

Lecture 21:

5.5. South Asia & Middle East

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for presentation: Th 2020-04-16

Original course by Melissa Dell (Harvard Econ 1342), revised by Brad DeLong

<<https://github.com;braddelong/public-files/blob/master/econ-135-lecture-21.pptx>>

<<https://www.icloud.com/keynote/04q8MTND7GufgVjyjcdQ0SXnQ>>

Discussion

South Asia & Middle East:

- What strikes you as important here?
 1. Why the “sudden stop” of the Middle East in development around 1500? (It is doing fine in comparative perspective before then.)
 2. Could Muhammed Ali’s dynasty have led a “Meiji Restoration” in Egypt, had his descendants been truly fortunate?
 3. Why does it seem that (both) Egypt (and Japan) had so much more state capacity to at least attempt reform in the 1800s to start to take advantage of the Industrial Revolution?
 4. Why didn’t the bad predatory institutions of the Netherlands abroad in Indonesia leak back home, and damage the Dutch economy as well?

Asia

Th Apr 16: 5.5. Asia:

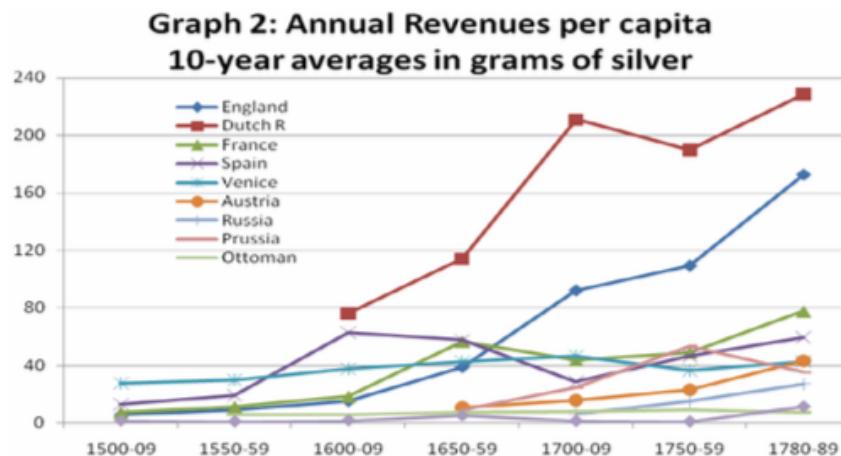
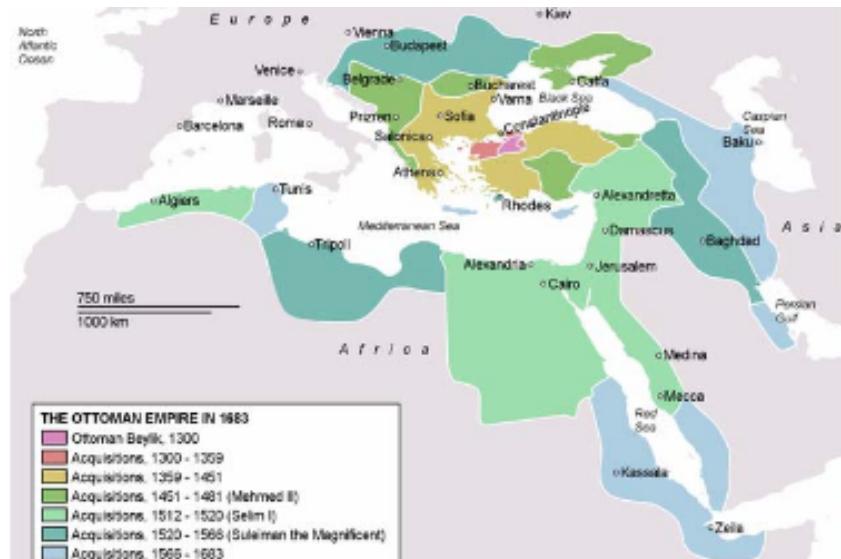
- Read Before: **Sevkut Pamuk** (2014): *Institutional Change and Economic Development in the Middle East, 700-1800* <<https://github.com;braddelong/public-files/blob/master/readings/article-pamuk-middle-east.pdf>>
- Slides: <<https://github.com;braddelong/public-files/blob/master/econ-135-lecture-21.pptx>>
- Discussion Thread: <https://bcourses.berkeley.edu/courses/1487685/discussion_topics/5747048>
- Zoom Q&A Session: <<https://github.com;braddelong/public-files/blob/master/econ-135-zoom-2020-04-16-09.59.01-99819691485.zip>>
- Asia is really big! Lots of things happen!!
 - Just look at a few places:
 - Ottoman Empire:
 - Qing China:
 - Dutch colonialism in Indonesia
 - Egypt

27:00 minutes of audio

Ottoman Empire

Mehmet II “the Conqueror”’s army takes Constantinople in 1453

- Most successful gunpowder empire of its day:
 - Biggest and most effective artillery park in the world
 - Best-disciplined infantry soldiers in the world: the *janissaries*
 - Highly-motivated professional, feudal, and conquistador cavalry: timarli sipahilar, kapikulu sipahilar, & akincilar
- But in the Outer Empire state both predatory & weak:
 - Around 1800 in Egypt the Mamluks were extracting 2/3 of peasant incomes through taxes (Owen, p. 36).
 - In Anatolia about 50% (p. 37).
 - Owen: “not a situation which permitted any accumulation of capital in the agricultural sector nor any regular increase in production...”



Source: Karaman, K. Kılvanç and Şevket Pamuk (2010) “Ottoman State Finances in European Perspective, 1500-1914,” *Journal of Economic History*, 70, pp. 593-627.

Urbanization

The Ottoman Empire had a few very large cities:

- Parasitic rent extraction-funded cities...

The Number of Cities

nr. cities >= 10000 inhabitants												
Country	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	
Scandinavia	-	-	-	-	-	-	-	-	-	2	6	
Great Britain	-	1	4	4	4	6	4	4	8	12	65	
Ireland	-	-	1	-	-	2	1	-	-	3	12	
Low Countries	-	-	2	2	7	13	9	21	28	32	37	
France	10	10	17	18	30	34	27	34	43	64	91	
Germany	6	6	10	9	13	24	22	25	33	29	58	
Austria/Switzerland	-	-	-	-	1	1	2	3	3	5	10	
Italy	5	9	18	19	31	47	28	44	77	68	128	
Iberia	9	15	21	19	22	24	21	34	55	35	85	
Poland	-	-	-	-	1	2	4	6	9	8	8	
Czech Rep.	-	-	1	1	1	3	1	3	1	4	3	
Hungary/Slovakia	-	-	-	-	-	-	3	3	4	-	18	
Yugoslavia/Albania	-	1	2	2	1	4	4	3	6	6	15	
Bulgaria/Rumania	1	1	3	3	4	8	5	8	9	10	22	
Greece	1	2	2	2	2	2	2	2	2	2	2	
Turkey	6	8	9	9	8	10	9	9	9	6	7	
Lebanon/Israel	2	4	4	5	3	4	2	2	1	1	1	
Syria	3	3	3	3	4	3	2	2	2	2	2	
Iraq	4	4	5	4	5	5	5	3	3	3	3	
Egypt	2	4	4	4	4	3	3	3	2	2	1	
North Africa	4	5	6	8	7	9	8	7	7	8	10	
Latin-West	30	41	74	72	110	156	119	178	261	267	522	
Balkan	2	4	7	7	7	14	11	16	20	22	57	
ME-NA	21	28	31	33	31	34	29	26	24	22	24	
Total	53	73	112	112	148	204	159	220	305	311	603	

Middle East had a few very Big Cities

Country	Urban primacy (population largest city / total population in cities >= 10,000)										
	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
Scandinavia	-	-	-	-	-	-	-	-	-	-	0.80 0.55
Great Britain	-	1.00	0.40	0.44	0.48	0.53	0.58	0.57	0.68	0.75	0.39
Ireland	-	-	1.00	-	-	0.54	1.00	-	-	0.63	0.43
Low Countries	-	-	0.50	0.53	0.27	0.16	0.38	0.13	0.08	0.20	0.21
France	0.16	0.19	0.10	0.19	0.18	0.26	0.29	0.21	0.23	0.26	0.21
Germany	0.24	0.20	0.20	0.17	0.18	0.13	0.11	0.11	0.07	0.11	0.13
Austria/Switzerland	-	-	-	-	1.00	1.00	0.67	0.48	0.65	0.63	0.63
Italy	0.33	0.19	0.15	0.12	0.09	0.08	0.11	0.10	0.13	0.15	0.13
Iberia	0.31	0.26	0.17	0.16	0.14	0.19	0.16	0.09	0.10	0.17	0.09
Poland	-	-	-	-	1.00	0.55	0.33	0.24	0.34	0.21	0.23
Czech Rep.	-	-	1.00	1.00	1.00	0.60	1.00	0.74	1.00	0.52	0.62
Hungary/Slovakia	-	-	-	-	-	-	-	-	0.41	0.38	0.35 0.11
Yugoslavia/Albania	-	1.00	0.73	0.50	1.00	0.34	0.39	0.50	0.24	0.29	0.14
Bulgaria/Rumania	1.00	1.00	0.43	0.38	0.37	0.23	0.24	0.30	0.18	0.20	0.11
Greece	1.00	0.83	0.73	0.66	0.60	0.67	0.55	0.66	0.60	0.75	0.85
Turkey	0.54	0.54	0.52	0.37	0.40	0.31	0.24	0.32	0.56	0.67	0.65
Lebanon/Israel	0.56	0.40	0.39	0.42	0.56	0.47	0.75	0.83	1.00	1.00	1.00
Syria	0.42	0.46	0.50	0.52	0.50	0.50	0.56	0.57	0.56	0.56	0.56
Iraq	0.54	0.65	0.70	0.74	0.69	0.50	0.55	0.63	0.46	0.46	0.70
Egypt	0.51	0.45	0.38	0.37	0.51	0.72	0.75	0.89	0.91	0.95	1.00
North Africa	0.56	0.46	0.30	0.25	0.28	0.23	0.32	0.33	0.32	0.34	0.41
Latin-West	0.12	0.11	0.06	0.05	0.04	0.06	0.06	0.05	0.04	0.07	0.07
Balkan	0.60	0.40	0.22	0.25	0.21	0.17	0.16	0.17	0.12	0.11	0.09
ME-NA	0.22	0.24	0.17	0.14	0.12	0.24	0.24	0.26	0.28	0.38	0.34
Total	-	-	-	-	-	-	-	-	-	0.80	0.55

