Public Policy Response to Coronavirus

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CORONAVIRUS CRISIS OF 2020

Coronavirus has created a global pandemic and economic crisis

Governments have quickly launched massive lockdowns to slow down epidemic that in turn disrupt the economy

Governments have also created new policies to alleviate economic hardship

Clear that government policy is absolutely central for health response and economic response

How do economists grapple with the situation?
EPIDEMIOLOGY

Severity. Covid-19 infection is serious in 15% of cases (need oxygen), very serious in 4% of cases (need ventilators or blood oxygenation for weeks)

Fatality rate around 1% with best health care, possibly up to 4% with no health care

Spread. Virus is highly contagious: each infected person infects in turn $R_0 \approx 2.5$ others on average

$\Rightarrow$ unchecked epidemic grows exponentially until $1 - 1/R_0 = 60\%$ of population has been infected (herd immunity)

Social distancing reduces $R$. $R < 1 \Rightarrow$ outbreak dies off.

Coronavirus particularly tough because of asymptomatic but contagious phase/cases and very long and intensive care needed
Chart 14: Transmission Rate during Coronavirus Stages in Patients

- **Asymptomatic (30%)**: No symptoms
- **Mild / Moderate (56%)**: No symptoms → Symptoms (mild/moderate) → Recovery
- **Severe (10%)**: No symptoms → Symptoms (Severe) → Hospitalization → Recovery
- **Critical (4%)**: No symptoms → Symptoms (Severe) → Hospitalization → Ventilation / ICU → Death

Chart 4: Hospitalized Coronavirus Patients vs. System Capacity

The distance between the bottom axis and this red dotted line is the healthcare system’s capacity in terms of ICU beds!

Source: Tomas Pueyo analysis
ICU patients using ~25% of hospitalizations that require ICU support, from China CDC
Number of current + repurposed ICU beds = ~100,000 (Johns Hopkins, http://www.centerforhealthsecurity.org/cbn/2020/cbnreport-02272020.html)
Chart 3: Infections and Deaths If We Do Nothing in the US

Transmission Dynamics

Population Inputs
Size of population: 328,484,431
Number of initial infections: 246

Basic Reproduction Number $R_0$
Measure of contagiousness: the number of secondary infections each infected individual produces.

Transmission Times
Length of incubation period, $T_{inc}$: 5.28 days
Duration patient is infectious, $T_{inf}$: 2.4 days

Clinical Dynamics

Morbidity Statistics
Case fatality rate: 4.00%

Recovery Times
Length of hospital stay: 10 days
Recovery time for mild cases: 11.1 days
Time to hospitalization: 5 days

Care statistics
Hospitalization rate: 14.00%

HEALTH CARE CHOICES

Do nothing approach not appealing ⇒ 60% of population gets infected, health care sector overwhelmed, mortality rate up from 1% to 4%, economy paralyzed for several months

Countries with big outbreaks have imposed drastic measures to flatten the curve:

Mitigation: Reduce $R$ to slow down epidemic and fraction eventually infected down to $1 - 1/R$ (e.g. if $R = 1.5$ then only 33% eventually infected instead of 60%) but still catastrophic

Suppression. Getting $R < 1$ so that outbreak dies off

China and Korea succeeded in suppressing outbreaks and can wait for vaccine or better treatments with less drastic measures

Size of outbreak depends on how fast social distancing measures are taken (Wuhan, Italy slow, some US states also slow)
Chart 12: Cases in Wuhan and Infection Evolution

Statistical artifact. They changed the definition of the diagnostic.

“Notice on Orderly Resuming Production”

Chart 12.b: New Daily Cases in South Korea

Reduction mostly through massive testing, contact tracing, enforced quarantines and isolations.

No mandated, society-wide social distancing

Patient 31 visits a megachurch

Dance

Source: Tomas Pueyo analysis from primary data from Johns Hopkins uploaded to Github by Ryan Lau:
Daily New Cases in Italy

Daily New Cases
Cases per Day
Data as of 0:00 GMT+0

Daily Cases

Feb 15
Feb 18
Feb 21
Feb 24
Feb 27
Mar 01
Mar 04
Mar 07
Mar 10
Mar 13
Mar 16
Mar 19
Mar 22
Mar 25
Mar 28

Novel Coronavirus Daily Cases
Cases per Day
Data as of 0:00 GMT+0

Daily New Cases

Feb 15
Feb 21
Feb 27
Mar 04
Mar 10
Mar 16
Mar 22
Mar 28

Active Cases in Italy

Feb 15
Feb 18
Feb 21
Feb 24
Feb 27
Mar 01
Mar 04
Mar 07
Mar 10
Mar 13
Mar 16
Mar 19
Mar 22
Mar 25
Mar 28

