

## Meerkats and Market Behaviour

### Thoughts on October's stock market fall



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October is not yet over, but it already qualifies as the worst single month for equity market performance since the global financial crisis of 2008. The valuations of US high-growth technology companies, which we favour, have been particularly hard hit. As a result, our fund has suffered along with the markets.

Despite the dramatic market moves, we do not believe this is an especially unusual event. Indeed, we believe it is a rather typical market panic. The question is: Does this panic become a new Minsky Moment, triggering a downturn in the real economy, as occurred with the global financial crisis?

On balance, while the global economy faces challenges in certain regions, we believe the all-important US economy will remain robust for the foreseeable future and October's selloff will prove to be just another temporary market wobble.

### Mild and Wild Randomness

Many readers will be familiar with the name Benoit Mandelbrot who became famous for his work on the mathematics of fractals – he invented the term – and his eponymous Mandelbrot set (Figure 3). Fewer people are aware that Mandelbrot was also one of the world's leading authorities on financial market volatility and a vocal critic of the mathematics underpinning modern financial theory and therefore financial market risk models.

Mandelbrot used to talk of financial markets experiencing periods of 'mild randomness' and occasional periods of 'wild randomness'. Mild randomness being the easily modelled type of randomness you get from

flipping a coin or rolling a dice. Mild randomness is unpredictable, but easily understood. We do not know the outcome of flipping a coin, but we do know the range of possible outcomes – heads or tails – and their respective probabilities – 50:50.



Figure 1: Both meerkats and humans work in groups, allowing an efficient division of labour

The mathematics of conventional financial theory assumes financial markets move with mild randomness, as if controlled by the statistics of coin flipping. It is assumed asset prices follow what is known as a random-walk. Asset prices are believed to move up or down in small unpredictable steps as though being controlled by a random process akin to flipping a coin.

According to this random-walk model investors should be able to create highly stable portfolios of assets simply through diversification. For example, if you hold only one equity in your portfolio then your portfolio will be subject to the full effect of the random volatility of that single asset. On the other hand, if you hold four different equities then, on most days, some will tend to move up in value while others will move down. Only about once every sixteen days are you likely to get a situation when all four equities move

up or down together. As a result, your overall portfolio should be less volatile.

If you were to hold, say, forty stocks, as we tend to, and all of those stocks move randomly, then you should expect to have an even more stable portfolio. In fact, you should only expect to see all of them rising or falling together roughly once every 4.4 billion years! To put that into context [the age of the Earth](#) is estimated to be around 4.5 billion years.

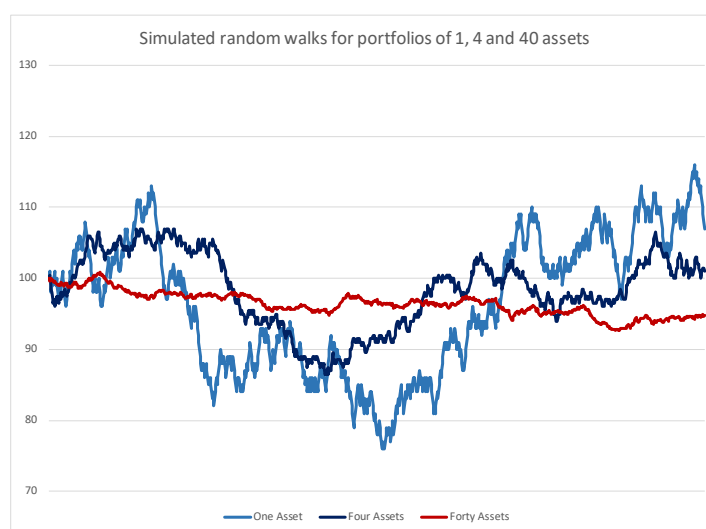


Figure 2: In theory, diversification reduces the volatility of portfolios

Figure 2 shows a simulation of the price volatility of three

portfolios holding respectively one, four and forty randomly moving assets.

The problem with this theory is, as Mandelbrot was at pains to point out, it does not fit the real world. This month alone, we have witnessed several 'one in 4.4 billion years' events, where all forty of our investments have moved in lockstep. What's more this pattern of behaviour has continued, with only very few divergences, for several days at a time.

The price movements in the equity markets this October have been a statistical impossibility, according to random walk financial theory. What's worse for that theory, is that October's market movements are not even especially unusual. It is true that we have not had such violent equity markets for a few years, but over the last ten years alone, the NASDAQ stock market has suffered at least eight similar bouts of 'impossible' volatility, leading to price declines of 10% or more.