Source: Bosker, Maarten, Eltjo Buringh and Jan Luiten van Zandem (2007) "From Baghdad to London: The Dynamics of Urban Growth in Europe and the Arab World", Unpublished.

Egypt

Muhammad Ali Pasha al-Mas'ud ibn Agha:

- Reigned 1805-1848
- Albanian orphan, tax collector in the Ottoman-ruled Greek port of Kavala, bored
- Signed up as a mercenary in the Ottoman army sent to reoccupy Egypt
- By 1803 commanded a regiment of his fellow Albanians
- Ottoman governor of Egypt could not afford to pay his soldiers... Mutiny! Muhammed Ali wound up on top...



Egypt's Position as of 1805

Napoleon had showed up and conquered the place, then left:

- Egypt at the crossroads
- Egypt a good kingdom to rule
- The Europeans were likely to come again
- Make Egypt Great Again:
 - New crops
 - Land reform
 - A modern military
 - A focus on cotton as an export
 - Construction of state-owned textile factories to jump-start Egyptian industrialization
 - Cannon & musket factories
 - A shipyard
 - Dams & railroads
 - Copy the French engineering Ecole Polytechnique
 - Medical school for women
- Why? Because otherwise his great-grandchildren would become the playthings of French bankers and British proconsuls...

INDUSTRIALIZATION IN EGYPT

Table 1. *Employment by major branches of industry under Muhammad Ali, late 1830s*

	Workers (1,000s)	% of total manufacturing
A. Mechanized manufacturing (total)	110	42.30
I. Textiles	64	24.61
Cotton	15	5.70
Linen	30	11.53
Wool	12	4.61
Silk	7	2.69
II. Foodstuffs	11	4.23
Sugar processing/refining	5	1.92
Rice and wheat mills	6	2.30
III. Military	15	5.76
Arsenal	5	1.92
Weapons, ammunitions, etc.	10	3.84
IV. Other	20	7.69
Indigo	9	3.46
Oil and soap	8	3.07
Paper and glass	1	0.38
Leather	2	0.76
B. Non-mechanized manufacturing (total)	150	57.69
Builders	40	15.38
Cotton weavers	80	30.76
Linen weavers	30	11.53
Total	260	100

Source: Radwan, *Capital formation*, p. 168.

Muhammed Ali's Strategy

Make Egypt great again:

- Why?
- Because otherwise his great-grandchildren would become the playthings of French bankers and British proconsuls...
- Population of Egypt in 1840: 5 million?
- Figure 1.2 million in the potential outside-the-home paid or self-employed labor force.
- By the late 1830s one in five was at work in manufacturing
- By the late 1830s one in 11 was at work in mechanized manufacturing
- In an era in which British manufactured exports were deindustrializing every other peripheral country on the globe, impressive...

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Was the Stuff Produced Useful?

Make Egypt ninth in the world in cotton spinning in the 1830s:

- As many spindles per capita as the United States or France or Spain
- And many more than Belgium, Germany, Austria-Hungary, Russia, or Mexico
- Admittedly it had a captive market in Egypt:
 - The military had to buy from Muhammed Ali's factories
 - As did other internal Egyptian customers cut off from products that did not carry the domestic-manufacture internal-transport stamp

LAURA PANZA AND JEFFREY G. WILLIAMSON

Table 2. *Machine cotton spinning, various countries (1830–40)*

Country	Year	Spindles (1,000s)	Spindles/1,000 people
Great Britain	1834	10,000	588
France	1834	3,000	90
US	1834	1,400	97
Spain	1840	1,200	80
Austria-Hungary	1834	800	28
Russia	1840	700	12
Germany	1836	626	22
Switzerland	1836	588	165
Egypt	1834	400	80
Belgium	1834	200	49
Mexico	1842	125	17

Source: Batou, 'Muhammad-'Ali's Egypt', p. 185.

A final introductory remark is needed. English visitors had a poor opinion of Ali's factories: 'An Englishman . . . visited Egypt in the early 1830s leaving a graphic description of the mills. According to his estimates, 50 per cent of the raw material was wasted as a result of carelessness. [His] evaluation of the finished product was equally gloomy'.²² Maybe so, but visitors to poor countries with emerging industries have always voiced such opinions, including British visitors to America in the 1830s, and American visitors to the Philippines in the 1930s. The use of labour-intensive and small-scale technologies—without steam or water power²³—makes sense where labour is cheap and where energy and machines are expensive.²⁴ Where cotton is abundant, why not use techniques that 'waste' it? Where capital-intensive and sophisticated technologies are needed for high-count luxury cloth, it made sense for the Egyptians to import such goods, especially since most locals could only afford cheap, low-count cloth. In any case, by 1834 Egypt was tied with Spain for the fifth highest spindle/population ratio in the world (table 2). Local factories were able to drive imports of lower-quality textiles out of Egyptian markets.²⁵ Furthermore, 'Egyptian factories were provided with jennies and looms made by Egyptian carpenters, smiths and turners under the direction of French technicians'.²⁶

Were the Factories Profitable?

NO!:

- After 1840 the system is dismantled
- Muhammed Ali is old and sick, his favorite son Ibrahim has tuberculosis, the next heir his grandson Abbas was called “bigoted and sensual”
- The factories were expensive
- No self-sustaining communities of engineering practice or of industrial entrepreneurship emerged
- Abbas shut it all down

We appreciate that Ali often supplied his ‘state industries’ with incompetent (military) managers, with equipment that was poorly maintained, and so on, but our focus is on the impact of his main industrial policies: the size and impact of the ‘marketing board’ food price wedge or virtual export tax on domestic food prices; the size and use of ‘marketing board’ and land tax revenues on infrastructure investment; the size and impact of the ‘marketing board’ price wedge in supplying cheap intermediates to manufacturing; the offsetting impact of rising nominal labour costs as the ‘marketing board’ supplied more expensive foodstuffs to urban workers; and the effectiveness of his non-tariff barriers in keeping out foreign competition. Whether these policies transformed the Egyptian economy is another matter entirely, and is not explored here.

The Khedive Ismail

The Egyptian succession:

- Muhammed Ali (1805-48), grandson Abbas (1848-54), uncle Said (1854-63), nephew Ismail (1863-79)
- The machines could not be kept working
- The cotton boom of the 1860s
- Suez Canal opened 1869
- 1876 state bankruptcy
- Egyptian independence ended with Ismail, with puppets only afterwards



Qing Dynasty China

“Revere the emperor & resist the barbarians!” will not work:

- Many western China specialists see and can almost touch an alternative history
- One in which late-nineteenth century China stood up economically, politically, and organizationally.
- Japan, after all:
 - won its short victorious war against Russia in 1905,
 - negotiated as an equal with Britain and the U.S. over warship construction in 1921,
 - was perhaps the eighth industrial power in the world by 1929
- We economists tend to be more skeptical:
 - QIMCS built up under Robert Hart in the 1860s
 - Failure of infrastructure management
 - Failure to collect the salt tax
 - Failure to suppress the Taiping
 - Lack of realism—fighting France over Vietnam



The Kaiping Coal Mine

Li Hongzhang and Tang Tingshu decide to try to jump-start industrialization:

- Chi Shihchang, a vice-president of the Board of Civil Offices: “Mining methods angered the earth dragon... [and so] the late empress could not rest quietly in her grave...”
- Chang Yenmao:
 - A political fixer for Cixi
 - Perhaps the wealthiest man in Tientsin
- Herbert Hoover and the Boxer Rebellion
- What had been a strategic property to jumpstart Chinese industrialization became something else...
- Li Hongzhang and Sun Yatsen



Tong Colliery, Kaiping, China.

