Coordinated Pandemic Policies

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Stanford and SFI
Human Diseases Eradicated

• Smallpox
Need for government

- externalities/underestimation of dangers
  - don’t (fully) account for others
  - don’t understand exponential growth
- myopic – react to observed dangers
- amnesia: forget lessons from past
- herd mentality: false security of others not acting, live in bubbles...
- disease can be partly/wholly asymptomatic
Coordination

• Disease *will* recur
  • Avoid whack-a-mole across regions/countries
Resurgence:
1918 Influenza Deaths, UK

Taubenberger and Morens (2006)
Coordination

• Disease *will* recur
  • Avoid whack-a-mole across regions/countries

• Interacting Complex Systems: Three Networks!
  • Pandemic
  • Businesses: supply chains matter...
  • Financial networks and defaults
Supply Chains

- Opening businesses needs to be coordinated

- E.g., Cannot produce medical supplies without key parts that might not otherwise look “essential”

- Financial consequences
World-wide share of automobile MCUs.  
(Source: HIS iSuppli).

<table>
<thead>
<tr>
<th>Share (%)</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>44%</td>
<td>Renesas Electronics (Naka Plant: 20%)</td>
</tr>
<tr>
<td>22%</td>
<td>Freescale</td>
</tr>
<tr>
<td>9%</td>
<td>Infineon Technologies</td>
</tr>
<tr>
<td>7%</td>
<td>Texas Instruments</td>
</tr>
<tr>
<td>6%</td>
<td>Fujitsu Semiconductor</td>
</tr>
<tr>
<td>3%</td>
<td>ST Microelectronics</td>
</tr>
<tr>
<td>3%</td>
<td>Microchip Technology</td>
</tr>
<tr>
<td>2%</td>
<td>Toshiba</td>
</tr>
<tr>
<td>4%</td>
<td>Others</td>
</tr>
</tbody>
</table>
The percentage changes of cars produced domestically from the previous year. 
(Source: The author created based on the data compiled by Japan Automobile Manufacturers Association, Inc.).

<table>
<thead>
<tr>
<th>Year 2011</th>
<th>Toyota</th>
<th>Nissan</th>
<th>Mazda</th>
<th>Honda</th>
<th>Japan Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td>-62.7%</td>
<td>-52.4%</td>
<td>-53.6%</td>
<td>-62.9%</td>
<td>-57.3%</td>
</tr>
<tr>
<td>April</td>
<td>-78.4%</td>
<td>-48.7%</td>
<td>-49.7%</td>
<td>-81.0%</td>
<td>-60.1%</td>
</tr>
<tr>
<td>May</td>
<td>-54.4%</td>
<td>0.8%</td>
<td>-11.8%</td>
<td>-53.4%</td>
<td>-30.9%</td>
</tr>
<tr>
<td>June</td>
<td>-15.9%</td>
<td>1.9%</td>
<td>-2.3%</td>
<td>-50.6%</td>
<td>-13.9%</td>
</tr>
<tr>
<td>July</td>
<td>-12.5%</td>
<td>15.3%</td>
<td>-5.0%</td>
<td>-18.5%</td>
<td>-8.9%</td>
</tr>
<tr>
<td>August</td>
<td>11.9%</td>
<td>-2.5%</td>
<td>5.6%</td>
<td>-17.2%</td>
<td>1.8%</td>
</tr>
<tr>
<td>September</td>
<td>1.2%</td>
<td>-6.7%</td>
<td>-3.0%</td>
<td>-21.2%</td>
<td>-4.5%</td>
</tr>
<tr>
<td>October</td>
<td>33.5%</td>
<td>32.9%</td>
<td>-0.8%</td>
<td>18.3%</td>
<td>20.3%</td>
</tr>
<tr>
<td>November</td>
<td>5.1%</td>
<td>25.1%</td>
<td>1.6%</td>
<td>-37.8%</td>
<td>4.5%</td>
</tr>
<tr>
<td>December</td>
<td>16.7%</td>
<td>24.6%</td>
<td>-8.1%</td>
<td>10.8%</td>
<td>13.4%</td>
</tr>
</tbody>
</table>
1995 World Supply Chains
(Re)Opening

• “Essential”

• Centrality: in interaction systems
  • disease
  • supply chain
  • financial

• *Coordinate whole supply chains, sustainably*
Multifaceted/Coordinated Policy

I. Disease/Business Management

Information:
- Education, propaganda
- Extensive/strategic testing

Incentives:
- Individuals: Tracing apps?
- Firms: mechanism design - social benefits/costs

Coordinated and prioritized openings:
- low disease/high business/high financial centrality
- whole supply chains
Multifaceted/Coordinated Policy

II. Government Aid: *New New Deal*

- Demand
  - displaced workers
  - info: avoid panic/hoarding/spending freeze

- Supply
  - equity and forgivable loans
  - by centrality, by chains

- Financial networks
  - anticipate business, consumer, country defaults
  - inject capital via central nodes
Coordination

- Between governments

- Complex interacting systems - Three networks:
  - disease
  - production
  - financial