These bouts of impossibly large volatility are what Benoit Mandelbrot used to call 'wild randomness' and their frequent occurrence was behind his criticism of financial risk models.

A few years back, shortly after the global financial crisis, I was lucky enough to be involved in a three-way discussion with Benoit Mandelbrot and economist Roger Ibbotson about the nature of financial market risk and the use of value at risk models. The discussion was arranged by Morningstar who published an edited transcript of the conversation: [Getting a Read on Risk](#).

In that discussion, both Mandelbrot and I agreed that the mathematics of financial risk models needed a complete rethink. How we choose to rethink the processes behind these episodic market panics has implications for how we should interpret them and how, as investors, we should respond to them.

## The Meerkat Model

When trying to understand market behaviour it is worth remembering that markets are still ultimately driven by human behaviour, and human behaviour is inherently social in nature – we make our decisions in groups.

Like humans, meerkats are also highly social animals who work together in groups. Working in groups allows for division of labour which, as Adam Smith explained, promotes greater efficiency.

The division of labour in a mob of meerkats is easy to see. A few of the meerkats act as lookouts, standing upright on their hind legs, searching for potential threats from predators. This allows the rest of the mob to go about the business of foraging for food, without needing to worry about the predators.

If the lookouts suddenly panic, the foragers instinctively panic with them and the whole mob begins to move together, dashing for cover. The foragers do not wait around to second-guess the lookouts, to do so may prove fatal. In effect the foraging meerkats outsource or crowdsource their flight response to the lookouts.

Once the flight response is triggered, the behaviour of the whole mob changes suddenly. The foragers who were previously

moving independently of one another suddenly act as one in their dash for safety. In the language of physics, the mob experiences a phase change; individuals cease acting as individuals and the whole mob acts as one single unit. This type of phase change occurred this month in the financial markets. Suddenly the values of different assets, that had previously been fluctuating independently, began to move together in lockstep. As a result, diversified low-volatility portfolios, represented by the red line in Figure 2, began trading like high volatility single-asset

portfolios, represented by the light blue line.

This sudden unpredictable behavioural shift is a move from Mandelbrot's mild randomness to wild randomness.

It seems reasonable to suspect these market moves are driven by us humans having acquired similar group-level behavioural traits to the meerkats. We humans, also being cooperative social animals keen to avoid becoming a predator's lunch, have likely evolved similar crowd-sourced flight responses. And, as a result, we have likely developed a predisposition to instinctively panic when we see others panicking, even if we do not understand why they are doing so.

For both meerkats and humans, on the planes of Africa, the price of triggering an unnecessary flight response, to avoid an imaginary predator, is small, just a little wasted energy and lost food. But the cost of failing to trigger a flight response in the presence of a real predator is large, potentially fatal. As a result, from an evolutionary perspective, it is perfectly rational to err on the side of over-panicking rather than under-panicking.

This tendency toward frequent panics is fine when the cost of panicking is low, but it becomes problematic when the cost-of each panic becomes significant.

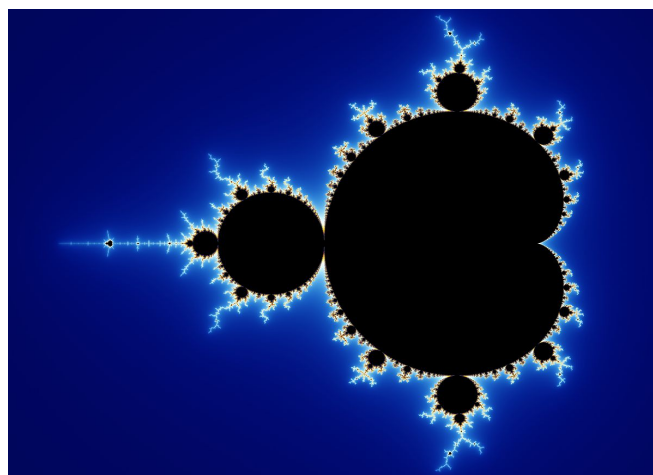


Figure 3. The Mandelbrot Set  
(Created by Wolfgang Beyer with the program Ultra Fractal 3)

For investors the cost of a false-positive flight-response, leading to an unnecessary divestment from the market, can be very high. Due to the anchoring bias, another of our behavioural quirks, once we have divested from the market we often find it very difficult to reinvest if the market has subsequently recovered to a higher price. As a result, if we panic unnecessarily, and the market does recover we often find ourselves unable to reinvest for extended periods. This means the cost of panicking unnecessarily is often a very substantial opportunity cost.

