107/1/1/1925779>>
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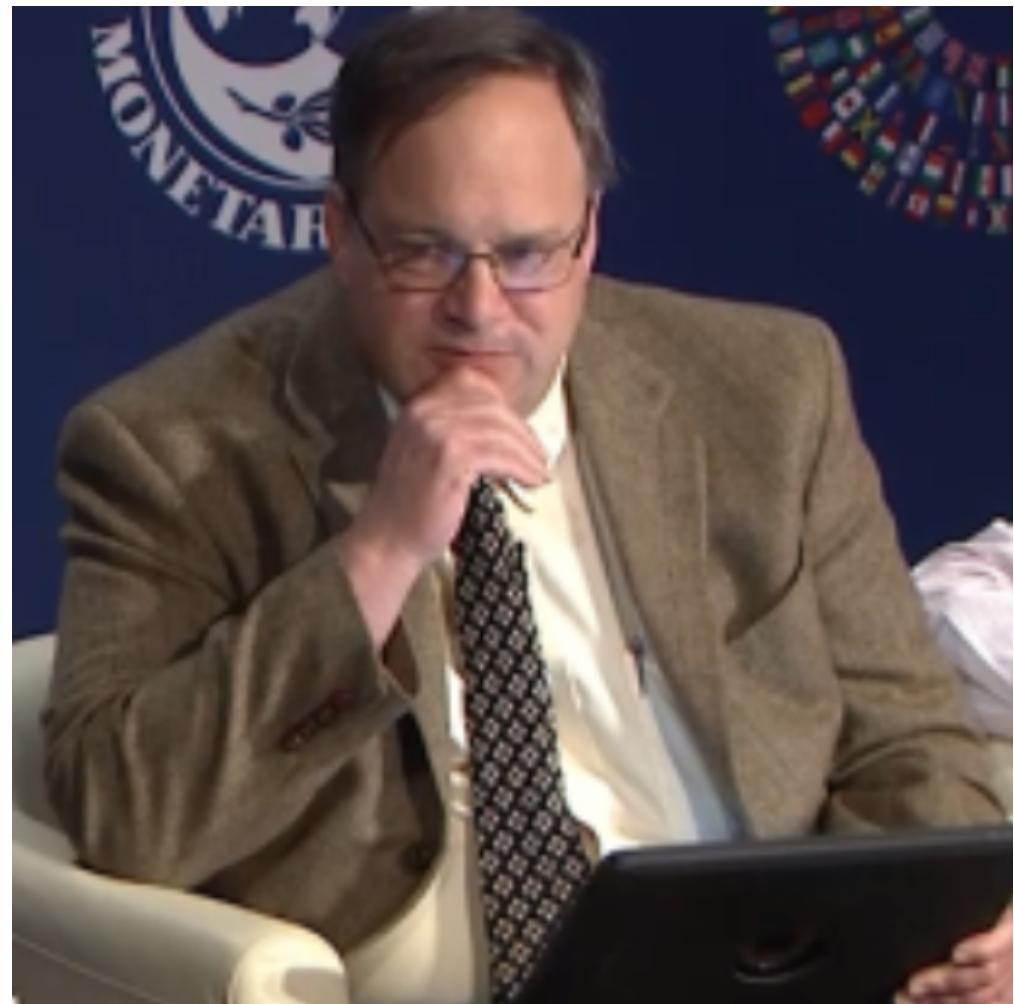
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Paper Presentations

????:

Catch Our Breath...

- Ask a couple of questions?
- Make a couple of comments?
- Any more readings to recommend?



Coronavirus!

Members of the public were told to avoid gatherings of 10 or more



ABC News



Trump warns coronavirus crisis could stretch into summer

Watch

Members of the public were told to avoid gatherings of 10 or more and older people and those with underlying condition were asked to stay home.

Coronavirus

Where we think we are, as of Mo Apr 6:

- We really do not know
- No random samples...
- If we extrapolate out the past week straight-line log:
 - We will have 440,000 deaths in three weeks
 - But it is unlikely to be that bad
- Best thing I have read comes from Jim Stock <<https://drive.google.com/file/d/12MV466ZZy5xHir4xdPhoTrL1oO8CbZU-/view>>:
 - The basic SIR epidemiological model of contagion
 - The effect of social distancing and business shutdowns on epidemic dynamics enters the model through a single parameter: the case transmission rate β
 - Re-express the model in terms of β and the asymptomatic (or not very symptomatic) hence non-tested rate—the fraction of the infected who are not tested
 - The COVID-19 non-testing rate is unidentified in our model
 - Estimates in the epidemiological literature range from 0.18 to 0.86.
 - The asymptomatic rate could be estimated accurately and quickly by testing a random sample
 - The optimal policy response and its economic consequences hinge critically on the asymptomatic rate

Coronavirus Extrapolations						
Date	Deaths	Cases = Deaths x 100	Constant Weekly New Cases	Cases = 5 x Cases(-3)	Cases = 20 x Cases (-3)	Cases = Cases (-3) x exp(3 x week ch)
2020-04-05	9618		3,102,000	4,809,000	19,236,000	55,832,145
2020-03-29	2484		869,400	1,242,000	4,968,000	53,654,400
2020-03-22	414		144,900	207,000	828,000	8,942,400
2020-03-15	69	961,800	19,800	34,500	138,000	128,966
2020-03-08	26	248,400	10,100	13,000	52,000	45,697,600
2020-03-01	1	41,400	370	500	2,000	100,000
2020-02-23		6,900	37	50	200	10,000
2020-02-16		2,600	4	5	20	
2020-02-09		100				
2020-02-02		10				
2020-01-26		1				
		0				

<https://www.incloud.com/numbers/0FzRFAnAOnIAin4VJWWiWIC0>

Coronavirus Cases:  United States

1,342,235

[view by country](#)

Coronavirus Cases:

364,059

Deaths:

74,554

Deaths:

10,792

Recovered:

278,182

Recovered:

19,536

USA State	Tot Cases/ 1M pop	Deaths/ 1M pop
USA Total	1,100	33
New York	6,662	243
New Jersey	4,626	113
Michigan	1,729	73
California	404	10
Louisiana	3,188	110
Massachusetts	2,026	38
Florida	662	12
Pennsylvania	1,016	13
Illinois	956	24
Washington	1,095	46
Texas	263	5
Georgia	710	22

Coronavirus II

We do not really know where we are, as of Mo Apr 6:

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<https://www.icloud.com/numbers/0FzRFAnAOoiAin4V.IWYWIWICQ>

Coronavirus Case



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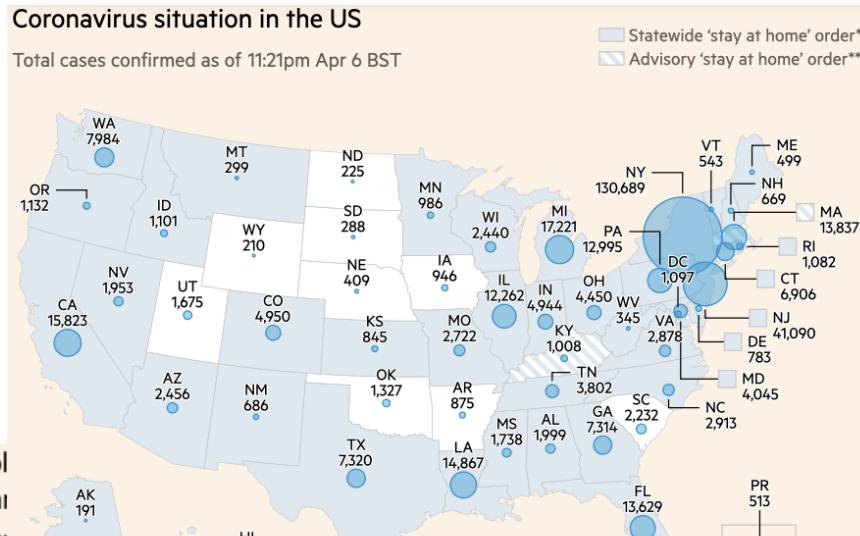
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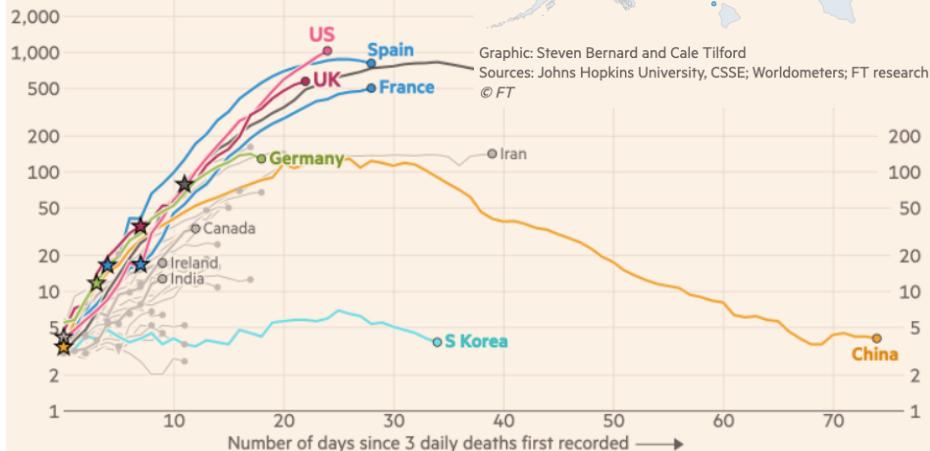
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Georgia	710	22

Financial Times Graphs Blown Up...



