Hello again!

Welcome to week two my notes and thoughts on Wharton’s 6-week class on managing pandemics, otherwise known as several pages of size 11 Times New Roman academic content. No CNN or Fox News flashy lights here.

I personally find it contrived when writers or speakers start their presentation with a comic. Notwithstanding that, I’d like to start this week’s note with a relevant comic:

![Comic Source: www.xkcd.com](source)

Before diving in, a few housekeeping items:

- What do you think might be the long-term consequences of coronavirus / shelter in place? I’d love to hear your thoughts (anonymous or named) to see what we can come up with. [Link here to 60 second survey]
- If you’ve been forwarded this note or have friends you’d like to share this with, please feel free to email me directly at charlie@dealingdrive.com and I’ll add them to the distribution list
- In my week 1 notes, I suggested that the 1918 Spanish Flu originated in China. I was wrong. It turns out that this one of many hypotheses (with one being origination in the U.S.), with no consensus

This week’s content is generally focused on two areas:

1. The psychology of decision making and biases, with an application to the coronavirus crisis
2. Supply chain: risk management principles, examples, and the impacts of coronavirus

Just like week 1, the remainder of this note is organized as follows:

Part A: Takeaways from Selected Pre-Readings

Part B: Interview Notes – 1) Carlyle’s Head of Europe and 2) CEO of SEPTA

Part C: Class Notes
PART A: NOTES ON SELECTED READINGS

#1 – Dealing with Pandemics: The Role of Risk Perception and Biases, Howard Kunreuther

- The response to COVID-19 by the U.S. (which largely ignored the virus until March) and South Korea (which implemented widespread testing immediately in January) highlight the nature of pandemics
  - There is exponential growth in the number of cases, and key decision makers do not pay meaningful attention until the number of cases is large enough to draw on public attention
  - Human minds have difficulty grasping exponential growth. It took 67 days to reach 100,000 cases, 11 days thereafter to reach 200,000, and only 4 more days to reach 300,000 cases
- 50 years of cognitive psychology research reveals that decision makers are swayed by behavioral biases that may be impairing society’s response. Notwithstanding this, there are ways to address these biases
  - **Myopia:** tendency to focus only on the near-term when weighing costs and benefits of actions
    - How to address? Highlight the long-term gains of social distancing, including the long-term economic benefits of having a larger, healthier and less-disrupted society
  - **Optimism:** tendency to underestimate potential losses that might occur from future threats
    - How to address? Observe data on exponential growth (i.e. the factoid above)
  - **Amnesia:** tendency to forget too quickly the lessons of past crises
    - How to address? Study the Spanish flu of 1918-19. An estimated 500 million people worldwide were infected with the disease with 50 million deaths, 675,000 of which were in the U.S.
  - **Inertia:** tendency to maintain the status quo when there is uncertainty about taking an alternate path
    - How to address? Indicate the impacts of maintaining the status quo versus acting early. This can be done by comparing the U.S. and South Korea’s response
  - **Simplification:** tendency to consider only a subset of simplified facts when considering a potential path of action involving risk, which could result in people assuming a crisis-scale pandemic is unlikely
    - How to address? Highlight the worst case scenario to show that there is value in agency. A recent op-ed piece in the NYTimes modeled a case that would result in 2.2 million deaths
  - **Herding:** acting based on the observed actions of others
    - How to address? Regulations may be required (e.g. shelter in place), though social proofing and herd behavior can be used positively to reinforce constructive behavior (e.g. social media)

#2 – What the Coronavirus Curve Teaches Us About Climate Change, Howard Kunreuther ([Link](#))

- Climate change has similar exponential characteristics to pandemics, highlighted above. Learning from coronavirus may arm us in combating climate change – delay is the enemy!
  - As shown below, the volume of carbon dioxide in air particles has grown exponentially (though less so than coronavirus)
  - The line of reasoning is a call to action for society to do to combat climate change what S. Korea has done to coronavirus – act early
#3 – Take the Deal, Choiceology Podcast  (Link)

- This is a podcast / interview with Nobel Prize winner Daniel Kahneman, one of the founders of behavioral economics and author of *Thinking, Fast and Slow* – I strongly recommend this book!