Total Coronavirus Currently Infected

Feb 15
Feb 18
Feb 21
Feb 24
Feb 27
Mar 01
Mar 04
Mar 07
Mar 10
Mar 13
Mar 16
Mar 19
Mar 22
Mar 25
Mar 28

Total Coronavirus Deaths in Italy

Feb 15
Feb 18
Feb 21
Feb 24
Feb 27
Mar 01
Mar 04
Mar 07
Mar 10
Mar 13
Mar 16
Mar 19
Mar 22
Mar 25
Mar 28

Currently Infected

Feb 15
Feb 18
Feb 21
Feb 24
Feb 27
Mar 01
Mar 04
Mar 07
Mar 10
Mar 13
Mar 16
Mar 19
Mar 22
Mar 25
Mar 28

Linear

Logarithmic
Daily New Deaths in Italy

Daily Deaths
Deaths per Day
Data as of 0:00 GMT+8

Novel Coronavirus Daily Deaths

0
250
500
750
1000


Daily Deaths
tournaments and concert tours have been called off. Some states have told people arriving from elsewhere to quarantine themselves. Others have warned that the pause on public life will likely last weeks more.

New coronavirus cases announced in the U.S. each day

Source: C.D.C., state and local health agencies, hospitals.

The New York Times is engaged in a comprehensive effort to track the details of every confirmed case in the United States, collecting information from federal, state and local officials around the clock. The numbers in this article are being updated several times a day based on the latest information our journalists are gathering from around the country. The Times has made that data public in hopes of helping researchers and policymakers as they seek to slow the pandemic and prevent future ones.

See our maps tracking the coronavirus outbreak around the world.

New York: 59,568 cases have been identified. When a cluster of coronavirus cases was first reported in the New York City suburb of New Rochelle, local and state officials raced to contain the outbreak. The National Guard deployed. Drive-through testing began. Epidemiologists attempted to find contacts of the first patients. Within a few days, though, it became clear that the virus was still spreading. With ramped-up testing, hundreds of new patients were being identified in Westchester County, on Long Island and in all five New York

Source: C.D.C., state and local health agencies, hospitals.
Where cases have been reported

- Calif.: 6,100+
- Wash.: 4,300+
- Ala.: 2,300+
- Tex.: 2,700+
- N.M.: 900+
- Ariz.: 900+
- Calif.: 6,100+
- Colo.: 2,300+
- Mo.: 900+
- Okla.: 400+
- Texas: 2,700+
- Utah: 700+
- Idaho: 300+
- Nev.: 700+
- Mont.: 100+
- N.D.: 98
- S.D.: 90
- Neb.: 100+
- Neb.: 100+
- Ill.: 1,100+
- Ind.: 1,300+
- Ky.: 400+
- La.: 3,500+
- Miss.: 700+
- Ala.: 800+
- S.C.: 90
- S.D.: 1,300+
- Tenn.: 2,700+
- Texas: 700+
- W.Va.: 200+
- Va.: 800+
- N.C.: 1,100+
- Wyo.: 86
- Hawaii: 100+
Chart 13: Suppression vs. Mitigation vs. Do Nothing — early on

- **The Hammer**
  - Learn
  - Cut virus growth
  - Understand true cases
  - Recruit personnel
  - Improve treatments
  - Get proper testing & tracing
  - Release healthcare system pressure
  - Build healthcare capacity & production
  - Understand cost-benefit of measures

- **The Dance**
  - Keep $R$ below 1
  - Proper testing, contact tracing, quarantining, isolating
  - Public education on hygiene and social distancing
  - Ban large gatherings
  - Most restrictions removed
  - Tighten up when needed
  - Apply highest cost-benefit social distancing measures

Source: Tomas Pueyo
SUPPRESSING BIG OUTBREAKS

With big outbreaks (as in most EU countries and now many US states), drastic social distancing measures are needed to bring $R < 1$

Government needs to shutdown large fraction of the economy (scope of shutdown varies across countries, Sweden, Netherlands, some US states, devo countries do less)

In many places (many EU countries, CA, NY, NJ, etc.): drastic lockdown where only remote and essential work is allowed

With drastic lockdown, GDP falls by 1/3, and 1/3 of workers are idled, 1/3 work from home, 1/3 still work (recent estimation for France)

How to cope with the economic crisis created by drastic lockdowns that are likely to last several months?
An unprecedented rise in unemployment