Italy and Spain's daily death tolls are plateauing, while the US and UK's are rising. Every day brings more new deaths than the day before.

Daily coronavirus deaths (7-day rolling avg.), by number of days since 30 daily cases first recorded



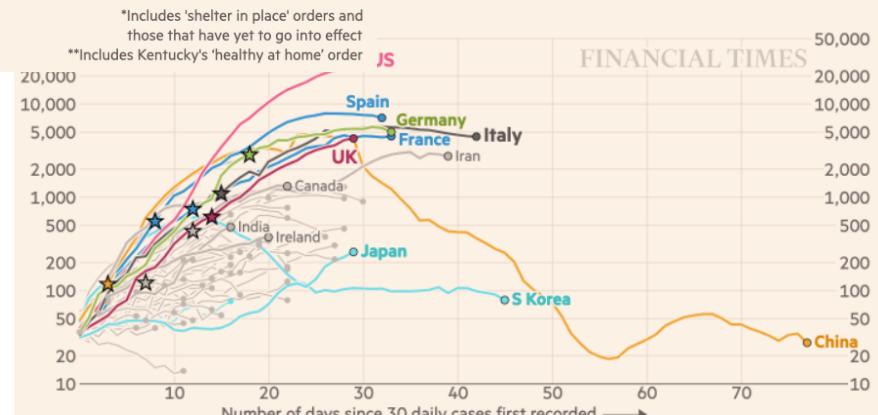
FT graphic: John Burn-Murdoch / @jburnmurdoch

Source: FT analysis of European Centre for Disease Prevention and Control; Worldometers; FT research. Data updated April 06, 19:00 GMT

© FT

numbers of new cases now in decline,

by number of days since 30 daily cases first recorded



FT graphic: John Burn-Murdoch / @jburnmurdoch

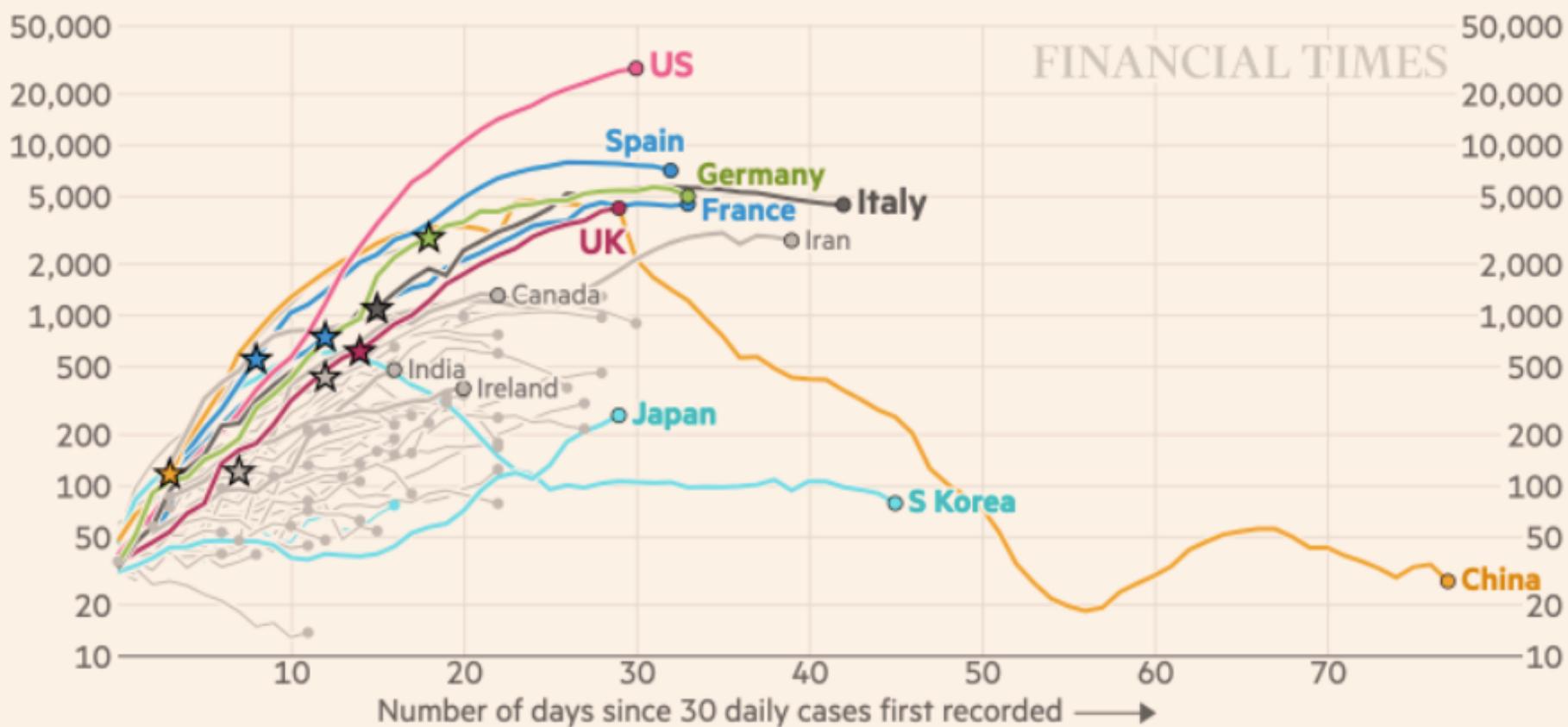
Source: FT analysis of European Centre for Disease Prevention and Control; Worldometers; FT research. Data updated April 06, 19:00 GMT

© FT

Italy has turned the corner, with numbers of new cases now in decline, following in China's footsteps

Daily confirmed cases (7-day rolling avg.), by number of days since 30 daily cases first recorded

