THOUGHTS FROM THE FRONTLINE

The Coming Crisis: Fingers of Instability

By John Mauldin | February 28, 2026

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Scottsdale, Houston, Los Angeles, West Palm Beach, Boston and New York

This letter is a little different. I am indeed working on my book about what I believe is a coming crisis by reviewing five different cycle theories. They all arrive at a similar scenario from different points of view, but they all suggest a crisis occurring sometime around the end of this decade or perhaps shortly thereafter. And all for different reasons. One background element ties them together, which is the subject of today's letter.

This is essentially a shortened first chapter. To long time readers, that background connection is our old friend: sandpiles and fingers of instability. but with a lot of edits and additions. Jumping in…

Ubiquity, Complexity Theory, and Sandpiles

With five different views about the coming crisis, which one is right? Do they conflict or reinforce each other? The correct answer is they're all connected, but not in obvious ways. And in the end, it makes no difference which one is "more" right. The results will be the same. Understanding this below-the-radar connection is key to making sure you, your family, community and country all get through this to what will be the inevitable positive conclusion, even if it is a very bumpy ride.

We are going to start our exploration with excerpts from an important book by Mark Buchanan, called *Ubiquity: Why Catastrophes Happen*. I HIGHLY recommend it to those of you who, like me, are trying to understand the complexity of the markets, economy and politics/society. The book is about chaos theory, complexity theory and critical states. It is written in layman's terms. There are no equations, just easy-to-grasp, well-written stories and analogies. But it gives us an essential framework to understand the coming storms.

As kids, we all had the fun of going to the beach and playing in the sand. Remember taking your plastic buckets and making sand piles? Slowly pouring the sand into an ever-bigger pile, until one side of the pile started an avalanche?

Imagine, Buchanan says, dropping one grain of sand after another onto a table. A pile soon develops. Eventually, just one grain starts an avalanche. Usually it's a small one, but sometimes it builds on itself and seems like a side of the pile collapses. Why?

Well, in 1987 three physicists named Per Bak, Chao Tang, and Kurt Weisenfeld began to play the sandpile game in their lab at Brookhaven National Laboratory in New York. Now, piling one grain of sand at a time is a slow process, so they wrote a computer program to do it. Not as much fun, but a whole lot faster. Not that they really cared about sandpiles. They were interested in what are called *nonequilibrium systems*.

They learned some interesting things. What is the typical size of an avalanche? After a huge number of tests with millions of grains of sand, they found there is no typical size. "Some involved a single grain; others, ten, a hundred or a thousand. Still others were pile-wide cataclysms involving millions that brought nearly the whole mountain down. At any time, literally anything, it seemed, might be just about to occur." The piles were chaotic in their unpredictability.

Now, let's read this next paragraph from Buchanan slowly. It is important, as it creates a mental image that may help us understand the organization of financial markets, the world economy and society (emphasis mine).

> "To find out why (such unpredictability) should show up in their sandpile game, Bak and colleagues next played a trick with their computer. Imagine peering down on the pile from above, and coloring it in according to its steepness. Where it is relatively flat and stable, color it green; where steep and, in avalanche terms, 'ready to go,' color it red. What do you see? They found that at the outset the pile looked mostly green, but that, as the pile grew, the green became infiltrated with ever more red. With more grains, the scattering of red danger spots grew until a dense skeleton of instability ran through the pile. Here then was a clue to its peculiar behavior: a grain falling on a red spot can, by domino-like action, cause sliding at other nearby red spots. If the red network was sparse, and all trouble spots were well isolated one from the other, then a single grain could have only limited repercussions. But when the red spots come to riddle the pile, the consequences of the next grain become fiendishly unpredictable. It might trigger only a few tumblings, or it might instead set off a cataclysmic chain reaction involving millions. The sandpile seemed to have configured itself into a hypersensitive and peculiarly unstable condition in which the next falling grain could trigger a response of any size whatsoever."

The Critical State

Something only a math nerd could love? Scientists refer to this as a "critical state." The term can mean the point at which water goes to ice or steam, or the moment that critical mass induces a nuclear reaction, etc. It is the point at which something triggers a change in the basic nature or character of the object or group. Thus (and very casually for all you physicists), we refer to something being in a critical state (or use the term critical mass) when there is the opportunity for significant change.

> "But to physicists, [the critical state] has always been seen as a kind of theoretical freak sideshow, a devilishly unstable and unusual condition that arises only under the most exceptional circumstances [in highly controlled experiments]… In the sandpile game, however, a critical state seemed to arise naturally through the mindless sprinkling of grains."

Thus, they asked themselves, could this phenomenon show up elsewhere? In the earth's crust, triggering earthquakes, or as wholesale changes in an ecosystem – or as a stock market crash?

> "Could the special organization of the critical state explain why the world at large seems so susceptible to unpredictable upheavals?" Could it help us understand not just earthquakes, but why cartoons in a third-rate paper in Denmark could cause world-wide riots?

