



Complexity

"There is but one step from triumph to downfall. I have seen, in the most significant of circumstances, that some little thing always decides great events."

Napoleon Bonaparte

"Strange things happen ... near the boundaries"

James Gleick

In the early 1960s, Edward Lorenz, a meteorologist at the Massachusetts Institute of Technology, was modelling weather systems on a computer when he accidentally discovered that small changes in initial conditions later produced large changes in outcomes. This surprising discovery became known as the 'Butterfly Effect', the "notion that a butterfly stirring the air today in Peking can transform storm systems next month in New York."¹

Scientists aim to predict outcomes and then conduct experiments to confirm them. Until Lorenz's breakthrough, scientists had largely ignored disorderly conditions, such as the turbulence in air or in flowing water, and instead used idealised systems to explain the world. Natural systems can be described - but they do not behave as neatly as idealised. The discovery of the Butterfly Effect encouraged work on Chaos Theory, which postulates that seemingly chaotic systems actually come out of orderly sets of mathematical functions.²

The theory of self-organised criticality, or Complexity Theory, is an extension of chaos theory. It hypothesizes that upheaval, change and enormous consequences flow from trivial seeming

events but with a power law hidden beneath. Think of the last snowflake landing on a mountain top that triggers an avalanche. Complexity is often referred to as existing "at the edge of chaos."³

These theories are germane to our analysis because the economy is an incredibly complex, adaptive and unpredictable system. Yet traditional economics uses precise mathematical functions, assumes perfectly rational agents and imagines an idealised system in equilibrium. Economists view the economy as a behavioural system that can be manipulated.

Which brings us to the US Federal Reserve and their efforts to promote tranquility in the financial markets. Authorities at the institution often obscure their support for rising asset prices by using the term "financial stability". Based on a lot of Fed statements, it appears financial conditions are 'stable' only when equity prices are rising and 'unstable' when falling. The Fed wants a system that is both stable and certain.

But the world is messy. Stability, as it relates to financial markets, is not actually based on the direction of security prices but rather on valuations and liquidity.

Markets are most stable when prices reflect their underlying fundamentals. As prices diverge from their fundamentals, they become unstable and much more sensitive to small changes in expected returns. Measured by many metrics (P/S, P/E, P/

BV, etc.), these are amongst the most expensive markets in history. Frothy equity valuations and tight credit spreads are typically signs of a bull market's speculative phase. These phases are usually followed by market instability as valuations normalise.

The other component of financial stability is liquidity. From a market perspective, liquidity refers to the transparency, ease and cost with which securities can be bought and sold. When prices rise steadily and predictably over some period of time, the importance of liquidity is usually ignored or taken for granted - at least until a crisis ensues.

For years, many "don't fight the Fed" analysts have encouraged participation in the markets regardless of valuations because the "trend is your friend". When there is a persistent trend, a bull market is fuelled by investors who have the longest time horizon, so each sell-off will usually be bought. In such a buy-the-dip environment, the trend is definitely your friend. Benoit Mandelbrot, the mathematician who pioneered fractal geometry, called this trend the "Joseph Effect" after the biblical story about seven good years followed by seven bad years. This effect is continuous and predictable.

Many of these same analysts claim that they will be able to identify the market top and exit gracefully. However, few of them take into account the discontinuities of asset prices, when prices can abruptly gap lower.

Complexity (cont'd)

Mandelbrot named this trend the “Noah Effect” after the biblical story of the deluge. This effect is chaotic and unpredictable.

As long as the system remains stable, these analysts might feel secure in their ability to time the market top. In the meantime, however, it means they are structurally short volatility (i.e. wagering stock volatility stays low).

The VIX, a proxy for expectations of stock volatility, is a very useful indicator. Perhaps the most fascinating signal comes from its fractal compression pattern, as regularly noted by Sven Henrich. (See chart).

Fractals are complex patterns that are self-similar across all scales. They are created by repeating a simple process over and over in an ongoing feedback loop. Fractals are images of dynamic systems – a picture of chaos.

Today’s VIX compression pattern with diminishing volatility spikes suggest the “stability” narrative has become so dominant that most investors believe that there is now no more market uncertainty. And this naturally has encouraged them to aggressively build massive, leveraged security positions.⁴

When a system is highly dependent on a stable future, it becomes vulnerable to volatility spikes. Breakouts from VIX compression lows are similar to earthquakes in geological terms, displaying the same power law distribu-

tion.⁵ If this fractal compression pattern holds, it indicates a future breakout could be an order of magnitude larger than anything seen before.

Exceptional uncertainty about the future of America’s economy has been addressed by the Fed promising with exceptional certainty that monetary policy will stay very loose, perhaps for years. Most investors believe that the Fed would never let markets fall and that strong markets will continue until at least 2023 or 2024.

Like all systems based on stability, the Fed has simultaneously created a system that is extremely fragile. This is evident by the need for ever greater monetary interventions with each significant market downturn.

There is always the hope the Fed will rescue the markets from the next financial crisis but it has a problem. The system is already awash with excess liquidity, and the Fed does not know how to deal with it. American money-center banks are stuffed to the gills with cash and are actually turning away depositors. The idea that the Fed will always be there to help could lead to one of the worst liquidity crises ever because so few are prepared for it.

One of the greatest risks the Fed faces in meeting its objectives would occur if a financial crisis was accompanied by unexpected inflation. Such a crisis would force the Fed to choose either a return to orthodox policy, at the cost of

defaults that would devastate asset prices, or to choose a currency collapse as runaway inflation revalues assets and liabilities. Without a resolute improvement in policy, it is increasingly likely that the economy may endure the latter, followed by the former.⁶

A new trend would then emerge as investors with the longest time horizon decide to reduce their allocation to stocks. This transition would prove severe as liquidity fades and markets become disorderly. All that money printing does not guarantee there will be enough liquidity when needed. “If the trader’s horizon becomes dominant, and liquidity evaporates when sell orders far outweigh the number of buy orders, the fractal structure of the market collapses and violent price corrections become manifest.”⁷

It is impossible to create stability and certainty without also increasing fragility. That’s how markets work. Today’s expensive markets lie near a critical boundary, vulnerable to ‘some little thing’ disrupting the narrative and triggering an avalanche.

The Fed may very well have policy right. But if they don’t, the avalanche will be an unforgiving dissipation of “energy”, a volatility spike that the markets have rarely seen. The next bear market, when it comes, will not be like the last. It will probably be much worse.

Best be mindful of your risk tolerance and invest accordingly.

Sources:

1. James Gleick, “Chaos: Making a New Science”, Penguin Books, 1997
2. Laurence Gonzales, “Deep Survival Who Lives, Who Dies, and Why”, Norton, 2004
3. Ibid
4. “Fragile Order Failing” Swarmblog.com, Zero-hedge.com, 18 June 2021
5. Ibid
6. Eric Peters, “The Fed Faces The Greatest Risk In Its History: An Economic Crisis Accompanied By Inflation”, One River Asset Management, 27 June 2021
7. “Fragile Order Failing” Swarmblog.com, Zero-hedge.com, 18 June 2021
8. Chart page two, Sven Henrich, “It’s Coming”, Northman Trader, 9 June 2021



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