Stars represent national lockdowns ★



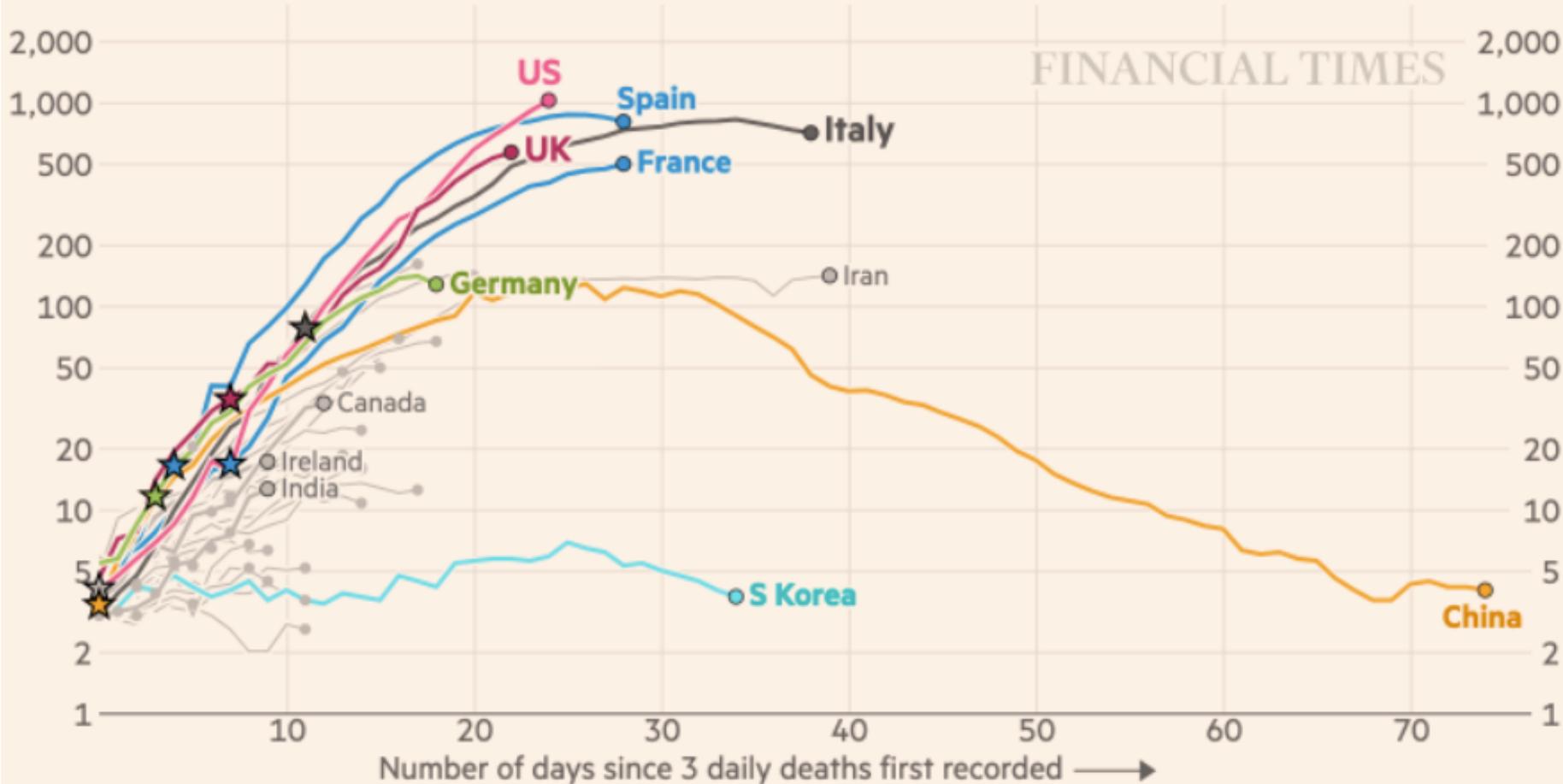
FT graphic: John Burn-Murdoch / @jburnmurdoch

Source: FT analysis of European Centre for Disease Prevention and Control; Worldometers; FT research. Data updated April 06, 19:00 GMT

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Italy and Spain's daily death tolls are plateauing, but in the UK and US every day brings more new deaths than the last

Daily coronavirus deaths (7-day rolling avg.), by number of days since 3 daily deaths first recorded



FT graphic: John Burn-Murdoch / @jburnmurdoch

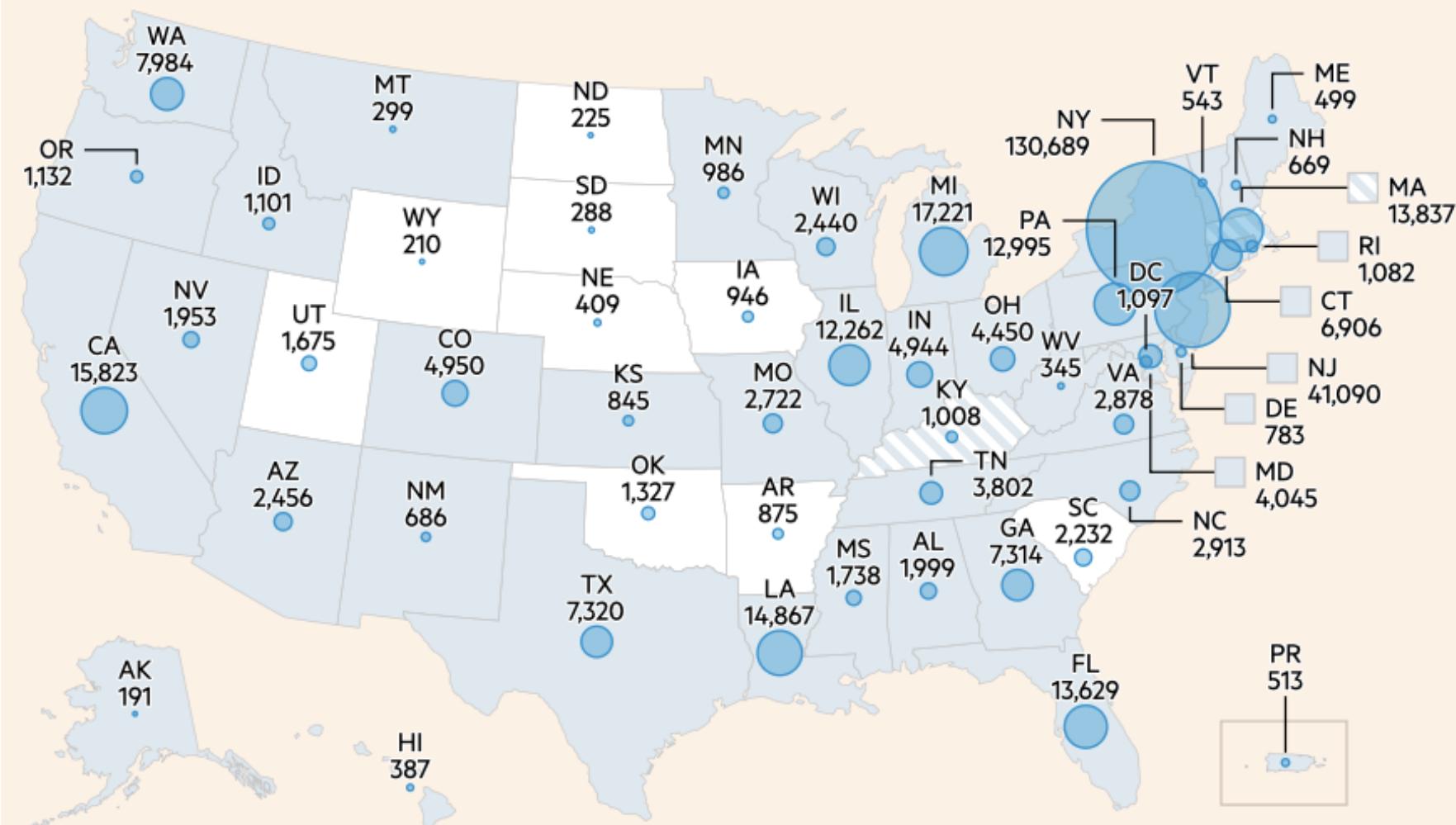
Source: FT analysis of European Centre for Disease Prevention and Control; Worldometers; FT research. Data updated April 06, 19:00 GMT

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Coronavirus situation in the US

Total cases confirmed as of 11:21pm Apr 6 BST

- Statewide 'stay at home' order*
- Advisory 'stay at home' order**



Graphic: Steven Bernard and Cale Tilford

Sources: Johns Hopkins University, CSSE; Worldometers; FT research

© FT

*Includes 'shelter in place' orders and those that have yet to go into effect

**Includes Kentucky's 'healthy at home' order

James Stock (2020)

Standard SIR model: <<https://drive.google.com/file/d/12MV466ZZy5xHir4xdPhoTrL1oO8CbZU-/view>>:

- Susceptible, Infected, Recovered (& immune), transmission rate β , recovery rate γ , reproduction number R_0 , asymptomatic hence non-tested rate π_0
- Calibration: half-life of infection one week: $\gamma = 0.5$, $s_0 = 0.02$, 50 cases on Jan 24
- For March 21, 2020, the positive test rate in the United States is approximately 10%...