As mentioned earlier, the current market selloff has been the sharpest monthly move since 2008, but similar short-lived market panics have occurred, on average, almost once a year over the last decade. Since 2008 there have been at least eight such false alarms, where the market fell by over 10% only to quickly recover. As things stand, the benefits of divesting in any one of those panics have now been eclipsed by the profits forgone by remaining out of the market.

Episodic market panics are, in our view, an inherent feature of all financial markets. Developing the ability to resist the temptation to respond to these episodes is, in our view, essential to successfully navigating financial markets.

To our eyes, the speed of market moves this month and especially the sudden rise in the correlation of assets, suggest October's moves have been more about crowd behaviour than about any change in the underlying economic situation. We have likely witnessed just a bout of Mandelbrot's wild randomness caused by a very human mob panic.

Usually the best response to such events is to do nothing, or even view them as a buying opportunity. That said, it would be irresponsible not to at least consider the risk that this time there may be a real predator around.

## Another Minsky Moment?

What differentiates a temporary market panic from a genuine sustained crisis is the so-called Minsky cycle. The Minsky cycle is a self-reinforcing cycle where, in the upswing, asset inflation, credit creation and profit formation all feed off one another. Rising asset prices provide the collateral for increased borrowing which in turn funds higher spending, driving profits and therefore asset prices still higher. But when the cycle turns contractionary, at the Minsky moment, falling asset prices render previously accumulated debt unsustainable, causing a contraction in spending, which then undercuts profits and asset prices.

The economic expansion prior to the global financial crisis of 2007-2008 was a perfect example of a Minsky cycle, centred on US house price inflation, US mortgage securitisation and US household spending. US households accumulated a stock of debt in the years prior to the financial crisis of 2007 that became unsustainable, once house prices began falling. Because the debt was held by households, the subsequent deleveraging cycle undercut household spending, thereby shaking the very foundation of economic activity.

The runup in US household debt, prior to the global financial crisis, is shown in Figure 4 which also shows that since 2009, US households and their financiers have become much more prudent, gradually driving down the household debt-to-GDP ratio. This has occurred despite both an expanding economy and a record low US unemployment rate. With relatively modest debt levels and high employment levels the US economy should be able to withstand the modestly higher interest rates being engineered by the Federal Reserve. We do not, therefore,

believe the US economy, which is still the world's most important economy, has the conditions for this market panic to morph into a Minsky cycle contraction.

Outside of the US there are certainly economies which worry us.

As we have discussed previously, in Europe, we believe the combination of the four private sector freedoms – the freedom of movement of people, goods, services and capital, coupled with the two public sector restraints – fiscal deficit rules and the prohibition

on fiscal transfers between member states – turn the European Union into a device for the promotion of wealth polarisation between more-prosperous and less-prosperous states. Greece and Cyprus were the first victims of this vicious cycle and now Italy is moving into the firing line.

It is our hope that the Brexit vote will open the door to the structural reforms – either a full fiscal integration or a reversion to national currencies – that is necessary to break these cycles, but, as yet, we see little progress in this direction. We are therefore concerned over the outlook for the Italian economy: See [Constant Reformation](#) .

We are also concerned, that China may have already entered a Minsky style credit-contraction phase. Although this is an important economy, due to the asymmetric trading arrangements between China and the US, we do not believe a slowdown in China would have a substantial impact on the US

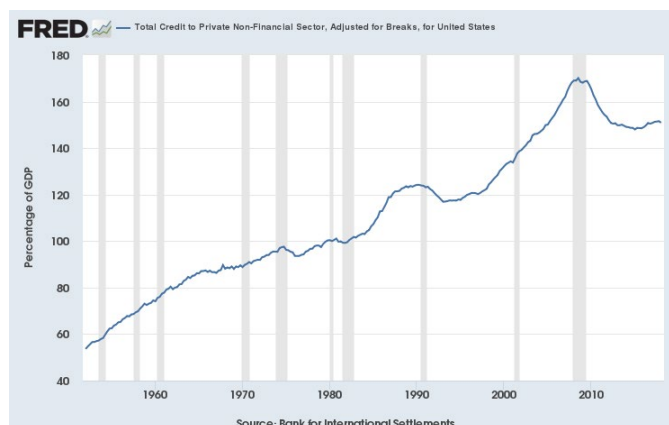


Figure 4: Private sector debt to GDP ratio, showing the borrowing binge before the 2007 crisis followed more prudent behaviour since then

economy. This is because, as President Trump points out, China does not import a significant amount of goods from the US.

## Summary

This month's selloff in the equity markets has the hallmarks of a large, but very typical temporary, market panic. The conditions to turn this panic into a broader economic slowdown do not appear to be in place. For this reason, we are inclined to view October as only a temporary interruption in what is otherwise a bullish outlook for the US equity markets. ■

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