Dutch Colonial Indonesia

In the 16th century, Java (in modern Indonesia) and Malaysia were amongst the most urbanized places in the world:

- Then the Dutch show up, with ships and cannon and muskets and well-drilled infantry...
- And by 1900 Indonesia is very poor...
- Ambon and Banda:
 - In Ambon the V.O.C. took over the existing feudal structure, which they used to monopolize supply.
 - In Banda, the V.O.C.:
 - killed most of the population in 1621 (probably over 20,000 people)
 - reorganized the production of nutmeg
 - established slavery system
 - ex-employees of the VOC as planters
- “Comprador” elites...
- De-economization: Reid (1993, Chapter 5): “When a Dutch factor visited Magindanao in 1686 he was told “Nutmeg and cloves can be grown here, just as in Malaku. They are not there now because the old Raja had all of them ruined before his death. He was afraid the Dutch Company would come to fight with them about it...”

Expansion and Decline

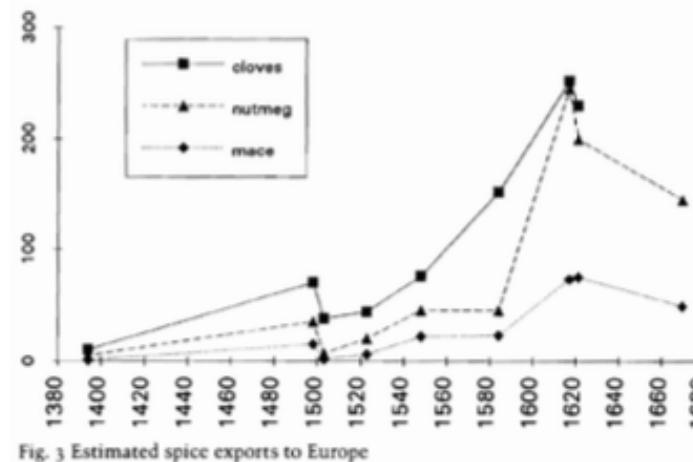


Fig. 3 Estimated spice exports to Europe



Map 2 Political centres in Southeast Asia, c. 1600

Source: Reid, Anthony (1988) Southeast Asia in the Age of Commerce 1450-1680: The Land below the Winds, Yale University Press. P. 9.

Big Ideas: Lecture 21: South Asia & Middle East

Takeaways from this class:

- Takeaways from Asia ex-Pacific rim (plus north Africa)?
 - Ottoman Empire
 - Egypt
 - Qing China
 - Dutch colonialism in Indonesia
- Takeaways from our tour of the continents more generally?
 - North America
 - Latin America ex-southern cone
 - Southern cone of South America
 - East Asian miracles
 - Africa
 - Asia ex-Pacific Rim

Readings

Optional readings:

- Laura Panza & Jeffrey Williamson (2015): Did Muhammad Ali Foster Industrialization in Early Nineteenth-Century Egypt?
<<https://github.com;braddelong/public-files/tree/master/readings/notes-panza-%26-williamson-egypt>>

Roadmap for the Next Two Weeks...

21. Th Apr 16: 5.4.2. South Asia & Middle East

- **Read Before:** Sevkut Pamuk (2014): Institutional Change and Economic Development in the Middle East, 700-1800 <<https://delong.typepad.com/files/pamuk.pdf>>
- **Slides:** <<https://github.com;braddelong/public-files/blob/master/econ-135-lecture-21.pptx>>

6. Policy Issues

22. Tu Apr 21: 6.1. "Deep Roots" vs. Path Dependence

- **Read Before:** Nathan Nunn (2012): Culture and the Historical Process <<https://delong.typepad.com/files/nunn-culture.pdf>>
- **Read Before:** Melissa Dell (2015): Path Dependence in Development: Evidence from the Mexican Revolution <<https://scholar.harvard.edu/files/dell/files/revolutiondraft.pdf>>
- **Slides:** <<https://github.com;braddelong/public-files/blob/master/econ-135-lecture-22.pptx>>

23. Th Apr 23: 6.2. Growth and Fluctuations; Trade and Development, Foreign Aid

- **Read Before:** Barry Eichengreen (2015): Hall of Mirrors: The Great Depression, The Great Recession, and the Uses-and Misuses-of History, selections <<https://delong.typepad.com/files/eichengreen-mirrors.pdf>>
- **Read Before:** David Atkin (2014): Endogenous Skill Acquisition and Export Manufacturing in Mexico <<https://delong.typepad.com/files/atkin-skill.pdf>>
- **Slides:** <<https://github.com;braddelong/public-files/blob/master/econ-135-lecture-23.pptx>>

24. Tu Apr 28: 6.3. Populism, Plutocracy, Kleptocracy, & Neo-Fascism

- **Read Before:** Ernest Gellner (1973): *Nations & Nationalism*, selections <<https://delong.typepad.com/files/gellner-nations.pdf>>
- **Read Before:** Barry Eichengreen (2018): *The Populist Temptation Economic Grievance & Political Reaction in the Modern Era*, selections <<https://delong.typepad.com/files/eichengreen-populist.pdf>>

25. Th Apr 30: 6.4. Global Warming

- **Read Before:** Melissa Dell et al. (2012): *Temperature Shocks & Economic Growth: Evidence from the Last Half Century* <https://scholar.harvard.edu/files/dell/files/aej_temperature.pdf>
- **Read Before:** Melissa Dell et al. (2014). *What Do We Learn from the Weather? The New Climate-Economy Literature*, selections <<https://economics.mit.edu/files/9138>>

Roadmap Following...

Tu May 5: 6.5. The Pace and Meaning of Economic Growth

- **Read Before:** William Nordhaus: Do Real-Output and Real-Wage Measures Capture Reality? <<https://www.nber.org/chapters/c6064.pdf>>
- **Read Before:** John Maynard Keynes: Economic Possibilities for Our Grandchildren<<<https://delong.typepad.com/files/keynes-persuasion.pdf>>>
- **Read Before:** Edward Bellamy (1887): *Looking Backward 2000-1887*, selections <<https://delong.typepad.com/files/bellamy-backward.pdf>>

7. Conclusion

Th May 7: 7. Conclusion: The Future?

- **Read After:** Robert Allen (2011): *Global Economic History: A Very Short Introduction*, selections <<https://delong.typepad.com/files/allen-geh.pdf>>

W May 13 11:30-14:30: FINAL PAPER/PROJECT DUE

Catch Our Breath...

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



Notes, etc....



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 Th Apr 09:

- 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/12MV466ZZy5xHir4xdPhoTrL1oQ8CbZU-/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:

- Best thing I have read comes from Jim Stock <<https://drive.google.com/file/d/12MV466ZZy5xHir4xdPhoTrL1oO8CbZU-/view>>:
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 - 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/0FzRFAaAOnIAin4VJWWiWIC0>

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 Extrapolations

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<https://www.icloud.com/numbers/0FzRFAoAQoiAin4V.IWYWIWICQ>

Coronavirus Case



United States

1,342,235

[view by country](#)

Coronavirus Cases:

364,059

Deaths:

74,554

Deaths:

10,792

Recovered:

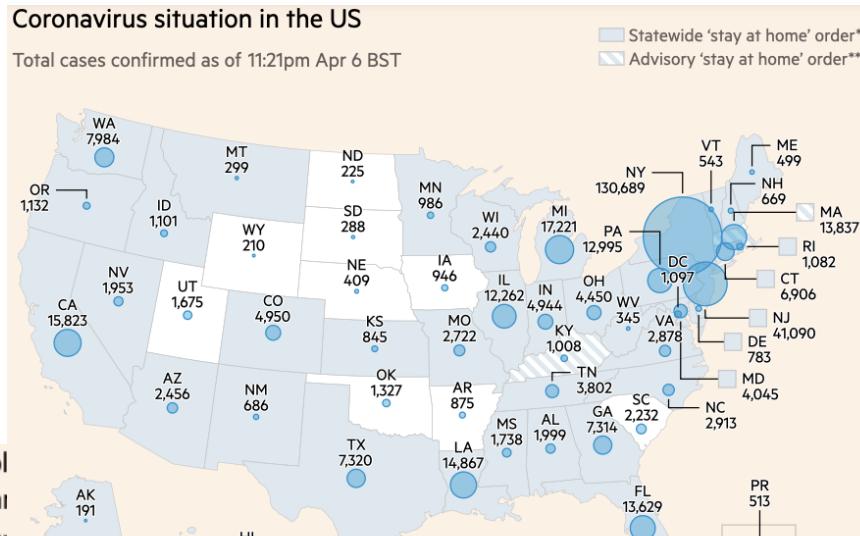
278,182

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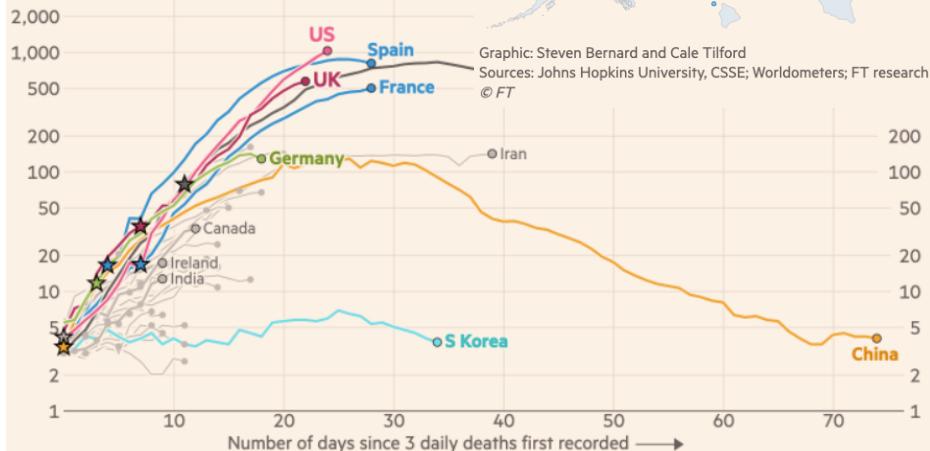
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Georgia	710	22