$$\Delta S_t = -\beta I_{t-1} \frac{S_{t-1}}{N}$$

$$\Delta R_t = \gamma I_{t-1},$$

$$\Delta I_t = \beta I_{t-1} \frac{S_{t-1}}{N} - \gamma I_{t-1}$$

<<https://drive.google.com/file/d/12MV466ZZy5xHir4xdPhoTrL1oO8CbZU-/view>>

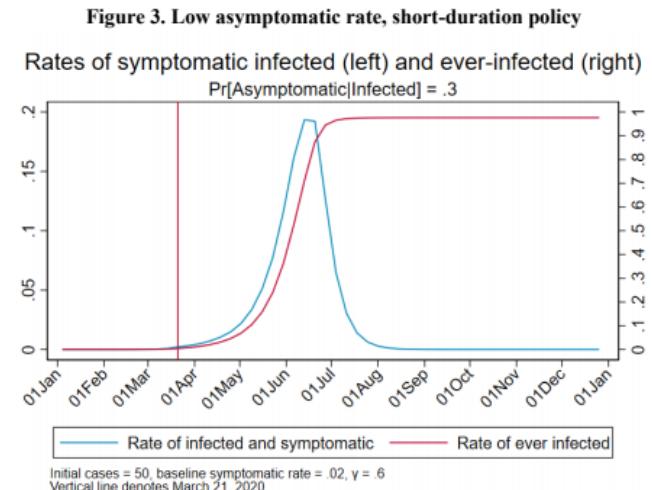


Figure 2. High asymptomatic rate, short-duration policy

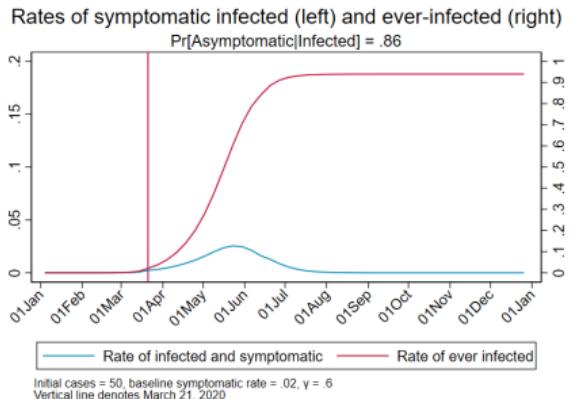


Figure 4. Low asymptomatic rate, severe long-duration policy

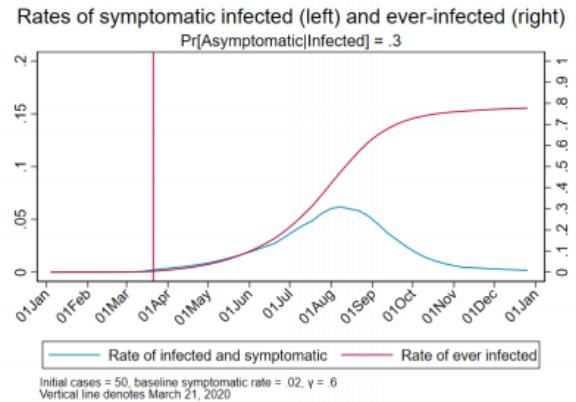
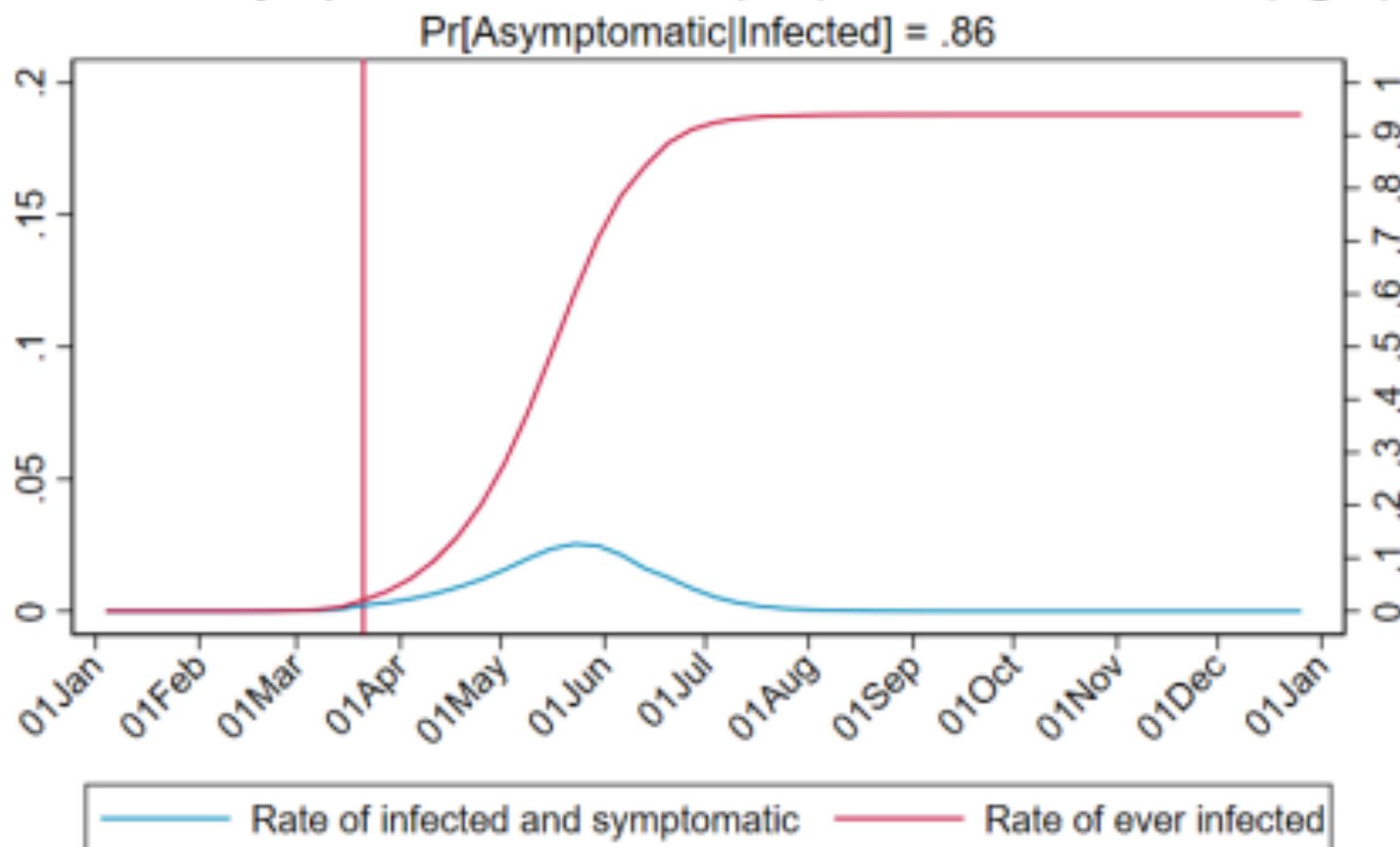


Figure 2. High asymptomatic rate, short-duration policy

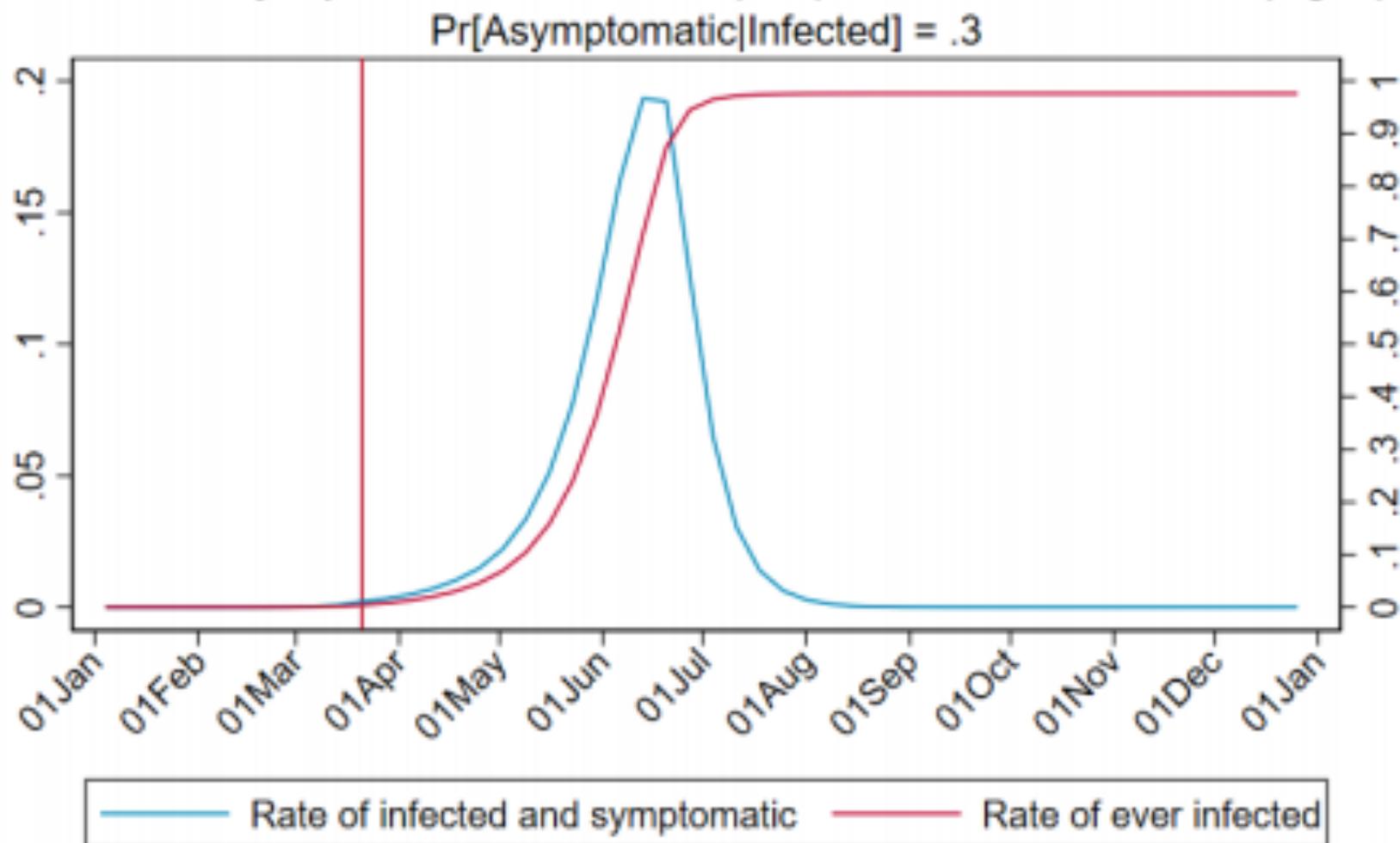
Rates of symptomatic infected (left) and ever-infected (right)



