

## Boolean Thinking In A Fuzzy World

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*“As complexity rises, precise statements lose meaning and meaningful statements lose precision”  
Lofti Zadeh (1921 - 2017), Azeri-American mathematician and computer scientist*

Let’s face it, this year has been like a bad hangover that just won’t go away, like being stuck in a parallel universe that lingers on with no end in sight. Maybe we should be rejoicing that the year will soon be over and that, just as with the “January Effect” stock markets rebound<sup>1</sup>, entering the new year might do the trick and rid us of this terrible hangover. Alas the conditions we face in the immediate future are more than just psychologically driven. The breadth and depth of the uncertainties ahead are such that the best we can hope for at this stage might be that things don’t get way worse than they already are. Not all uncertainties are of the same construct and our cognitive flaws tend to make us more vulnerable to certain types than others.

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We are not completely helpless when dealing with uncertainties. The advent of probability distributions, for example, have done wonders in creating a semblance of order out of all the chaos, helping us to better manage the risks we face by namely exposing all the possible outcomes for a specific event and their likelihood of occurrence. Unfortunately, our minds don’t always work the way we would want them to, even when we know that the probability of occurrence of a particular event might be, say, 60%, we will likely give it a much greater weight just because it is more likely than not to occur (i.e. greater than 50% chance). The problem with this is that if our world generates situations that are mostly “shades of gray” whilst our minds gravitate more towards the extremes of “all or nothing”, you can imagine how error prone we become.

Binary outcomes versus those that are “shades of gray” can be expressed mathematically in the form of Boolean<sup>2</sup> versus Fuzzy logic<sup>3</sup>. Boolean types, which also happen to be the foundational basis of computer languages, deals with conditions that can only exist in binary states, which basically means either as a one (true) or a zero (false), just like a switch that can be either turned on or off. Fuzzy logic, on the other hand, deals not only with the zeros and ones but also everything in between, which means that conditions can exist that are partially true (closer to 1) or partially false (closer to zero) or somewhere in between. Suppose we are expecting a certain event to take place at some point in the future, and that the outcome of the event appears to be Boolean in nature, if we don’t consider that some fuzzy logic might be embedded into it, we will be inviting trouble.

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<sup>1</sup> <https://www.thestreet.com/investing/what-is-the-january-effect>

<sup>2</sup> [https://en.wikipedia.org/wiki/Boolean\\_algebra](https://en.wikipedia.org/wiki/Boolean_algebra)

<sup>3</sup> [https://en.wikipedia.org/wiki/Fuzzy\\_logic](https://en.wikipedia.org/wiki/Fuzzy_logic)

We can illustrate this by juxtaposing our binary prone mindset to the current, somewhat toxic environment we live in. A rollercoaster year might thankfully be almost over, but anyone with even a vague notion of current affairs will realize that we still face at least two major hurdles in the next couple of weeks that could drastically upend our lives in the longer term. The U.S. presidential elections are the first such obviously disruptive event that comes to mind, and although its outcome might appear Boolean in nature (i.e. only one of two contestants can technically win the presidency), by treating it as such, we might in fact be underestimating the true risks.

In the past, information was mostly distributed in a “controlled” manner, through filtered outlets, but technology seems to have upended it all. Social media platforms democratized the expression and dissemination of opinions by giving voice to a much broader segment of the population than ever before. It is in its use for subversive purposes, however, that we should be concerned. The systematic spread of disinformation designed to polarize society is clearly undermining the democratic process<sup>4</sup>. The platforms have effectively been “weaponized”, and there is unfortunately nothing in the present to counter it<sup>5</sup>. Now suppose Trump were to unambiguously lose the November elections, on the surface it may appear like a slam-dunk situation, like winning or losing the lottery, but the context and conditions this time around are so extraordinary different, that even a clear cut outcome does not guarantee a peaceful transfer of power<sup>6</sup>.