Source: US Employment and Training Administration
ECONOMIC RESPONSE: DO NOTHING

Lockdown businesses lose their revenue and can no longer pay their workers and maintenance costs

⇒ most idled workers get laid off (unemployment rate of 30%)

Many businesses will go bankrupt and have to liquidate (especially small ones which cannot borrow)

Self-employed lose their earnings (e.g. UBER drivers)

⇒ Economic hardship for tens of millions families (as many families don’t have savings to dip in)

⇒ Slow recovery as it takes time for businesses and jobs to be re-created

Do nothing creates economic catastrophe ⇒ Govt shuts down the economy, govt should also mitigate economic hardship
MACRO PERSPECTIVE

Lockdowns shut down part of the economy and this economic output is lost [supply side shock]

But government can change distribution of losses [=who absorbs the losses] to alleviate hardship and keep businesses alive

Govt can issue public debt to fund transfers to individuals or businesses hit by lockdown

Implicitly, new public debt is bought by individuals who are saving more [maybe haven’t lost income but can’t consume as much because of shutdown]

Extra public debt will be repaid with higher taxes in future decades
BUSINESS PERSPECTIVE

Lockdown forces businesses to stop or reduce operations (e.g., restaurants, airlines) temporarily

Businesses can layoff workers but still have maintenance costs to pay (such as rent, interest on debt, maintaining equipment, essential workers, etc.)

In principle, businesses could borrow to cover these costs until they can reopen

**Liquidity issue:** Businesses may not be able to borrow. Government can provide loans (done through central bank). Business absorbs the loss but can survive.

**Solvency issue:** Businesses may not be able to repay the loan (if shutdown is long). Government can provide grants (=forgiving loans). Govt absorbs the loss.
EU COUNTRIES RESPONSE: HIBERNATE

Most EU countries have adopted plans to “hibernate” the economy and avoid mass layoffs and business destruction.

Govt pays for the wages of idled workers and maintenance costs of idled businesses.

Example: UK pays 80% of wages of idled workers (up to £2,500/month) and idled business maintenance costs.

Businesses and workers can resume work once lockdown ends:

⇒ Alleviates hardship and allows for fast recovery

⇒ Can work if shutdown is not too long (< 6 months)

Challenge is how to generate government funding (e.g. Spain, Italy pay higher interest on their public debt than Germany), on-going attempts to find EU level solution (Eurobonds).
US RESPONSE

Enormous wave of layoffs in the US: 3.3m in week 3/15-3/21

US passed historically large $2.2T stimulus on 3/27/2020

Expands unemployment insurance (more generous, covers more people including self-employed)

Direct one time checks to families ($1200/adult+$500/child), not well targeted but can be administered fast

Emergency loans for businesses. Loan allows to avoid bankruptcy but has to be repaid (some businesses might become insolvent)

Loans can convert into grants for small businesses if they don’t layoff workers but not systematic as in EU

⇒ Alleviates hardship but won’t be enough prevent mass layoffs and rise in fraction of people with no health insurance
DEVELOPING COUNTRIES

Harder to track epidemic in developing countries (Iran outbreak possibly worst to date)

Huge variation in policy responses from abrupt lockdown in India to “nothing to worry about for now” in Brazil or Mexico

Devo countries have weaker health care capacity (⇒ higher mortality) and weaker state capacity to impose lockdown (⇒ bigger outbreaks)

⇒ Barring climate help, health crisis in devo will be bigger

Devo countries have less ability to issue public debt to respond (face high interest rate) and suffer from huge capital outflows

⇒ Economic crisis will also be more severe in devo countries

Help to devo countries key to help eradicate pandemic
RECOVERING FROM ECONOMIC CRISIS

Economy will restart once the outbreak is controlled and has shrunk in size

With systematic testing, tracing, quarantining, possible to sustain $R < 1$ with less business lockdown (as in South Korea)

But still risky situation as outbreaks can explode again, various restrictions will still need to be in place (banning large gatherings, etc.)

Vaccine could become available in 12-18 months

Economy recovers faster if fewer businesses, work-employer, business-customers relationships have been destroyed
LESSONS FROM THE CRISIS

Crisis is global and huge and evolving incredibly fast ⇒ making predictions is hard

Health and economic systems much more fragile that we thought

Markets fail in emergency and collective action through government becomes crucial (highlights social aspect of humans)

Response through government moves faster and bolder than we could have imagined (left-right divide muted)

⇒ Human societies put in a big fight to save their vulnerable people (care for the sick and old)

How do we build a more resilient health and economic system?
REFERENCES


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