Initial cases = 50, baseline symptomatic rate = .02, $\gamma = .6$
Vertical line denotes March 21, 2020

Figure 3. Low asymptomatic rate, short-duration policy

Rates of symptomatic infected (left) and ever-infected (right)

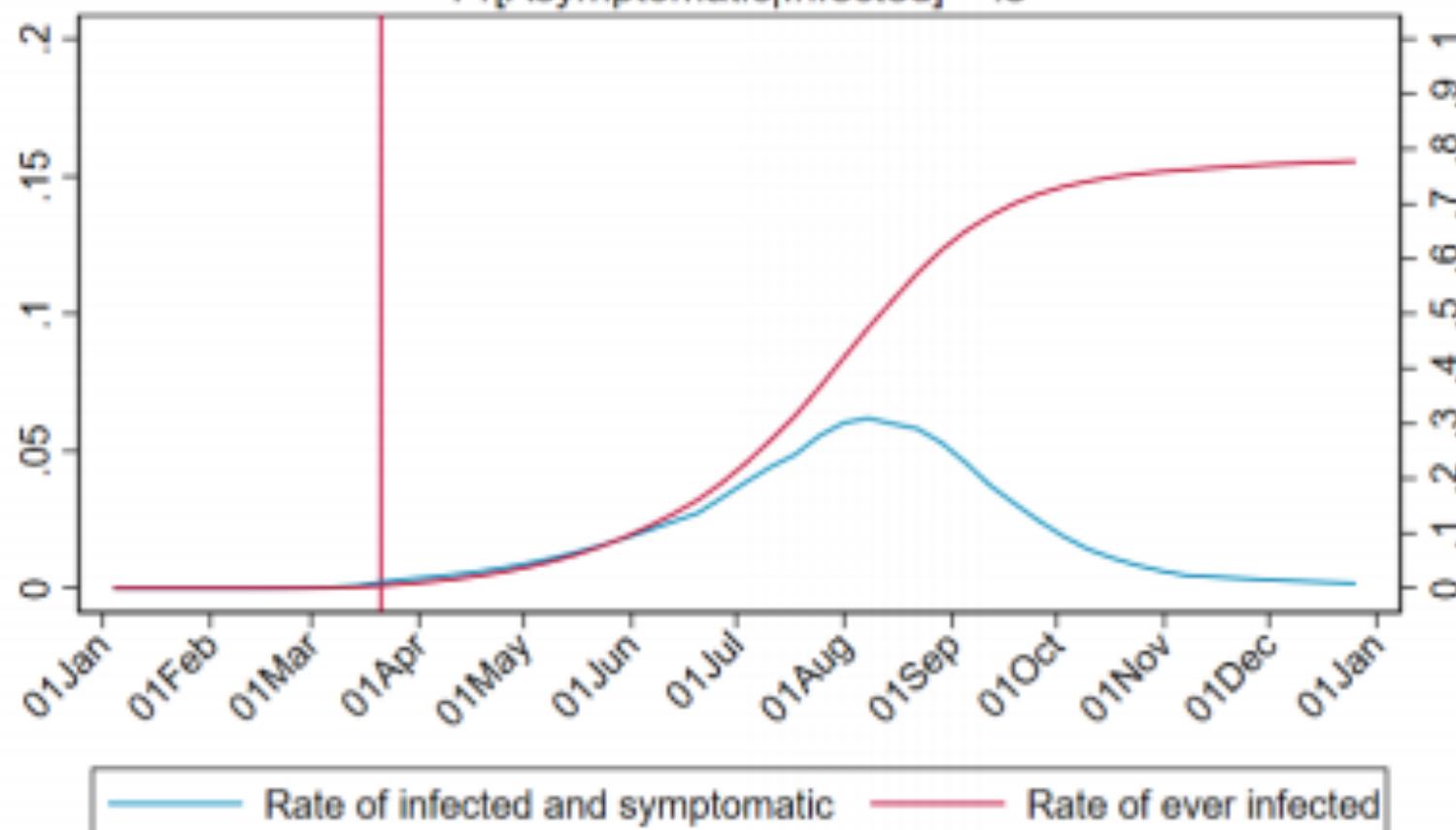


Initial cases = 50, baseline symptomatic rate = .02, $\gamma = .6$
Vertical line denotes March 21, 2020

Figure 4. Low asymptomatic rate, severe long-duration policy

Rates of symptomatic infected (left) and ever-infected (right)

$$\Pr[\text{Asymptomatic} | \text{Infected}] = .3$$



Initial cases = 50, baseline symptomatic rate = .02, $\gamma = .6$
Vertical line denotes March 21, 2020

$$\Delta S_t = -\beta I_{t-1} \frac{S_{t-1}}{N}$$

$$\Delta R_t = \gamma I_{t-1},$$

$$\Delta I_t = \beta I_{t-1} \frac{S_{t-1}}{N} - \gamma I_{t-1}$$

Bringing the Economy Back Up from Anæsthesia

Major issues:

- Certificates of immunity:
 - Which requires test, test, test:
 - And not just disease virus tests
 - Presence-of-antibodies tests
- How quickly can we match the immune with public-contact jobs?
- What jobs can be done with minimal infection risk?
- What minimal-infection substitutes can we find for previous jobs?
- How quickly can restrictions be relaxed without the virus coming roaring back?
- How do we avoid having the market give a “shutdown” signal to enterprises we in fact want restarted?
 - Which is pretty much all of them
- How much of the potential caseload do we want to push out beyond the vaccine-arrival date?

ALL THESE QUESTIONS ARE ANSWERABLE IF WE LEARN THE ASYMPTOMATIC HENCE NON-TESTED RATE!!

Keeping the Economy from Crashing During the Lockdown

Nick Rowe: We have a 50% output cut in 100% of the sectors:

- A temporary 100% output cut in 50% of the sectors (what the Coronavirus does) is very different from a 50% output cut in 100% of the sectors
- Nick's thought experiment:
 - In three months we are going to invent unobtanium:
 - Substantial intertemporal substitutability
 - Plus lower cross-good contemporaneous substitutability
 - Hence high desired savings rate now
 - Flex-price market thus produces a nominal rate at the zero lower bound and a high inflation rate over the next three to six months
 - Plus liquidity-constrained workers in affected sectors see their demand go to zero immediately
 - Can we get there? Should we get there? What should we do instead?
 - We need a good RBC economist: are there any?...

Keeping the Economy from Crashing During the Lockdown II

Nick Rowe:

- <https://worthwhile.typepad.com/worthwhile_canadian_initi/2020/03/relative-supply-shocks-unobtainium-walras-law-and-the-coronavirus.html>
- Plus: to extend the thought experiment:
 - We just lost the ability to make “unobtainium”
 - So we *should* be substituting leisure for work, and moving workers into relatively unproductive labor, making the commodities we can still produce right now
 - How should relative prices move as a result? How should we make them move?