Buchanan concludes in his opening chapter:

> "There are many subtleties and twists in the story … but the basic message, roughly speaking, is simple: The peculiar and exceptionally unstable organization of the critical state does indeed seem to be ubiquitous in our world. Researchers in the past few years have found its mathematical fingerprints in the workings of all the upheavals I've mentioned so far [earthquakes, eco-disasters, market crashes], as well as in the spreading of epidemics, the flaring of traffic jams, the patterns by which instructions trickle down from managers to workers in the office, and in many other things. At the heart of our story, then, lies the discovery that networks of things of all kinds – atoms, molecules, species, people, and even ideas – have a marked tendency to organize themselves along similar lines. On the basis of this insight, scientists are finally beginning to fathom what lies behind tumultuous events of all sorts, and to see patterns at work where they have never seen them before."

Going back to the sandpile game, you find that as you double the number of grains of sand involved in an avalanche, the probability of an avalanche becomes 2.14 times more likely. We find something similar in earthquakes. In terms of energy, the data indicate that earthquakes become four times less likely each time you double the energy they release. Mathematicians refer to this as a "power law," a special mathematical pattern that stands out in contrast to the overall complexity of the earthquake process.

Fingers of Instability

So, what happens in our game?

> "…after the pile evolves into a critical state, many grains rest just on the verge of tumbling, and these grains link up into 'fingers of instability' of all possible lengths. While many are short, others slice through the pile from one end to the other. The chain reaction triggered by a single grain might lead to an avalanche of any size whatsoever, depending on whether that grain fell on a short, intermediate or long finger of instability."

Now, we come to a critical point in our discussion of the critical state. Again, read this with not just markets but our entire society in mind:

> "In this simplified setting of the sandpile, the power law also points to something else: the surprising conclusion that even the greatest of events have no special or exceptional causes. After all, every avalanche, large or small, starts out the same way, when a single grain falls and makes the pile just slightly too steep at one point. What makes one avalanche much larger than another has nothing to do with its original cause, and nothing to do with some special situation in the pile just before it starts. Rather, it has to do with the perpetually unstable organization of the critical state, which makes it always possible for the next grain to trigger an avalanche of any size."

This concept applies to not just financial markets, but to how we organize our political systems, generational differences, geopolitics and war, the over-production of elites and even how information is interpreted. They ALL connect. The Great Recession was a financial crisis. COVID-19 was a health crisis with a financial crisis and added political crises which further divided a fractious world.

We all see pressures building up in many different aspects of society. They each create their own fingers of instability. But in the sandpile of life, they are connected.

Now, let's couple this idea with a few other concepts. First, Hyman Minsky (who should have been a Nobel laureate) points out that stability leads to instability. The more comfortable we get with a given condition or trend, the longer it will persist and then when the trend fails, the more dramatic the correction.

The problem with long term macroeconomic stability is that it tends to produce unstable financial arrangements. Just as long term geopolitical or social stability will eventually produce a critical state. If we believe that tomorrow and next year will be the same as last week and last year, we are more willing to add debt or postpone savings in favor of current consumption. Or ignore any of a number of societal crises. Thus, says Minsky, the longer the period of stability, the higher the potential risk for even greater instability when market participants or a country's citizens must change their behavior.

Relating this to our sandpile, the longer a critical state builds up in an economy, or in other words, the more "fingers of instability" are allowed to develop connections to other fingers of instability, the greater the potential for a serious "avalanche."

Therefore (and ironically), the longer a crisis takes to come about, the bigger the repercussions. One of the conclusions at the end of the book will be that we simply don't know when the avalanche will be triggered. The US is such a large and wealthy country, and many of the rest of the shirts in the global laundry are just as (or even more) dirty, that global money might come to the US as a safe haven, thus prolonging our "stability" as the sandpile grows to an ever more critical state.

We Are Managing Uncertainty

Or, maybe, a series of smaller shocks lessens the long reach of the fingers of instability, giving a paradoxical rise to even more apparent stability. This is the thrust of Nassim Taleb's book, *Antifragility*.

> "People often think that the opposite of fragility is durability. If something is fragile, that means it's easily broken. Therefore, if something isn't easily broken, logically that should mean it's the opposite of fragile. **However, there's another step beyond durability: something that actually gets stronger under stress.** Since there isn't an established English word for such a thing, [Nassim] calls it *antifragility*—not just the lack of fragility, but its true opposite.