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



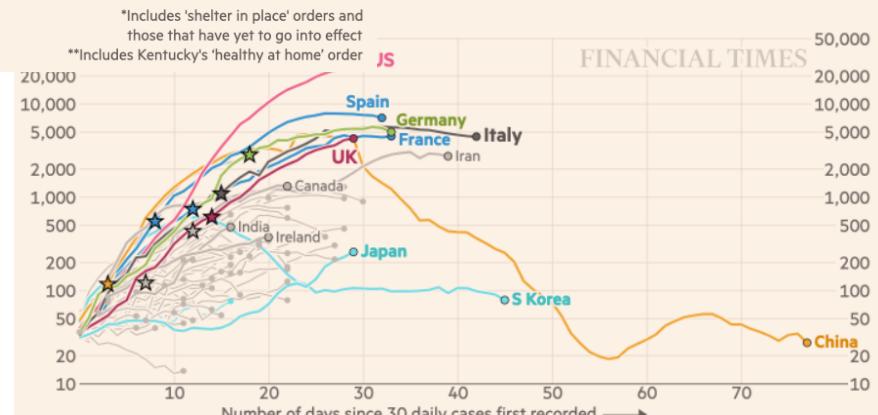
FT graphic: John Burn-Murdoch / @jburnmurdoch

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

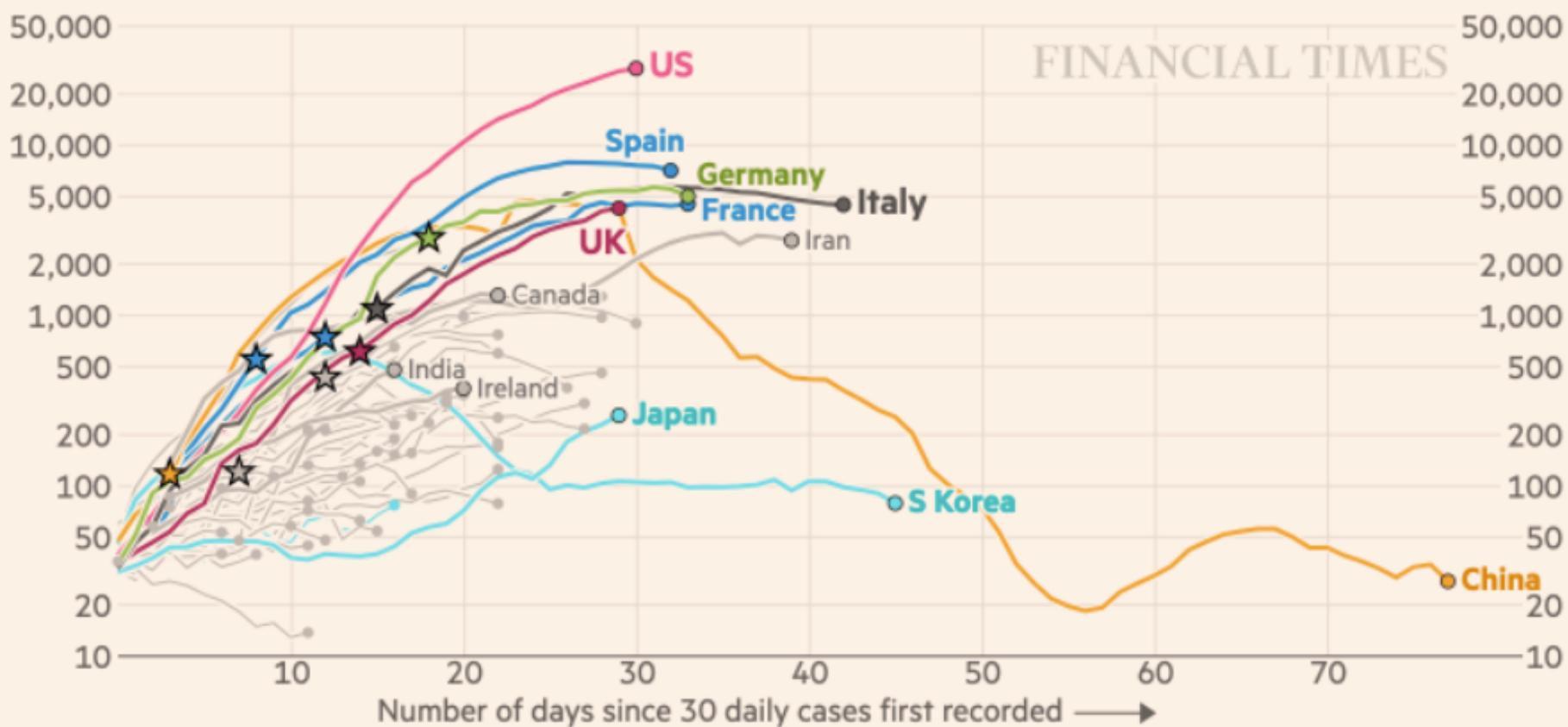
Source: FT analysis of European Centre for Disease Prevention and Control; Worldometers; FT research. Data updated April 06, 19:00 GMT

© 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 ★



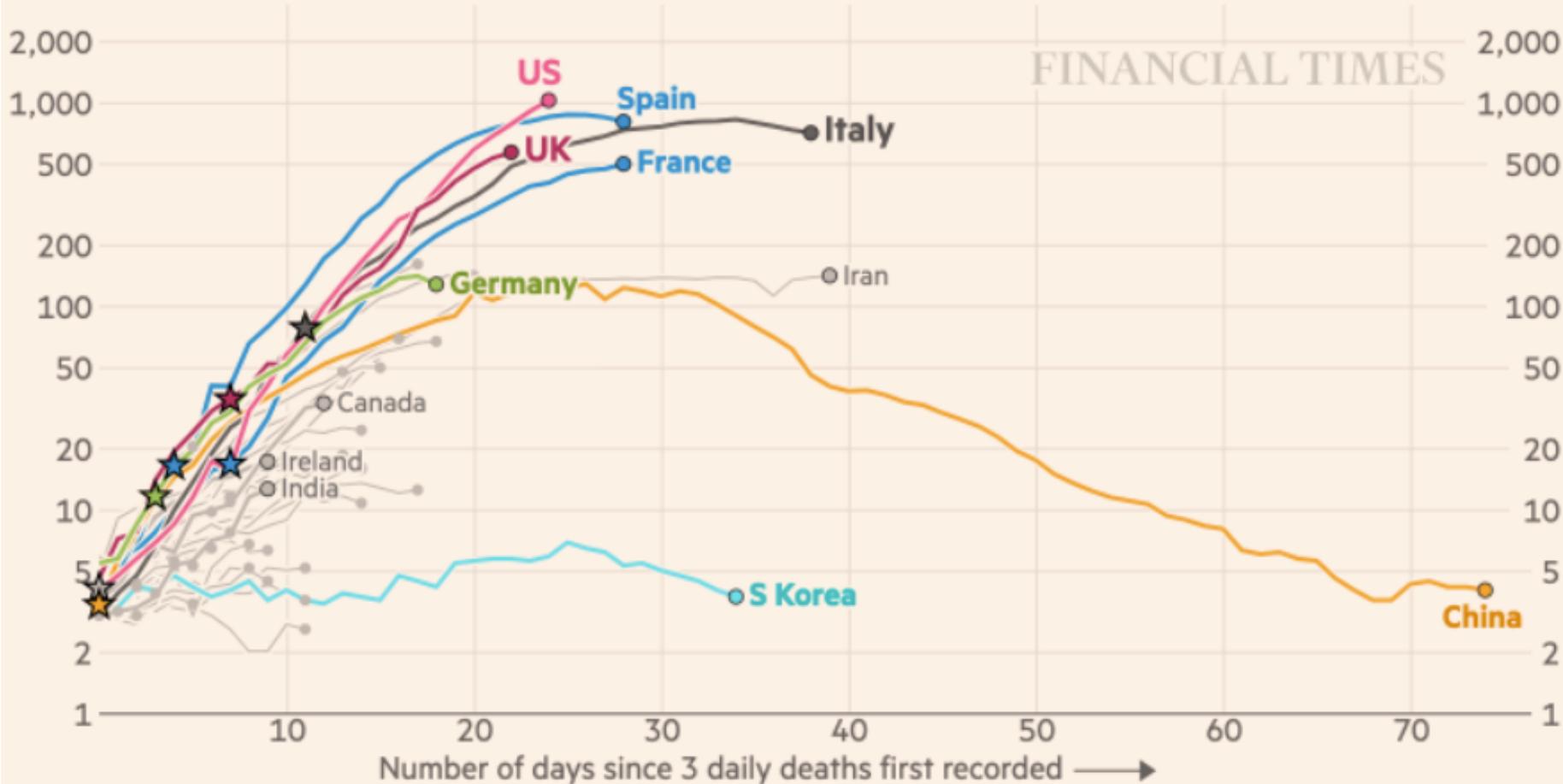
FT graphic: John Burn-Murdoch / @jburnmurdoch