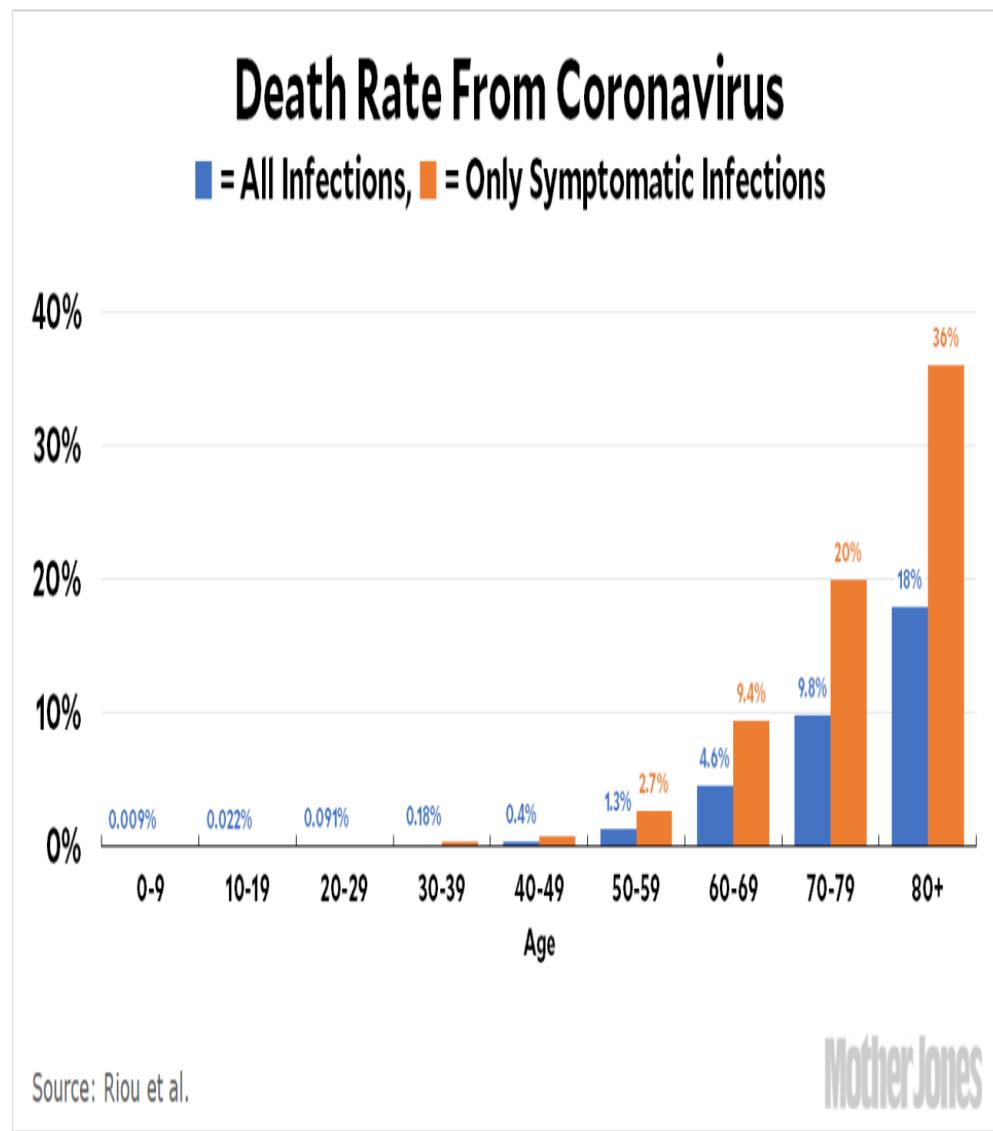
Plus: distributional issues

Plus: bankruptcy and credit chain issues

MOAR Coronavirus!

Death for Geezers!

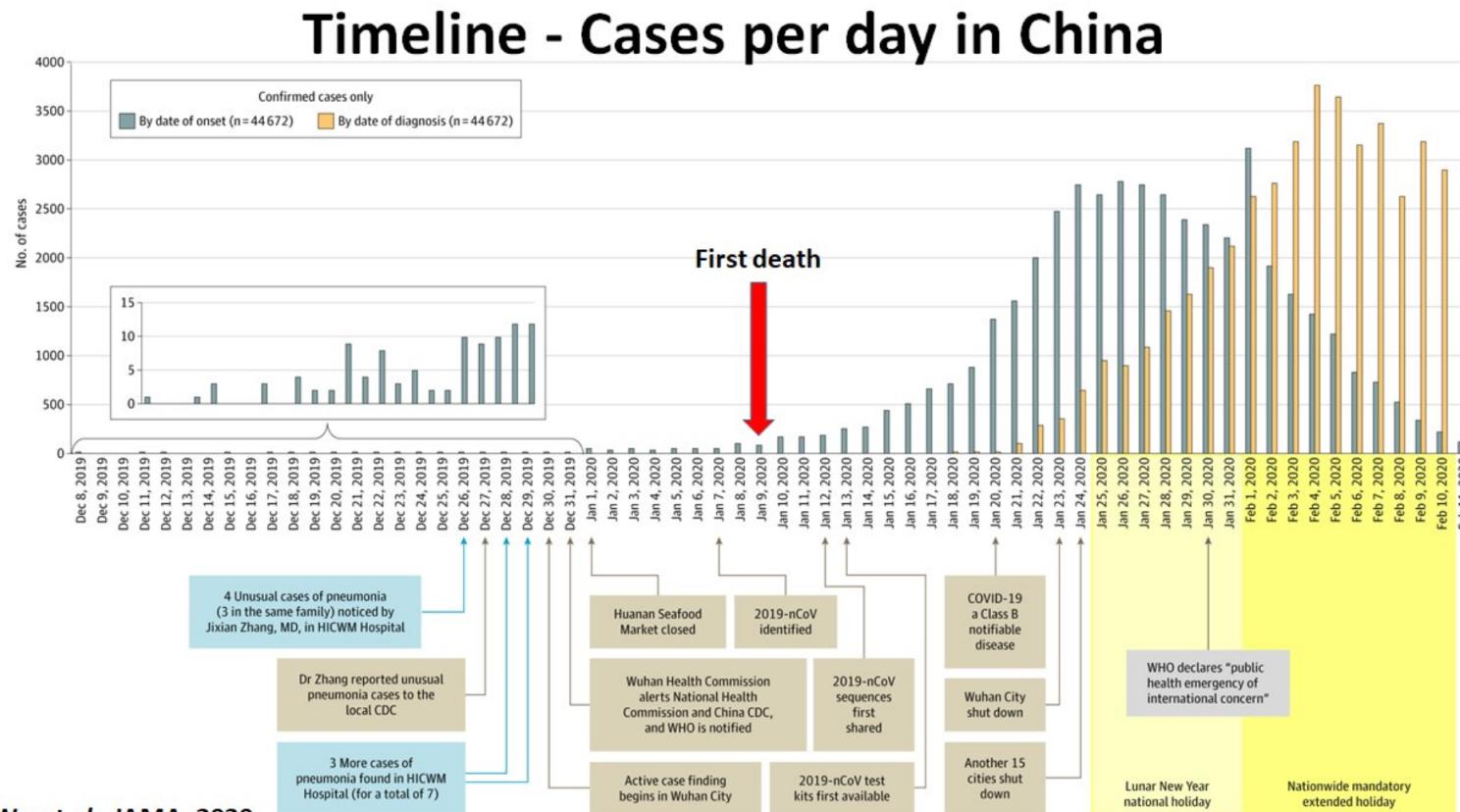
- Mortality for the Youngs very low...
- It's the flu for them—for you...
- And an extra doubling—or is it 5%?—mortality for the asthmatic
- And an extra doubling—or is it 5%?—mortality for the overweight



What We Think Happened in Wuhan

China beat it quickly & relatively easily!

