

Discussion of  
“How do People Respond to Small Probability Events  
with Large, Negative Consequences?”

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# Pandemics Through Detailed Consumption Data

- Very important and timely paper!
- What can we learn from differential consumption responses?
  - ▶ importance of demand shocks vs. supply shocks?
  - ▶ why are lockdown policies more prominent now, e.g., vs. 1918?
- Is the data consistent with the canonical model of risk taking and the economic value of life?
  - ▶ COVID-19 as a natural experiment of a rare, heterogeneous disaster
  - ▶ should epidemiologist incorporate economics to their analysis?

# Summary of Results

- Using administrative monthly Portuguese consumption micro data
  - ▶ older consumers reduced their spending by more than younger ones
  - ▶ ... more so for high-contact goods
  - ▶ richer consumers cut their consumption by more than poorer ones
- Using a calibrated model of consumption under (life) uncertainty
  - ▶ model broadly consistent with the evidence
  - ▶ lockdown explains 1/2-2/3 of the consumption decline

## Simpler Version of the Model

Consumer's problem

$$\max_{c_1, c_2} z + \frac{c_1^{1-\rho}}{1-\rho} + \beta(1 - c_1\pi l) \left( z + \frac{c_2^{1-\rho}}{1-\rho} \right)$$

subject to

$$(1 + \mu) c_1 + \frac{c_2}{1+r} = w + \frac{w}{1+r}.$$

## Simpler Version of the Model (cont'd)

Optimal decision

$$\underbrace{\frac{1}{\beta(1 - c_1\pi l)} \frac{c_1^{-\rho}}{c_2^{-\rho}}}_{\text{MRS}} = \underbrace{\frac{\pi l}{(1 - c_1\pi l)} \frac{\left(z + \frac{c_2^{1-\rho}}{1-\rho}\right)}{c_2^{-\rho}} + (1 + \mu)(1 + r)}_{\text{relative price}}$$

- The relative price of current consumption increases with:
  - ▶ a higher case-fatality rate, chance of infection, i.e.,  $\uparrow \pi l$
  - ▶ a higher period utility, i.e.,  $\uparrow \left(z + \frac{c_2^{1-\rho}}{1-\rho}\right)$
  - ▶ a lower marginal utility, i.e.,  $\downarrow c_2^{-\rho}$
  - ▶ a stricter lockdown, i.e.,  $\uparrow \mu$
  - ▶ a larger interest rate

# Key Empirical Relationship

$$\begin{aligned} \% \Delta \text{ consumption} = & -\frac{\tilde{c}_2}{\rho} \frac{z + \frac{c_2^{1-\rho}}{1-\rho}}{c_2^{-\rho}} \pi \Delta \text{infected} \\ & - \left( \frac{\tilde{c}_2}{\rho} + \tilde{c}_1 \right) \Delta \text{lockdown} \end{aligned}$$

- Old: much larger case-fatality rate,  $\uparrow \pi$
- Rich:  $\downarrow (z + c_2^{1-\rho}/(1-\rho))$ ,  $\uparrow c_2^{-\rho}$

# (Preliminary) Quantitative Analysis

- Calibrate model using:
  - ▶  $\pi$  = estimated case-fatality rate by age
  - ▶  $I$  = measured deaths /  $\pi$
  - ▶ preference parameters: literature,  $\beta$ , ..., + some consumption data,...
  - ▶  $\mu$ : fraction of firms that remain open (?)
- “model does quite well at accounting for the behavior...”