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

© FT

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

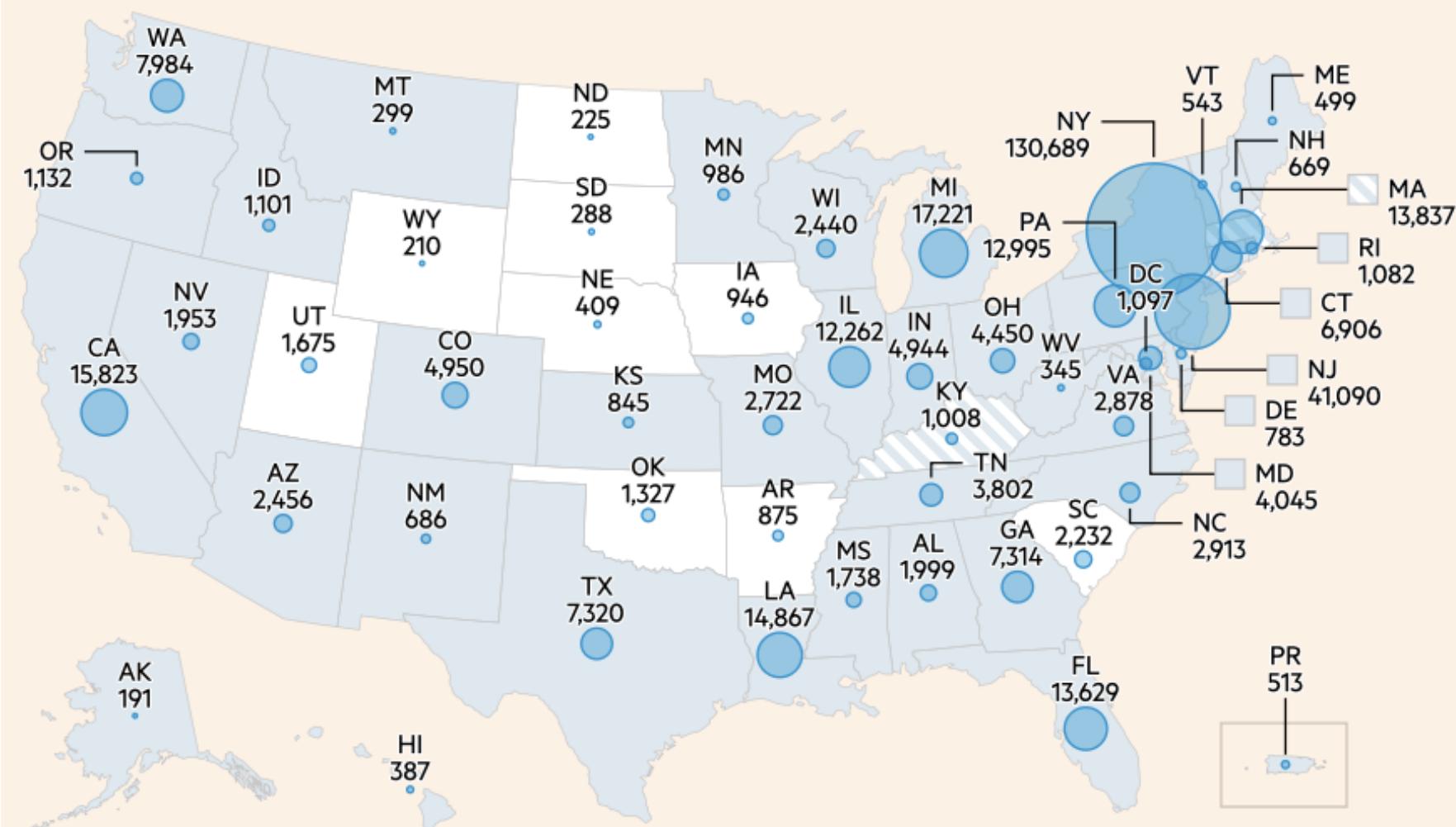
Source: FT analysis of European Centre for Disease Prevention and Control; Worldometers; FT research. Data updated April 06, 19:00 GMT

© FT

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

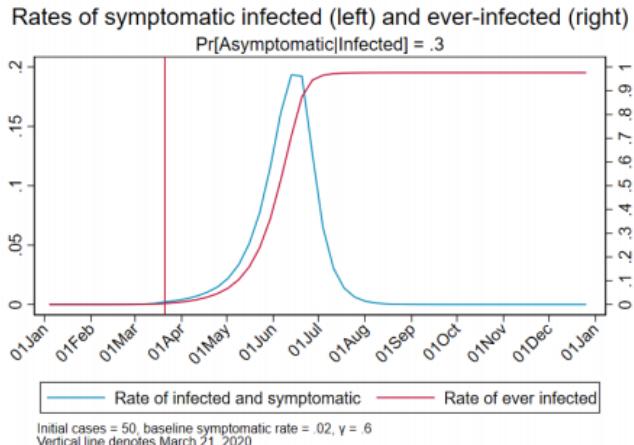
**Includes Kentucky's 'healthy at home' order

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%...

Figure 3. Low asymptomatic rate, short-duration policy



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

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

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

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

Figure 2. High asymptomatic rate, short-duration policy

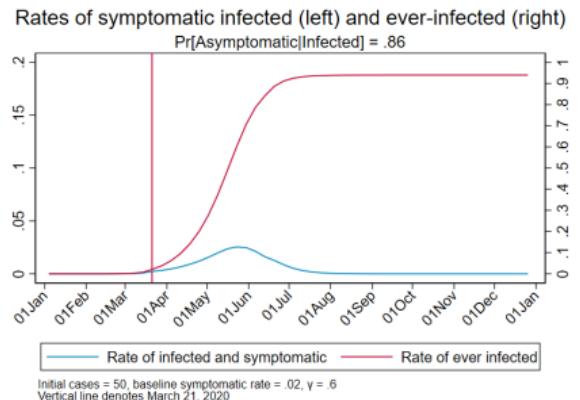


Figure 4. Low asymptomatic rate, severe long-duration policy

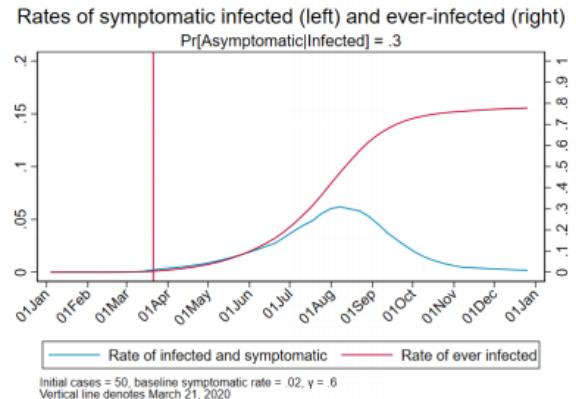
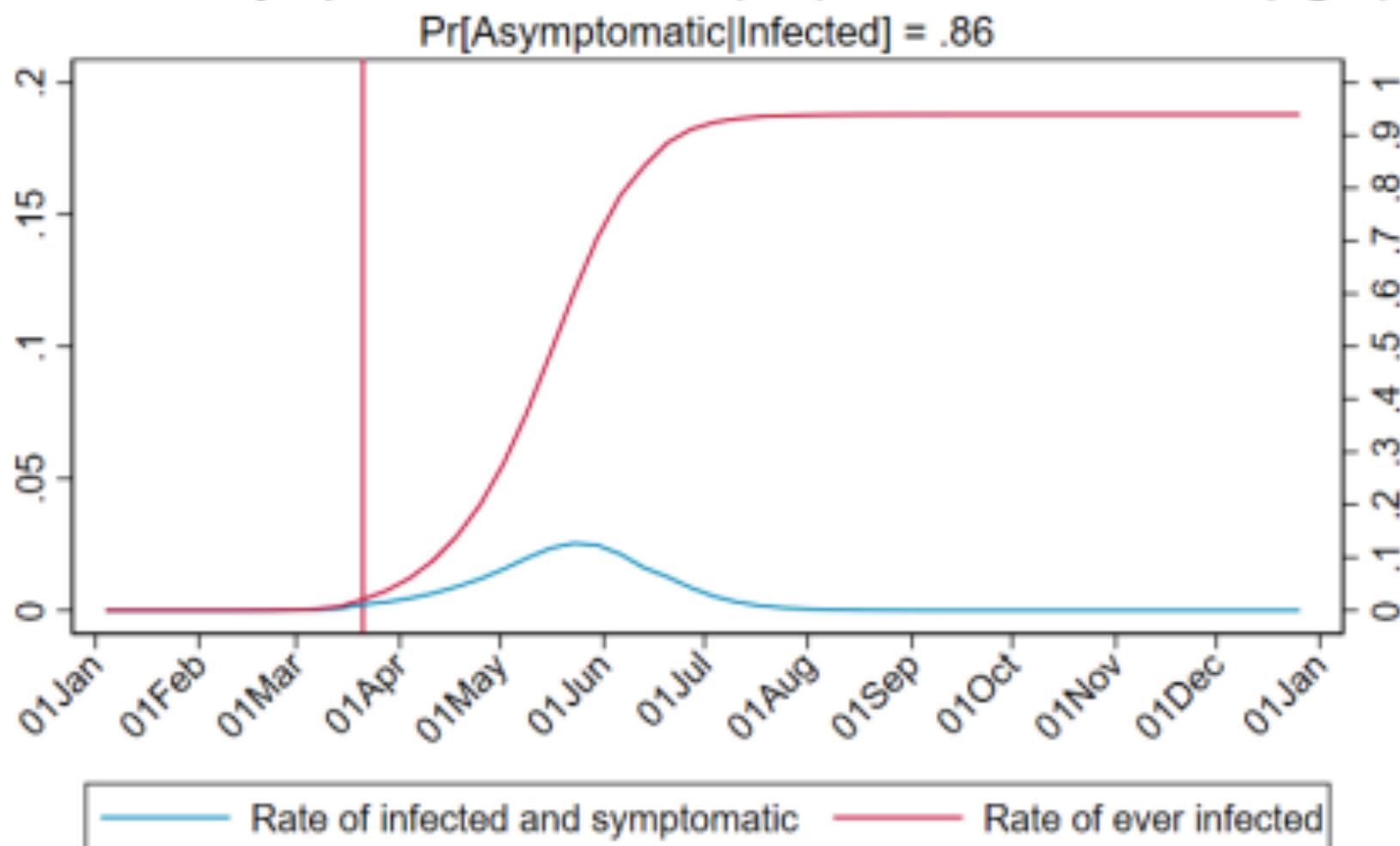


