

# COVID-19 and the Bioeconomy

David zilberman

# Statistical value of life and Covid-19 intervention

- In assessing benefit and costs of policy the notion of **statistical value of life** is very useful
- It is \$7.3 million in the US
- It was predicted that without social distancing the US will have 2.2 million fatalities- with the number will be 200,000 with social distancing
- The cost of social distancing -25% reduction in Real GNP for 4-12 months
- Life saving benefits of social distancing  
$$2 \text{ mil} * 7.3 \text{ mil} = \$14.6 \text{ Tril} > .25 \text{ Gen} * 12 \text{ month} = \$5.35 \text{ tri}$$
- Similiar calculus may work for Europe

# Table 1: Assessment of Factors Affecting Mortality Rate from COVID-19

	Dependent Variable: Deaths per Million People		
	States Only	Countries Only	States and Countries
Risk increase with High life expectancy Cold climate			
Tourists			
Population density			
Constant	722.9428 (582.6905)	-235.4681* (120.3951)	-133.1114 (193.1540)
log(Population Density)	234.3358*** (32.3614)	1.2160 (8.9920)	41.3410*** (14.1237)
Percent over Age 65	-29.7276 (23.2710)	5.5827** (2.5735)	8.8338** (4.1770)
Avg. Temperature (Farenheight)	-17.7798*** (5.0077)	-0.5881 (1.1762)	-3.6059* (1.9662)
log(Total Air Passengers)	-3.0200 (21.7896)	18.8805*** (5.4698)	12.0068 (8.8139)
Observations	50	114	164
R <sup>2</sup>	0.5514	0.2478	0.1909
Adjusted R <sup>2</sup>	0.5115	0.2202	0.1705

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

# Risk is less likely in developing countries

- Younger population
- Less exposure
- Warmer climate
- But weaker social safety net
- Policy need to divert among countries recognizing diversity
- Fine tuning policies that
  - reducing exposure (especially to vulnerable population) while
  - maintaining economic activity is tough
- Tough adaptation under fire

# Influenza Pandemics have Random Outcomes

World average value of statistical life

\$2.13 mil

Average annual death from pandemic

2918 -2020 2.2 million

Annual average Social cost of lives lost

4.69 Tril

With 530,000 lives lost in 2020 lives cost

is 1.1 Tril

But pandemic costs also

include economic

adjustment \$5.36Tril

Name	Date	Fatalities	2020 equivalence	Cost of Life in million dollars
Spanish Flu	1918-20	50 million	216,000,000	\$460,080,000
Asian Flu	1957	1.1 million	2,960,000	\$ 6,304,800
Hong Kong Flu	1968	1 million	2,190,000	\$ 4,664,700
Swine Flu	2009	350,000	395,000	\$ 841,350
COVID-19	2020	530,000	530,000	\$ 1,128,900
Total			222,075,000	\$473,019,750
Average			2177206	\$ 4,637,449
Total since WWII			6,075,000	\$ 12,939,750
Average since WWII			81,000	\$ 172,530

# High cost because we were not prepared

- Less than \$10 billion annual costs of preventing flu- which costs hundreds of billions in average damages
- Low mitigating costs lead to high adaptation costs
- Lesson to climate change
- If we do not mitigate we will pay
- We do not meet the challenge of climate change
  - Behind on the Paris agreement
  - Greenhouse gases are accumulating

# The Bioeconomy to the rescue

- Bioeconomy key to decarbonization
- Moves away from non-renewable to renewable
  - Replacing fossil fuel with renewable fuels
  - Introducing recyclable renewable plastics
  - Replacing petroleum-based with plant-based products
- Sequester carbon by trees and biological processes
- Reduce GHG footprint of ag with better varieties and modern technologies
- Policies should enhance transition to the Bioeconomy and will endorse a new essential biotechnologies