> "We live in an unpredictable world. The models and theories we use to try to predict the future invariably fall apart as unforeseen events prove them wrong and, in turn, destroy the plans we made based on those models. Clearly, systems based on such flawed models are bound to be fragile—easily broken.
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> "The solution to this problem is antifragility. Instead of a never-ending search for more accurate models and better predictions, **all we need to do is make sure that we're in a position to benefit from uncertainty and volatility instead of being harmed by it.**
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> "This is hardly a new concept; nature exhibits antifragility in almost everything she creates. An organism can strengthen itself through minor damage in the form of exercise. In a similar sense, a species can strengthen itself through minor damage in the form of natural selection, which leads to evolution.
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> "However, unlike nature, humans try to control the world through models and rules. We think we can perfectly predict the future and avoid any shocks that would cause our fragile systems to fall apart. We think we can outsmart millions of years of evolution and antifragility, and we're almost invariably wrong.
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> "Instead of trying to predict the future, we should assume that there will be major events we can't see coming—because, sooner or later, there will be. If we're prepared for them, using the methods and practices explained in this book, we can make sure that such events work to our advantage instead of hurting us. **By avoiding fragility and embracing antifragility wherever possible, we can set ourselves up to thrive in an uncertain world."**

Another way to think about it is the way Didier Sornette, a French geophysicist, has described financial crashes in his wonderful book, *Why Stock Markets Crash* (the math, though, was far beyond me!). He wrote:

> "[T]he specific manner by which prices collapsed is not the most important problem: a crash occurs because the market has entered an unstable phase and any small disturbance or process may have triggered the instability. Think of a ruler held up vertically on your finger: this very unstable position will lead eventually to its collapse, as a result of a small (or an absence of adequate) motion of your hand or due to any tiny whiff of air. The collapse is fundamentally due to the unstable position; the instantaneous cause of the collapse is secondary."

When things are unstable, it isn't the last grain of sand that causes the pile to collapse or the slight breeze that causes the ruler on your fingertip to fall. Those are the "proximate" causes. They're the closest reasons at hand for the collapse. The real reason, though, is the "remote" cause, the farthest reason. The farthest reason is the underlying instability of the system itself.

This is one reason we get "fat tails" in financial markets. In theory, returns on investment should look like a smooth bell curve, with the ends tapering off into nothing. According to the theoretical distribution, events that deviate from the mean by five or more standard deviations ("5-sigma events") are extremely rare, with 10 or more sigma being practically impossible – at least in theory.

However, under certain circumstances, such events are more common than expected; 15-sigma or even rarer events have happened in the world of investing. Examples include Long Term Capital in the late 1990s and any of a dozen bubbles in history. Because the real-world commonality of high-sigma events is much greater than in theory, the distribution is "fatter" at the extremes ("tails") than one would expect.

This holds true in geopolitics, too. The unthinkable sometimes happens. Before World War I began, no one thought it would come to war. Peace had been the rule for 40 years. Surely, mankind had evolved. Until…

Thus, the build-up of critical states, those fingers of instability, is perpetuated even as, and precisely because, we hedge risks. We try to "stabilize" the risks we see, shoring them up with derivatives, emergency plans, insurance, treaties, alliances, political change and all manner of risk-control procedures. And by doing so, the economic and social systems can absorb body blows that would have been severe only a few decades ago. We distribute the risks, and their effects, throughout the system.

Yet as we reduce the known risks, we sow the seeds for the next 10-sigma event. It is the improbable, unseen risks that will create the next real crisis. It is not that the fingers of instability have been removed from the equation, it is that they lurk in different places, not yet visible.

A Stable Disequilibrium

We end up in a critical state that Paul McCulley calls "stable disequilibrium." It has "players" all over the world, tied inextricably together in a vast dance through investment, debt, derivatives, trade, globalization, international business and finance. Each player works hard to maximize their own personal outcome and reduce their exposure to "fingers of instability."

The longer we go on, asserts Minsky, the more likely and violent any "avalanche" is. The more the fingers of instability can build, the more that state of stable disequilibrium can go critical on us.

It's all connected. We are building an unstable sandpile and it will come crashing down at some point. Then we will have to dig our way out.

The good news is we have seen this movie before. And after the crisis, a new period of stability and growth follows, for at least another 50-80 years. In my upcoming book we will look for ways to get through to that happier future.

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Next week I fly to Houston where I am on an economic advisory board for the Rice University economics department. Then I will be in LA meeting with the Inner Circle, exploring several companies that are literally changing the technology landscape of defense and energy. We will be opening clinics in West Palm Beach and the DC area, hopefully in early April. Construction has begun. Then NYC and Boston.

I finish this from Scottsdale where Dr. Roizen and I are attending the 2026 Functional Longevity Summit, along with 3-400 doctors. The organizers have asked us to talk about Therapeutic Plasma Exchange. For those interested in staying healthy for longer, Mike and many experts now believe the first part of your journey should begin with therapeutic plasma exchange. Seriously. You can learn more at Lifespan-Edge.com (note the dash). If you haven't, you really need to read our main research report. The research and other information can make a real difference in your life. You can set up a discovery call to talk with our doctors about the procedure and see if it is right for you. As well as look at a lot more research.

And with that, I will hit the send button. Have a great week.

Your thinking how to make my body antifragile analyst,

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