- **Background & Problem:** The theme of the podcast is about analyzing decisions through the lens of what people stand to lose and gain. The analysis crystalizes around a scene from Deal or No Deal, where a participant has the choice between one of two briefcases, or to take a sure deal of $300k.
  
  - Contestants feel enormous amounts of loss when the $1 million case is eradicated, even though they had nothing to lose to begin with.
  
  - When given an attractive offer from the bank, even as high as $200k, the game forces contestants to focus on how much less this is than $1 million, instead of what they stand to gain.

- **Extension to Coronavirus:** Imagine the following problem – there is a virus spreading through the U.S. that is expected to have 600 deaths, and you can choose one of two policies.. which would you choose?
  
  - A) 100% chance of having 400 deaths
  
  - B) 1/3 chance of zero deaths, and 2/3 chance of 600 deaths

  - Experiments show that people generally choose (B), but when this problem is framed as (A) saving a guaranteed 200 lives, people overwhelmingly choose (A). Why?

- **Principles w/ Dan Kahneman:** This is the core finding of Kahneman and Amos Tversky’s model of *Prospect Theory*, which shows that people take riskier bets when they are framed around what they stand to lose. When a decision is framed by what they stand to gain, people are more risk averse.

  - **Practical takeaway:** When you’re faced with an important decision, before acting, ask yourself if there is a different way of framing the decision/question that would make you act differently.

#4 – Supply Chain Lessons From The Catastrophic Natural Disaster in Japan (Link)

- In March 2011, an 8.9-magnitude earthquake hit Japan with an ensuing tsunami, which destroyed thousands of homes and numerous forms of infrastructure, resulting in 86,000 deaths and the evacuation of 550,000 people. The subsequent nuclear meltdown of Fukushima shook the economy further.

- The paper highlight some insightful case studies of how Japanese manufacturers reacted to, and learned from, the shock, and Part C of this note (lecture summary) also introduces some generalizable principles.

- **Iryou**, a medical device company, produces goods that are not particularly price sensitive.
  
  - As a result, they did not rely on a global supply chain (an interesting connection to make between price sensitivity and a requisite global supply chain to take advantage of cost arbitrage)
  
  - However, the earthquake did reduce supplier capacity by 50% and drove a 3-hour daily power outage imposed by the electricity distributor.
  
  - To address this, Iryou did three things:
    
    - Installed its own pipelines to power plants to have independent energy supply
    - To facilitate communication and find back-up vendors, established a 24-hour crisis center
    - To ensure prompt information sharing, Iryou flattened its organization structure

- **Sangyo** is a large engineering company that manufactures machinery and equipment.
  
  - The company was outside of the earthquake zone, but its production line was closed for 2 weeks due to the difficulties in procuring components.
  
  - In response to the disaster, the company did the following:
    
    - To accurately and tightly manage the supply chain, Sangyo directly manages inventory at supplier branches
    - It conducts firm-wide risk analyses of earthquakes, fires, and other natural disasters
    - It maintains one month of inventory (*which seems a little low to me*...), and plans to increase its use of generic components so that back-up supply is easier to secure.
PART B: NOTES ON VIDEO INTERVIEWS

1 – Marco De Benedetti, Managing Director and Co-Head of Europe Buyout, The Carlyle Group

- **What is the situation in Italy today (where Marco is based)?**
  - The situation is unclear – Italy is 10-14 days ahead of the curve relative to the rest of the world. They have not yet seen the peak, but the second order derivative of admissions has decreased.
  - It started in northern Italy but is now spread throughout the country. The best estimate for infected persons is some 500,000 people, as knowledge of the number is constrained by the number of tests.
  - Most of the economy is still on lock-down, and companies are facing liquidity issues. People are asking the question – is the current pain of shut down worth it? Will the virus spread again once the world re-opens? People are finding it hard to give guidance because this is all so new.
  - Marco’s expectation is that there will be a gradual, iterative opening (perhaps with two steps forward, one step back) – until the world fully comes back to normal.