COVID-19 is the other disruptive uncertainty we face. The recent rapid resurgence in cases as we enter the winter season (where such viruses propagate more easily) are reasons for concern. Some pundits suggest that a vaccine is imminent and should put an end to the pandemic, but an effective vaccine is just one step in a complicated process that is anything from certain to yielding success. The hurdles are many, not only would they have to produce a sufficiently large quantity of vaccines in a short enough time, they would have to immunize a significant enough proportion of the population to reach “herd immunity” levels quickly enough to minimize the health and economic costs of the pandemic. Also, a sufficient enough quantity of people would have to be willing to take the vaccine in the first place for it to have its intended effect, another tall order given the political climate.

### ***Where Do We Go From Here?***

The COVID’s resurgence will serve to reinforce some of the new “mindsets” that have emerged since the pandemic began to radically impact our lives. It is going to contribute to more permanently cementing certain ideas and aspects of the changes that we have been experiencing in our daily activities. As a result of living in these constrained conditions, elements of social distancing, the way we consume goods and services or the manner in which we conduct our businesses are going to be altered, in some cases permanently. Not all changes will affect us negatively, mind you; the lockdowns appear to have led to a greater awareness on the environment and the damages we are causing just as the window of opportunity for reversing course is coming to a close<sup>7</sup>.

The sharp rise in cases across the globe in what appears to be the early stages of a second wave is bound to negatively affect businesses that had already been “fragilized” by the first wave lockdowns. Retailers in particular are going to be hard hit as households continue to tighten their belts in light of this new surge, right as we enter the holiday season when most sales occur. The U.S. economy in particular, which is facing COVID infection rates that are rapidly surpassing pre-lockdown levels, and the much-needed new round of stimulus measures that is continually being postponed appears to be treading a fine line.

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<sup>4</sup> Just as supply chains contributed to accelerating economic development across the globe, its use to conduct industrial espionage and force asymmetrical trade accords have somewhat undermined the benefits.

<sup>5</sup> <https://knowledge.wharton.upenn.edu/article/singer-weaponization-social-media/>

<sup>6</sup> Given the incumbent’s combative nature in a highly charged climate, anything can happen. It should be said that the same is arguably true if the incumbent were to unambiguously win the elections.

<sup>7</sup> <https://www.worldenvironmentday.global/amid-covid-19-these-10-countries-are-aiming-kickstart-their-economies-repairing-nature>

Europe, which is also facing a sharp resurgence in cases, appears to be in a better position to face the headwinds. The weakened recovery and subdued inflation will likely prompt the ECB to apply additional stimulus measures on the ailing economies over the coming months. The tightened spreads between the core and periphery member states may seem surprising considering the precarious environment we are traversing. They reflect greater confidence in the European authorities handling of the pandemic and its aftermath. A pan-EU stimulus plan in which all members would share the collective “financial burdens” is also being perceived by investors as a sort of “leveling of the playing field”, a sharp departure from the 2010 sovereign debt crisis. About the only other major hurdle for Europe concerns the settlement of a post-Brexit trade deal that has been dragging along and needs to be finalized by the end of the year to avoid another potential crisis.

The global economic recovery which is in the final stages of the “catch up” rebound phase, following the lockdown induced freefall earlier in the year, will be embarking on a less clear path going forward. Considering that the pandemic is still an event in progress, it appears likely that the economy is going to remain highly sensitive to its degree of severity. It basically means that even if we are unlikely to experience a lockdown induced almost complete shutdown like we did earlier in the year, it is highly likely that the recovery will continue to follow a staggered or stepwise pattern, at least until we gain the upper hand.

It is difficult at this stage to forecast anything of significance given that so much of what happens next is going to depend on the duality interplay of the election’s outcome and the manner in which the second wave of the pandemic unfolds. But even afterwards, when the results of those events are known, there will still linger a cloud of uncertainty on how things do actually unravel from then on. Herein lies the conundrum, so much is at stake and dependent on events that are going to take place in the near future, and yet, that knowledge appears to be of limited use because the context in which it is occurring is so very different from anything we experienced before that there is very little guidance out there to help us prepare for what may come next. To summarize, even after the plane had landed, you should continue to keep your seatbelts fastened, because the taxiing carries its own set of risks.

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