Figure 2. High asymptomatic rate, short-duration policy

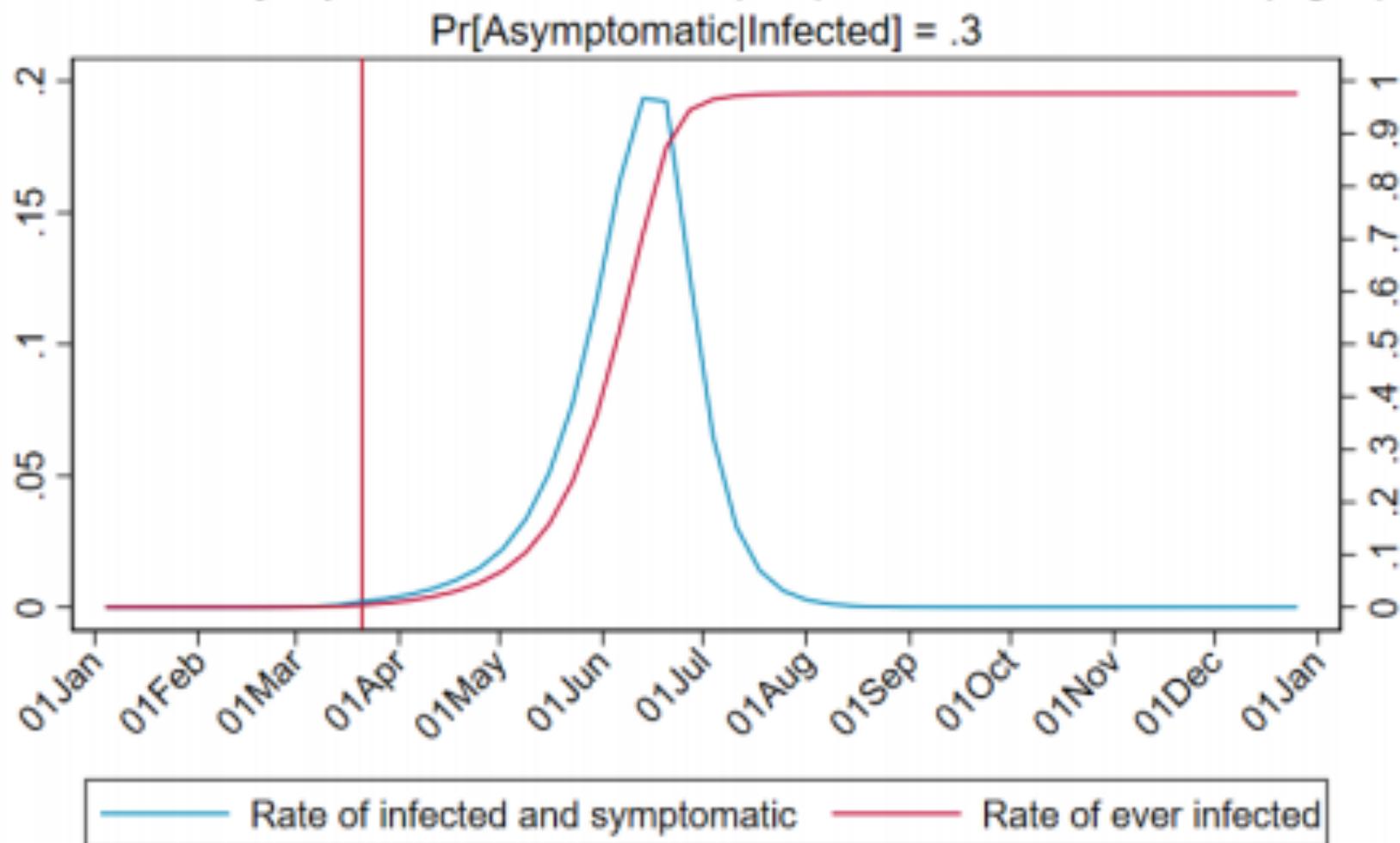
Rates of symptomatic infected (left) and ever-infected (right)



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)

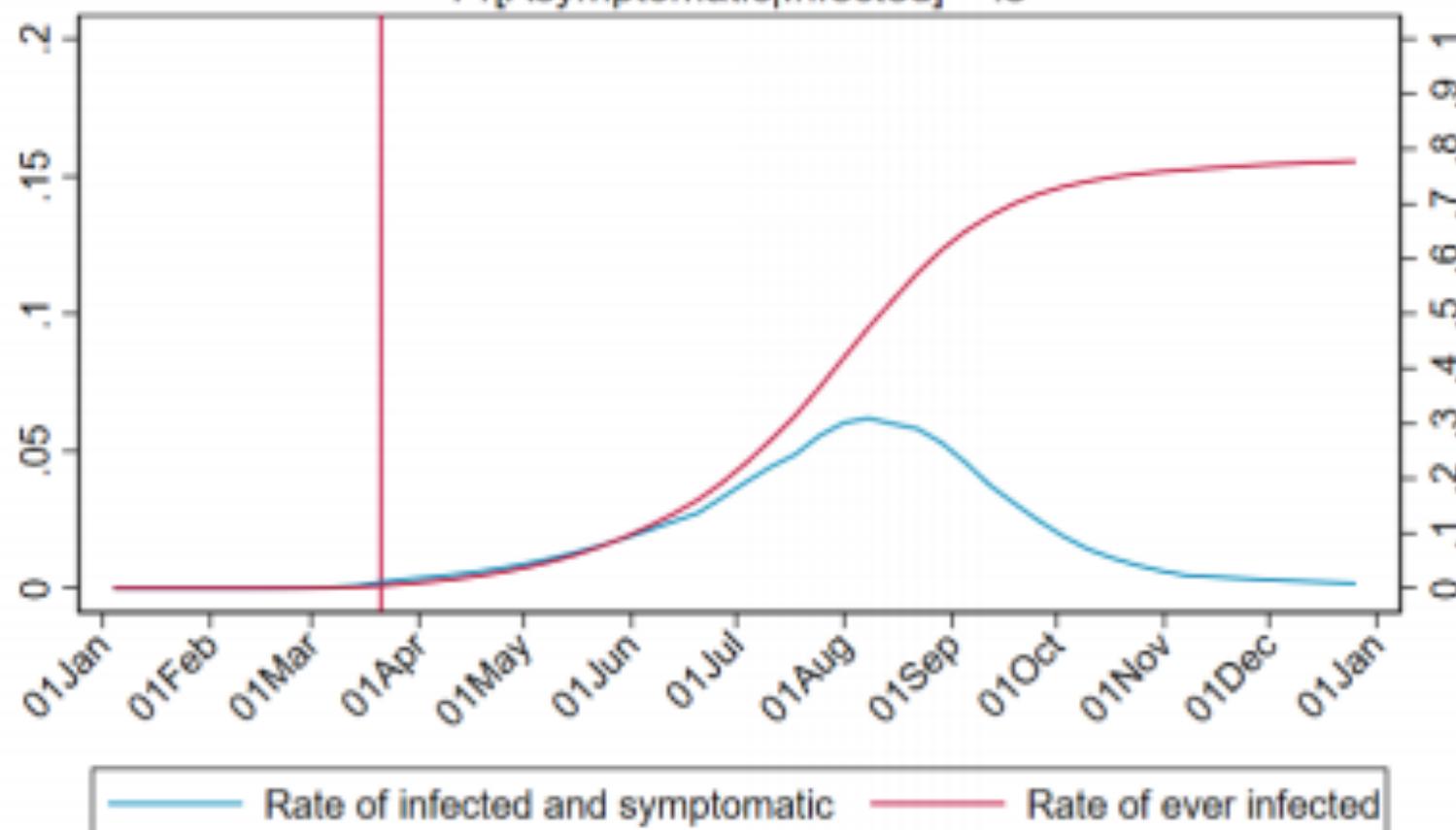


Initial cases = 50, baseline symptomatic rate = .02, $\gamma = .6$
Vertical line denotes March 21, 2020

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?