- **How is Carlyle’s European Buyout Fund being impacted by this now and in the future?**
  - The portfolio has some 25 companies, some of which are completely idle (e.g. retailers), some are still running but hampered (e.g. some industrial companies). This is impacting 99% of industries.
  - The impact to the interconnected supply chain makes it very hard to predict what the impact is.
  - Nobody can make an accurate forecast, but we can think through scenarios. The two big variables are (1) the length of the shutdown including associated cash need, and (2) the shape of the recovery.

- **Why are there empty shelves in supermarkets?**
  - It’s true that some of it is because people initially stocked up, however a more meaningful effect is that there is a more permanent increase in demand for goods as they eat (and use the bathroom) more at home.

2 – Leslie Richards, CEO, SEPTA (Pennsylvanian Transportation Authority, which has 9,500 employees)

- **[This may be less relevant to those of you that live outside the Northeastern U.S.]**

- **What are the operational challenges facing SEPTA?**
  - On a typical day, SEPTA manages 1 million trips per day. Ridership is spiraling downwards – regional rail ridership is down 94%, driving a significant financial burden.
    - Expected to fall $150 million short for 2020 operating budget.
  - Still need to provide essential trips to essential people (e.g. healthcare workers, cleaners, grocery store workers), but need to discourage people from traveling.
  - Up to quadrupling cleaning, and only using vehicles with plastic covers – have re-allocated employees towards cleaning to keep people employed.

- Everybody is being hit at the exact same time, so SEPTA is trying to see where in the chain they are being impacted and seeing how they can help ease the burden, including policy engagement.

- **As CEO of SEPTA, how do you run your organization remotely?**
  - She knows that if she doesn’t work from home when she needs to, other employees will look to her example. It has invariably been challenging to change into a “work at home” mindset.
  - Outside of ensuring IT is sufficient, supporting connectedness and employee morale – just checking in with people – can really help beat the doom, gloom, and isolation.
PART C: NOTES FROM CLASS ON APRIL 1

Lecture #1: Katherine Milkman – Changing Behavior for Good in the Face of Disasters

- Katie’s research and teaching focuses on behavioral biases, which is generally the flavor of this lecture
- Consider Spock from Star Trek – he is a rational, non-emotional decision maker. Most of economic theory assumes that we are all Spock. The opposite is Homer Simpson
  - Real humans are probably somewhere in between, maybe a little more like Spock than Homer
  - We mostly make good choices but we’re susceptible to bias
- Over the past 20 years policymakers have realized that we need to design policy architecture (“Good Choice Architecture”) that is cognizant of this for the benefit of people
  - Example: in a school cafeteria line, put the salad first and the hamburgers last, so that kids’ plates are already somewhat full when they get to the unhealthy food
  - Another hilarious example: the Amsterdam Airport Urinal Fly, and how Richard Thaler’s behavioral economics reduces urinal spillage by 80%