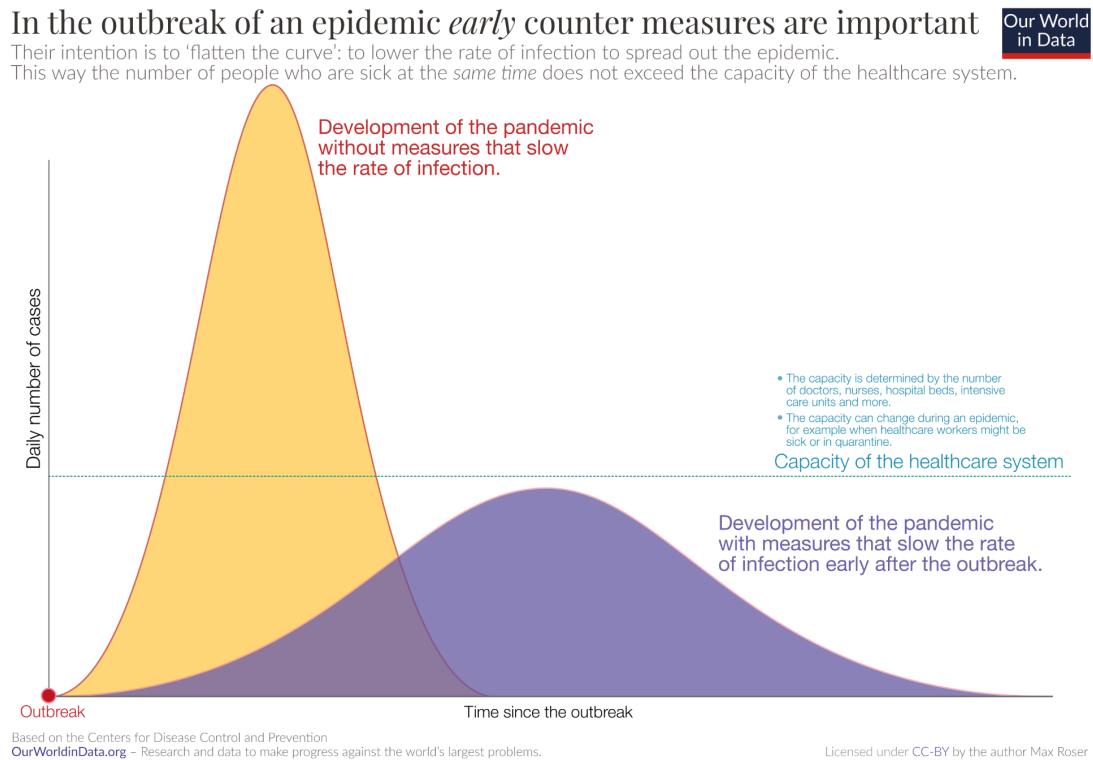
- We think
- Shut down Wuhan when 200 cases per day
- That seems to have been a good decision



The Goal

When Is It Appropriate to Move on This?

- Immediate social distancing...
- Self-isolate if you have a cough and a fever...
- Hope that warmer temperatures will do to this what they did to SARS...
- Otherwise, when do you want to start spreading out transmission. It seems that early is as good as later, so do it early...
 - I have no good intuition on why you want to move early
 - Plus your moving early will be wasted if you get reinfected
 - Plus the sparks you throw off making others' lives more difficult



References

- **Financial Times** (2020): Coronavirus Tracked: The Latest Figures as the Pandemic Spreads <<https://www.ft.com/coronavirus-latest>>
- **Nick Rowe** (2020): *Relative Supply Shocks, Unobtainium, Walras' Law, and the Coronavirus* <https://worthwhile.typepad.com/worthwhile_canadian_initi/2020/03/relative-supply-shocks-unobtainium-walras-law-and-the-coronavirus.html>
- **Jim Stock** (2020): *Coronavirus Data Gaps and the Policy Response* <<https://drive.google.com/file/d/12MV466ZZy5xHir4xdPhoTrL1oO8CbZU-/view>>

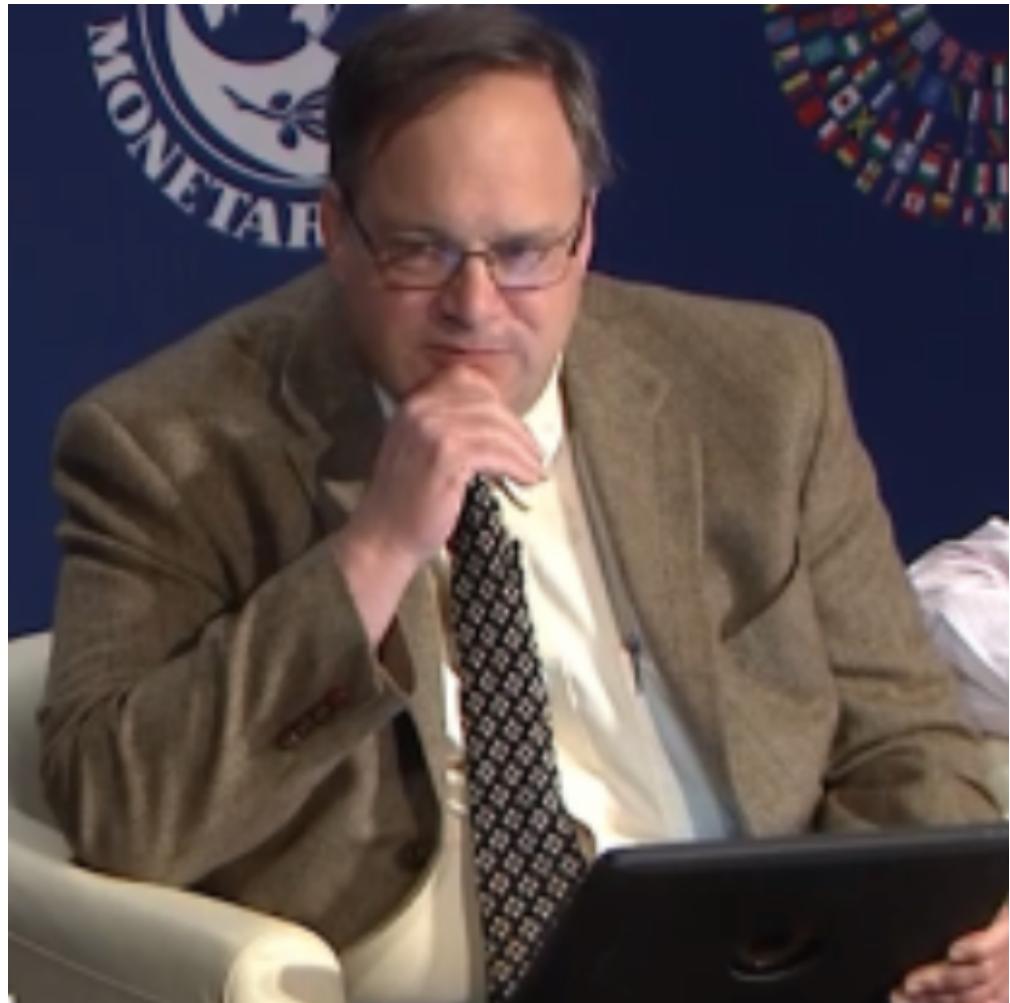
MOAR Coronavirus!

What I am watching:

- **Max Roser & Hannah Ritchie:** *Coronavirus Disease (COVID-19)* <<https://ourworldindata.org/coronavirus>>...
- **Worldometer:** *Coronavirus Update (Live)* <<https://www.worldometers.info/coronavirus/>>: '125,599 Cases and 4,605 Deaths from COVID-19 Virus Outbreak...'
- *FT Coronavirus Tracker* <<https://www.ft.com/content/a26fbf7e-48f8-11ea-aeb3-955839e06441>>
- Josh Marshall's COVID Twitter List <<https://twitter.com/i/lists/1233998285779632128>>
- NEJM Group: Updates on the Covid-19 Pandemic <http://m.n.nejm.org/nl/jsp/m.jsp?c=%40kxNtXckRDOq8oG0jJvAXsIzN4mPECIPhtxoTSdTU9k%3D&cid=DM89089NEJM_COVID-19_Newsletter&bid=173498255>: 'From the New England Journal of Medicine, NEJM Journal Watch, NEJM Catalyst, and other trusted sources...'

Catch Our Breath...

- Ask a couple of questions?
 - Make a couple of comments?
 - Any more readings to recommend?
-
- <<https://www.icloud.com/keynote/0YKEi7HeOrVGvKYtt9FEqH7nA>>
 - <<https://www.bradford-delong.com/2020/04/coronavirus.html>>
 - github:<<https://github.com/braddelong/public-files/blob/master/coronavirus.pptx>>
 - <https://github.com/braddelong/public-files/blob/master/coronavirus.pdf>
 - html File: <<https://www.bradford-delong.com/2020/04/coronavirus.html>>
 - Edit This File: <<https://www.typepad.com/site/blogs/6a00e551f08003883400e551f080068834/post/6a00e551f080038834025d9b3bd66a200c/edit>>
 - <<https://delong.typepad.com/files/2020-04-01-coronavirus.pdf>>



Coronavirus! (March 16)

With 31 deaths in the U.S. as of March 11, a 1% death rate, and up to 4 weeks between infection and death, that means that as of Feb 12 there were 3100 coronavirus cases in the United States.