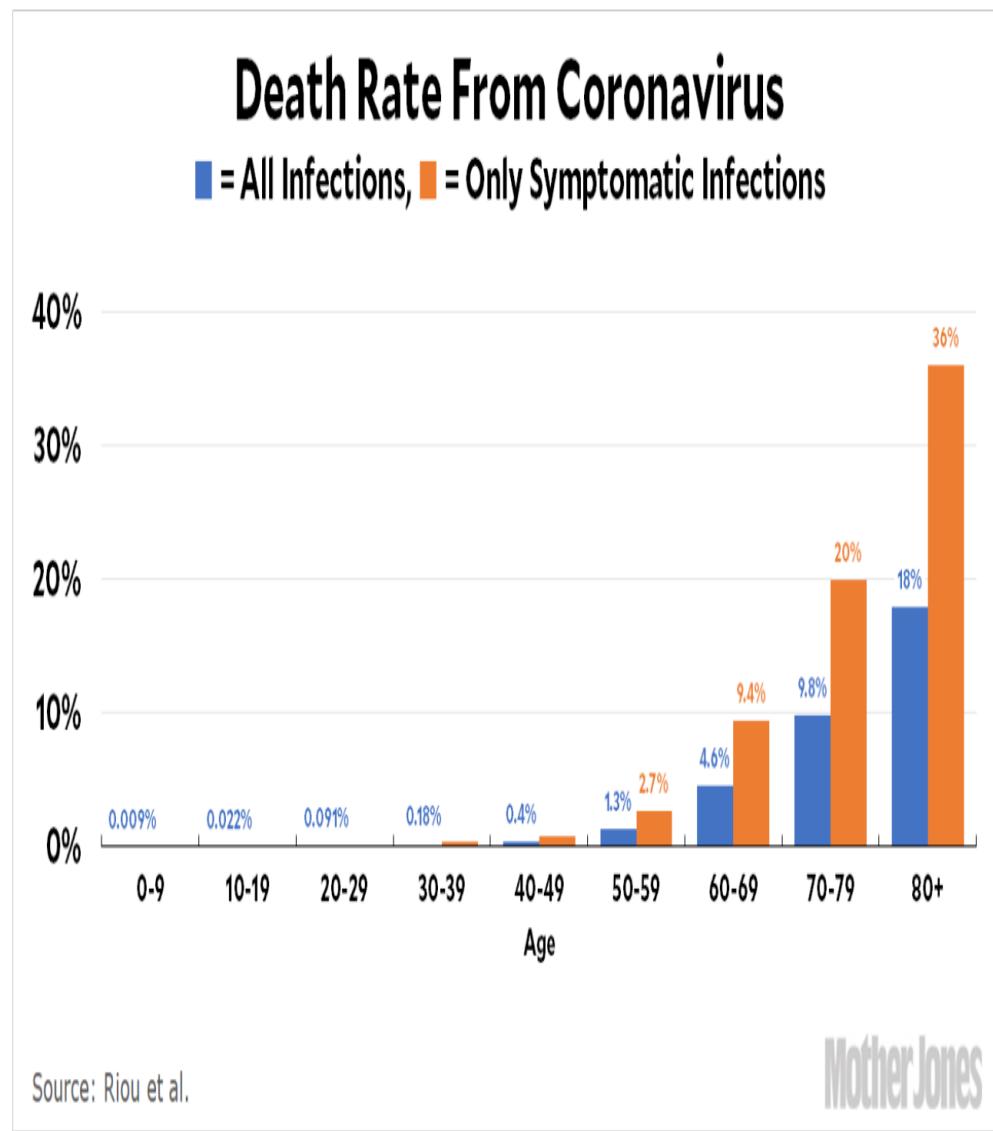
Plus: distributional issues

Plus: bankruptcy and credit chain issues

MOAR Coronavirus!

Death for Geezers!

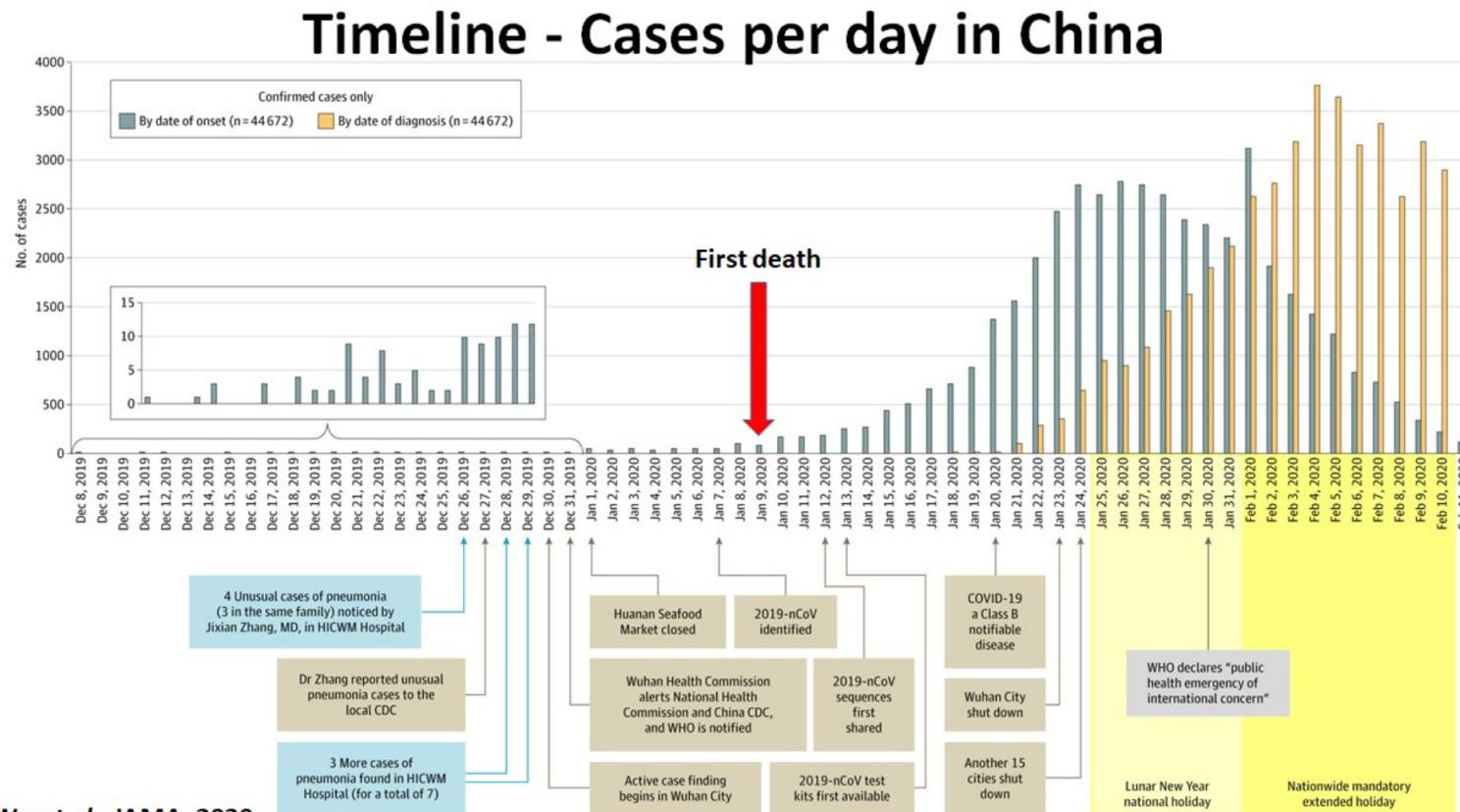
- Mortality for the Youngs very low...
- It's the flu for them—for you...
- And an extra doubling—or is it 5%?—mortality for the asthmatic
- And an extra doubling—or is it 5%?—mortality for the overweight



What We Think Happened in Wuhan

China beat it quickly & relatively easily!