- There are several good choice architecture decisions that can be taken in the coronavirus epidemic
- Principle #1: Set Helpful Defaults – Defaults are the decision you end up with without changing
  - E.g. for organ donation, countries that have an “Opt Out” policy have a ~99% consent rate of organ donation, versus as low as ~5-30% for countries that require you to “Opt In”
- Principle #2: Prompt People to Plan – People are more willing to follow through with something if you first encourage them to think through a plan of how it will work
  - This plan even works if you don’t share it with other people for accountability, because standalone it still improves memory function and makes execution easier by identifying roadblocks
  - This could improve the execution of COVID-related issues like social distancing / hand washing
- Principle #3: Leveraging Prospect Theory
  - This was outlined in the “Readings” section earlier, so will not repeat here
- Principle #4: Leverage Social Norms / Social Proofing
  - People respond to peer pressure and social proofing. Hotels were able to improve towel re-use rates from 36% to 44% by prompting that other people are doing it too! This was much more effective than making the environmental protection argument
  - Application to COVID: Most people in your neighborhood are social distancing – you should too!
- Principle #5: Create Accountability
  - An energy company was trying to get people to sign up for cutting their own power access in periods of surge demand. They found that the signup rate tripled when households were given the option to post a sticker that would “brag” that they had done this very green thing
  - Another example is asking people to publicly pledge to do something, which has helped doctors reduce their prescriptions of antibiotics by 25%
  - I’m personally experiencing this, having promised some 200+ people that I would do six summaries
- Principle #6: Identify the Victim
  - People respond to personal stories more than statistics. For raising money to address poverty in Africa, fundraising dollars doubled when the campaign centered around one single girl that was suffering, as opposed to stating the millions that suffered from starvation
  - So, when attempting to persuade people to perform social distancing or hand washing, instead of listing out statistics, we’ll have more luck connecting their action to a friend’s grandparents

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1 I’d like to give a shout out and apology to Hubert Wu and his co-workers at Behavioral Insights Team in London that are amongst the readers of these notes. BIT is an indirect brainchild of Richard Thaler (co-parent of behavioral economics), and helps countries worldwide implement Good Choice Architecture. The apology is for my butchering behavioral economics.
Lecture #2: Howard Kunreuther – Anticipating Risks, Coping with Uncertainty

- Howard’s area of focus is decision making under uncertainty – The lecture focuses on 3 questions

1 - Why didn’t the public pay attention to COVID-19 during January? Why March?
  - People generally fail to understand exponential growth. We tend to view things linearly
    - Consider this example of exponential growth of lily pads in a pond

2 - What is the role of uncertainty and biases?
  - The features influencing risk perception of pandemics are dread, novelty, fatality, uncontrollability, lack of scientific awareness, and catastrophic potential
  - This makes things very different than making decisions rationally in normal life!
  - Per Daniel Kahneman’s book *Thinking, Fast and Slow*, we believe there are two types of thinking in the brain
    - **System 1**: Intuitive, automatic, quick, no effort. Our System 1 brain does a great job of dealing with everyday decisions like learning when to break, but it doesn’t have the requisite large swath of data and repetition on how to deal with pandemics
    - **System 2**: Intentional, thorough, focuses on long-term and interconnectedness. Generally we don’t do a great job of this, as illustrated by our dealing with the coronavirus
  - There are 6 biases that veer us towards System 1 as opposed to System 2
    - Discussed in detail in the “Readings” section (myopia, etc.) – will not repeat here!
    - Some punchline implications for coronavirus can be illustrated in the simple phrase, “I’m not going to be impacted by this, and the numbers are small, so why should I bother?”
    - This helps explain why some of the regional cases exploded so much, e.g. Louisiana
    - When managing biases and setting policy, it’s helpful to look at them all as a package as opposed to in isolation -> you then will see compounding effects (CC Note: or what Charlie Munger likes to call a Lollapalooza effect)

3 - How do we take advantage of the lessons from the coronavirus to address climate change?
  - This is briefly touched on in the readings summary (i.e. showing that climate change is a similar exponential growth issue to climate change)
  - Examples of impacts of increasing CO2 emissions from empirical studies
    - 20cm sea level rise in 136 coastal cities would cause annual flood loss of $1.2 trillion per year in 2050, vs. $52 billion in 2005
    - At the same time, Florida (hurricane-prone) has seen a 163% increase in population over the past 40 years vs 61% nationwide -> People aren’t thinking about the climate loss

**Student question 1**: What is the point of comparison here, when deciding if we’re being overly optimistic or overly pessimistic?
  - Each individual is different, but we need to avoid being paranoid. Consider being cautiously optimistic about how we can make ourselves more productive in this time of working in isolation