With 87 deaths in the U.S. as of Mar 16, a 1% death rate, and up to 4 weeks between infection and death, that means that as of Feb 17 there were 8700 coronavirus cases in the United States

If it is doubling every seven days, then now about 150,000 people have and in the next week about 150,000 more people in the U.S. will catch coronavirus—which means 1/2200, currently 3500 of the 7.6 million inhabitants of San Francisco Bay. Touch a hard surface that any of those 3500 has touched in the last 48 hours, and the virus has a chance to jump to you...

These numbers could be five times too big. These numbers are probably not five times too small unless the thing is a lot less deadly, and there are a lot of asymptomatic cases...

- What is wrong with this analysis?

MOAR Coronavirus!

As of March 21: Things are not moving in the right direction:

- What is the R_0 ?
- How can the R_0 be changed?
- How will the R_0 change?
- What is the asymptote share of the population?
- What is the mortality rate?

Country, Other	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	Active Cases	Serious, Critical	Tot Cases/1M pop
China	80,880	+36	3,213	+14	67,819	9,848	3,226	56.2
Italy	27,980	+3,233	2,158	+349	2,749	23,073	1,851	462.8
Iran	14,991	+1,053	853	+129	4,590	9,548		178.5
Spain	9,428	+1,440	335	+41	530	8,563	272	201.6
S. Korea	8,236	+74	75		1,137	7,024	59	160.6
Germany	7,241	+1,428	15	+2	65	7,161	2	86.4
France	5,423		127		12	5,284	400	83.1
USA	4,186	+506	73	+5	73	4,040	12	12.6
Switzerland	2,353	+136	19	+5	4	2,330		271.9
UK	1,543	+152	55	+20	52	1,436	20	22.7
Netherlands	1,413	+278	24	+4	2	1,387	45	82.5
Norway	1,323	+67	3		1	1,319	27	244.0

Coronavirus Cases:

179,836

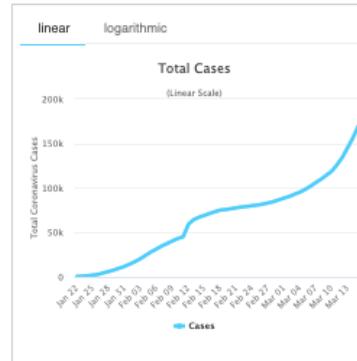
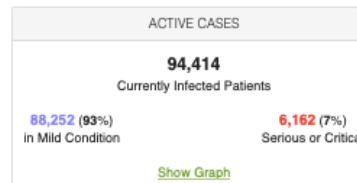
[view by country](#)

Deaths:

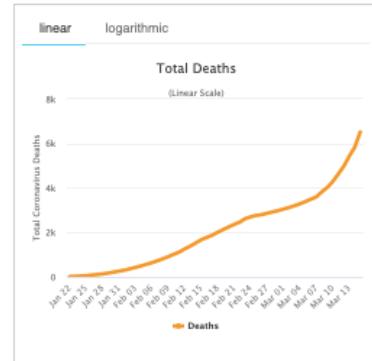
7,098

Recovered:

78,324



[More Case Statistics](#)



[More Death Statistics](#)

MOAR Coronavirus!

As of March 10: Things are not moving in the right direction:

- What is the R_0 ?
- How can the R_0 be changed?
- How will the R_0 change?
- What is the asymptote share of the population?
- What is the mortality rate?

Coronavirus Cases:

125,599

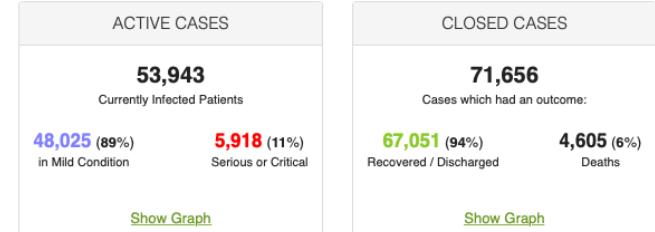
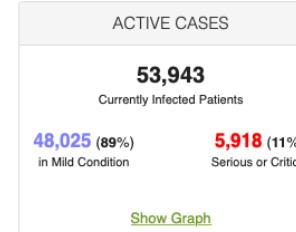
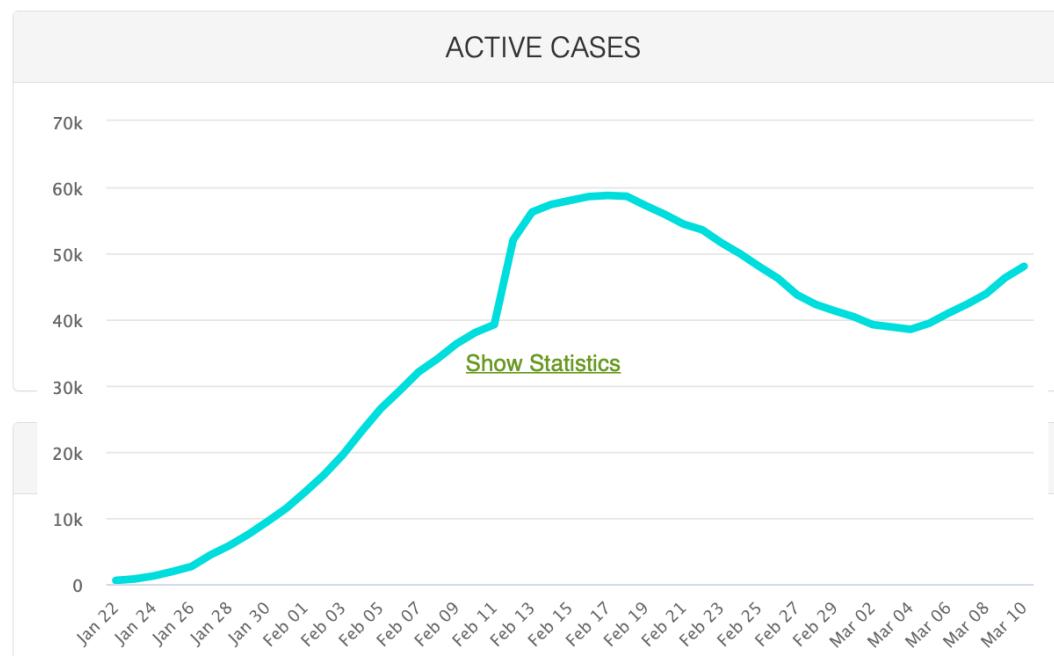
[view by country](#)

Deaths:

4,605

Recovered:

67,051



Notes



Econ 210a

Other Classes...

Brad DeLong

U.C. Berkeley

Last Edited: 2020-04-29

Readings

Inequality:

- Branko Milanovic, Peter H. Lindert, & Jeffrey G. Williamson (2010): Pre-Industrial Inequality <<http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0297.2010.02403.x/abstract>>
- Thomas Piketty & Gabriel Zucman (2014): Capital Is Back: Wealth-Income Ratios in Rich Countries 1700–2010 <<http://qje.oxfordjournals.org/content/129/3/1255.full.pdf>>

Unfreedom:

- Nathan Nunn (2008): *The Long-Term Effects of Africa's Slave Trades* <<http://www.jstor.org/stable/pdfplus/25098896.pdf>>

Women, Men, & Children:

- Abigail Smith Adams (1776): *Letter to John Adams 31 March - 5 April 1776* <<https://www.masshist.org/digitaladams/archive/doc?id=L17760331aa>>
- Martha Bailey (2013): *Fifty Years of Family Planning: New Evidence on the Long-Run Effects of Increasing Access to Contraception* <<http://www.nber.org/papers/w19493>>
- Claudia Goldin (1991): *The Rise of Women's Employment* <<http://www.journals.uchicago.edu/doi/abs/10.1086/649603>>
- Heather Antecol, Kelly Bedard, & Jenna Stearns (2018): *Equal but Inequitable: Who Benefits from Gender-Neutral Tenure Clock Stopping Policies* <<https://pubs.aeaweb.org/doi/pdf/10.1257/aer.20160613>>
- Alberto Alesina, Paola Giuliano, & Nathan Nunn (2013), *On the Origins of Gender Roles: Women and the Plough* <https://scholar.harvard.edu/files/nunn/files/alesina_giuliano_nunn_qje_2013.pdf>