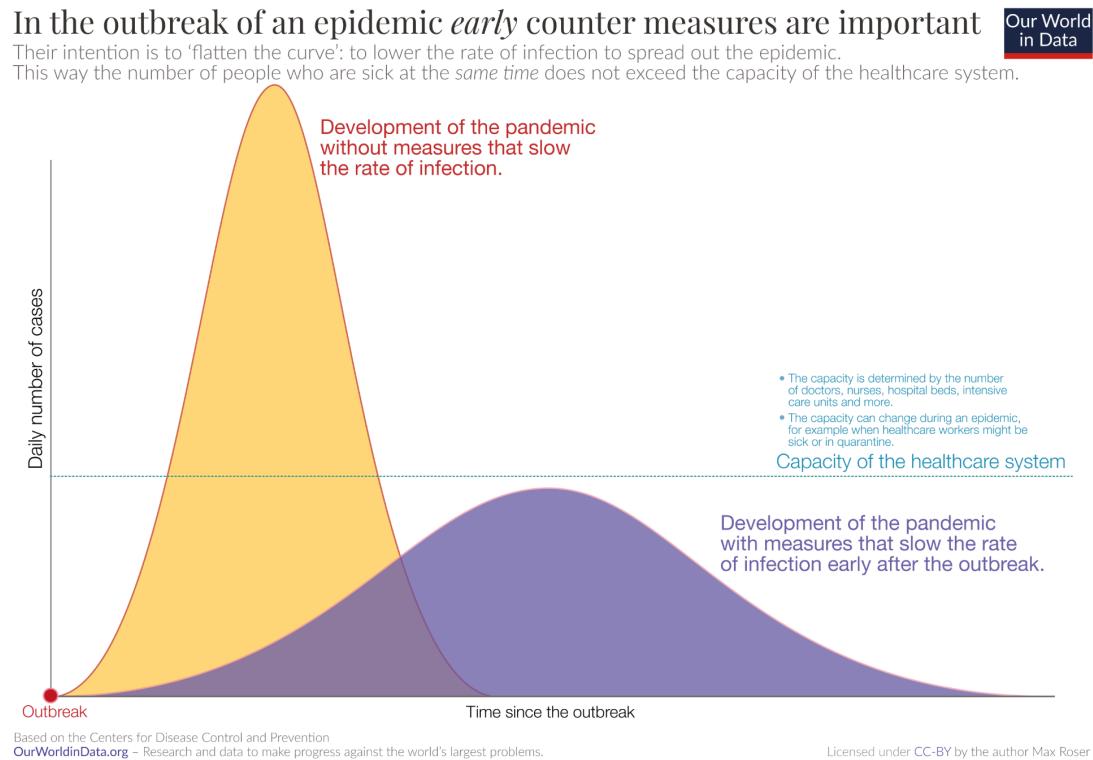
- We think
- Shut down Wuhan when 200 cases per day
- That seems to have been a good decision



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>>

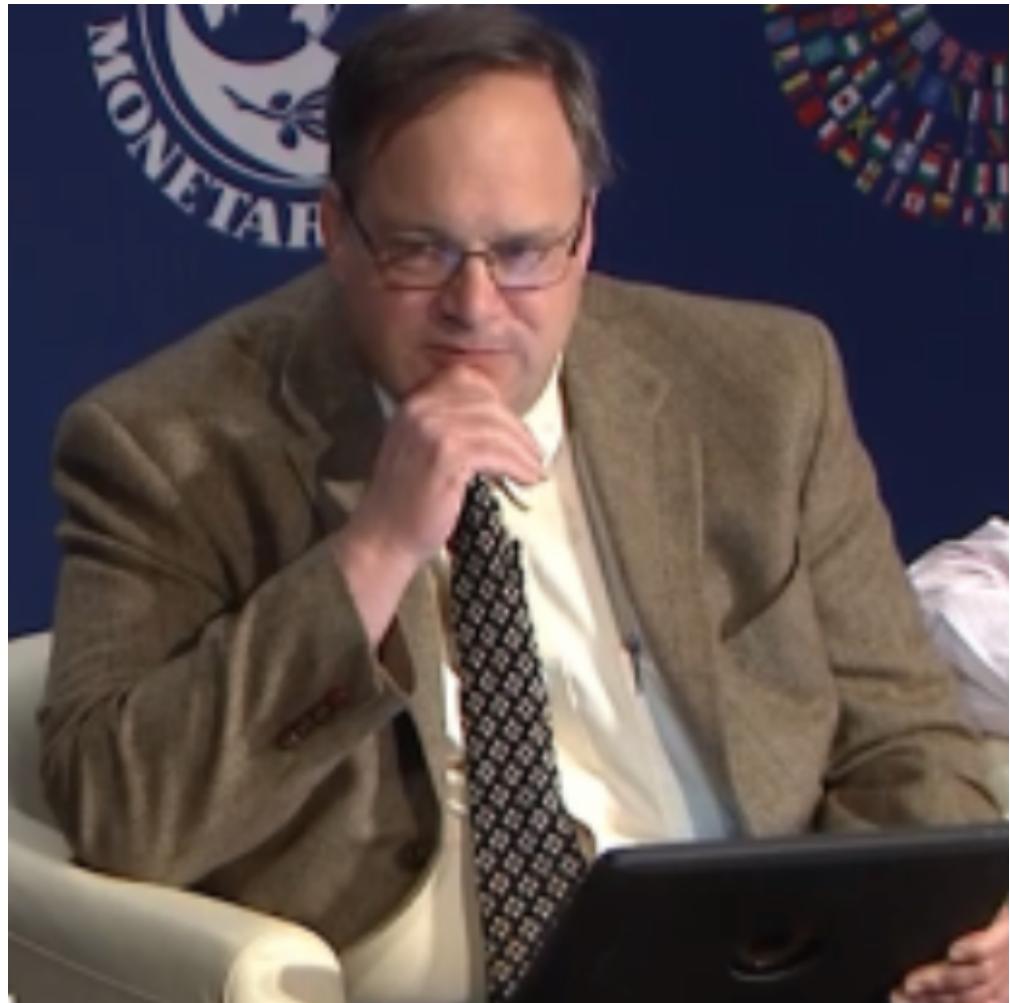
MOAR Coronavirus!

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

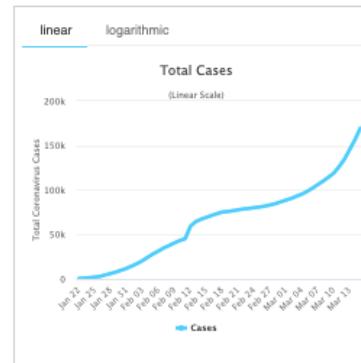
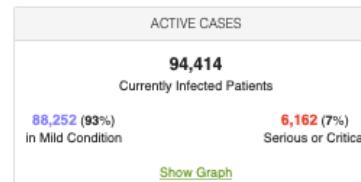
[view by country](#)

Deaths:

7,098

Recovered:

78,324



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

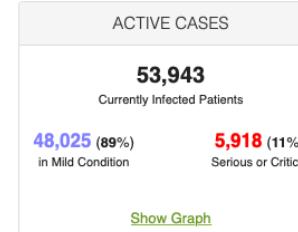
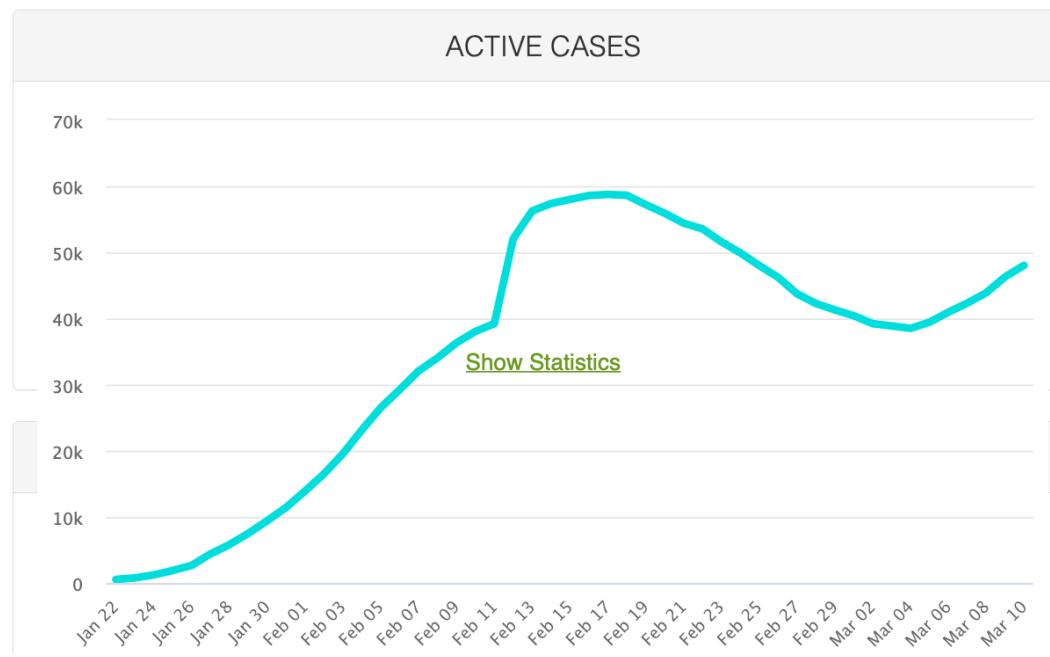
[view by country](#)

Deaths:

4,605

Recovered:

67,051



Notes