**Student question 2**: The federal government provides flood insurance. Should there be pandemic insurance?
  - For background, flood insurance is a national program where private insurers market the product, but the federal government bears the risk (systematic risk doesn’t work with private insurance)
  - Pandemic risk may be more similar to terrorism risk, which provides for private insurers covering the first layer of risk, but the federal government insuring against the tail risk

**Student question 3**: Which biases are from nature vs nurture? Does technology impact this?
  - [Like addiction], the first step is to admit you have a bias. Myopia (focus only on the short term) is probably the most “natural” and also the most dangerous

**Student question 4**: What big piece of information would change public behavior?
  - A famous person dying, like Rod Hudson / Freddie Mercury with AIDS, will change behavior

- Supply chain is ultimately about matching supply and demand. When COVID broke out first in China, the world interpreted this as a supply chain shock, though over time this clearly became a demand shock
  - Hence, the scope of COVID is greater than virtually all past disasters (natural or human)
  - It has also happened tremendously rapidly, making planning extremely difficult
  - Guiding quote from Ike: “In a war, plans are useless, but planning is essential”

- The standard approach of risk management and supply chains
  - There are several historical events that have spurred either supply or demand disruptions, including the 1995 Kobe earthquake, Thai floods in 2011, and the great recession
  - That said, there are more frequent smaller events, such as strikes, political coups, and typhoons
  - A supply chain map helps you identify each component input in your product, as well as who manufactures it -> the key exercise to do is calculate “revenue at risk” (RAR)
    - **RAR: What is the revenue I would lose if I couldn’t get/replace this specific part?**
      - Prevention can be done by: dual sourcing, buffering inventory, standardizing parts, locating in less risky areas, and making your nodes more resilient (e.g. earthquake-proof factories)

- **Thoughts from guest lecturer Edwin Keh, who ran global procurement at Walmart (2008-10)**
  - Something was always going on in Edwin’s day to make it less smooth. Every morning his team would get a report of major events (e.g. embargos, earthquakes) that would impact sourcing
  - The team would then have to co-ordinate a response. Do we allocate volume from one region to another? Do we move forward/back certain deliveries? Should we change how we deliver?
  - There are also less common approaches. When there was an earthquake in Szechuan, Walmart sent in food and temporary housing to stabilize the region, faster than NGOs could have done

- Current supply chain impacts / responses across three industries (presented by guest lecturers):
  - **Footwear and apparel (Edwin Keh, cont’d):** capacity is disrupted and still not back at pre-crisis levels. There is still restriction to movement across large countries (China, India, Indonesia)
    - About 50% of production capacity is still not back on line in China (as of April 1)
    - Demand has also fallen off a cliff, so material and labor are now in limbo
    - There is also substantially less airfreight capacity as a lot of goods fly “underbelly”
    - There are, however, significant opportunities in serving PPE and e-Commerce needs
  - **Automotive:** initially there was a huge negative supply shock, but overshadowed by fall in demand. There are promising signs coming out of the return of demand from China
    - There is currently sufficient inventory throughout the market to meet demand when it comes back on, but ramping up operations could be tricky based on which regions come back online first
    - Short term economic pressures are expected to focus auto makers on their more traditional and successful product lines. There will likely be a rollback or delay in regulations for fuel economy
  - **Consumer Electronics:** When Apple warned that its manufacturing may be impacted by manufacturing in China, it lost over $100bn in market cap over 4 days
    - Industry players expect that 65% of SMEs in China are at risk of going out of business -> i.e. small players that are important to feeding the supply chain
    - Companies should be focused on taking care of their supply base – give them extended payment terms! Companies are actually doing the opposite to take care of their own near-term cash needs
    - The #1 priority is to keep employees healthy – what happens when cases pop up in factories?
    - Industry participants generally believe that demand is going to come back in a messy, zig-zag fashion, which will make supply chain and production planning tricky

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2 Affectionately known as “J.P. MacDee”, and one of Wharton’s most beloved professors who has done a great deal of research on automotive manufacturing efficiency, especially in Japan with Toyota Production System