
Mandelbrot's Legacy More Than Fractals

When I read that Benoît Mandelbrot passed away over the weekend, it brought back memories of one of my most enjoyable subjects at university. As part of an economics degree at the University of NSW, we all had to complete four 'general studies' subjects.

For the most part, the time was better spent working on your pool game at the bar. But after my first lesson in Mathematics in Art and Architecture, I didn't miss a class. In the following weeks I was introduced to Cubism, the Bauhaus movement and one of the most fascinating phenomena I have seen.

The picture above is the result of the iteration of a relatively simple mathematical equation. I don't know which formula created that image but something as simple as $z = z^2 + c$, where z is a complex number, can produce an equally intricate image when plotted graphically.

These 'fractals' became known as [Mandelbrot Sets](#) thanks to Benoît Mandelbrot's work on them. The fascinating thing is that if you zoom in, and then zoom in again and again, the image seems to grow, replicate itself and evolve.

When we first plugged one of these equations into a high-powered computer in the lab and watched the image develop in front of our eyes, it blew me away. Watch the video below and you'll see what I mean.

So what's this got to do with finance? Well, it was news to me but Mandelbrot also spent time working on financial markets. Specifically, he wrote a number of papers debunking the mathematics behind the Efficient Markets Hypothesis and was co-author of *The (Mis)Behaviour of Markets: A Fractal View of Risk, Ruin and Reward*. Published in 2004, the book apparently warned of the oncoming crisis.

You can read this [Financial Times obituary](#) if you're interested, which also contains a number of recent video interviews where he discusses the problems with modern portfolio theory (you need to be a subscriber or register for a free trial). I'll be putting his book on the Christmas wish list, and if anyone wants to throw a Picasso down the chimney, I won't say no.