## (Preliminary) Quantitative Analysis

	Young			Old		
	data	model	without lockdown	data	model	without lockdown
March	-10	-13		-17	-29	
April	-30	-30	-9	-45	-42	-21
May	-19	-18		-29	-27	



## Comments/Questions

- Should use more granular age data to test the theory
  - ▶ case-fatalities increase exponentially... consumption respond too?
- Consumption response of the young in multigenerational Household?
  - ▶ How important are they in Portugal?
- Richer model of the consumption of the old, e.g., DeNardi et al.?
  - ▶ medical expenses shocks, heterogeneous life span risk

## Richer consumers cut their consumption by more

- “[T]he rich have more to lose from becoming infected than the poor”

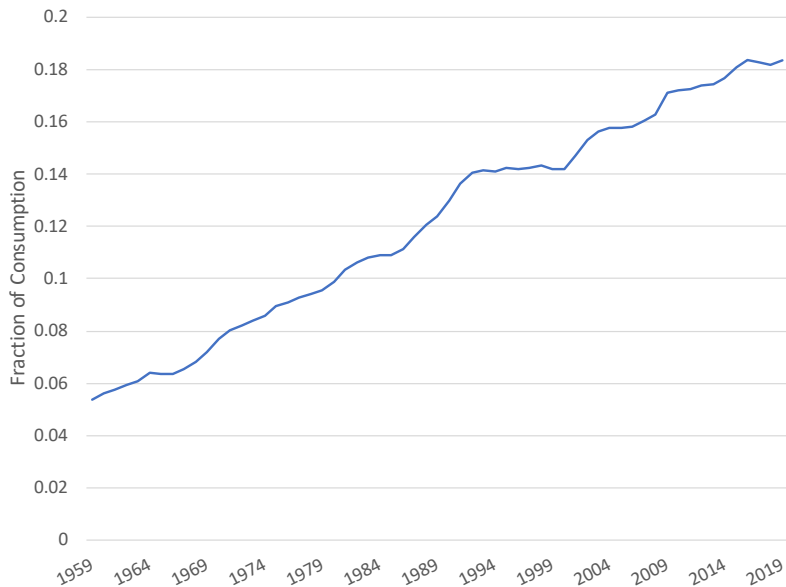
... and they value the marginal unit of consumption less!

- This effect is important to understand the rise in health expending

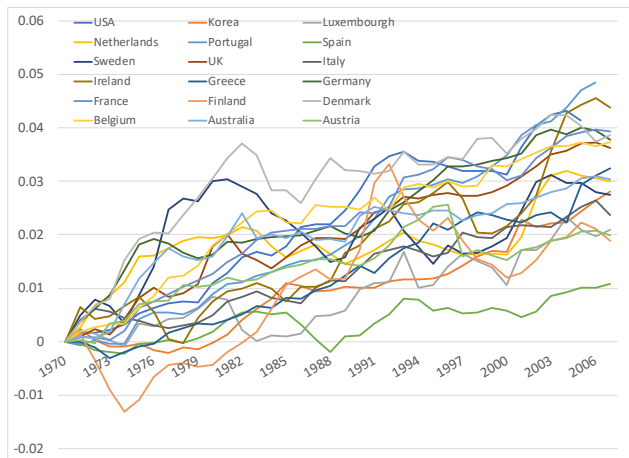
“As people get richer and consumption rises, the marginal utility of consumption falls rapidly. Spending on health to extend life allows individuals to purchase additional periods of utility. The marginal utility of life extension does not decline.” Hall-Jones (2007)

- Can it explain why are lockdown policies more prominent now?

# Rise in Health Expending in the US



# Rise in Health Expending Across Countries



## Why are lockdowns more prominent now?

*“Experience has shown that people have a low tolerance for mandatory health measures [...] In 2007, the CDC issued guidelines for how to ensure maximum compliance with public health measures in a pandemic. Based partly on lessons learned in 1918, these recommended that measures only be made mandatory when the proportion of the sick who die rises above 1 per cent [...] Using 2016 numbers, that means that more than 3 million Americans would have to die before CDC would advise such a step.”*

Spinney (2017), Pale Rider

- more willing to trade off a large consumption drop, Hall et al. (2020)
- there are now available treatments, if health system not overwhelmed
- but there will not be a consensus given **heterogeneity...**