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Markets Insight

Algorithms are an easy scapegoat for volatile markets

Computer-driven trading draws suspicion that obscures the advantages of algos

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Growing up in the science fiction-infused 1960s and '70s, nothing excited me more than computers' potential to do things that humans could and to improve the world. Today, they help aircraft to stay aloft, doctors to treat patients and investors to manage portfolios, all the while relieving humans of stressful tasks.

For many, though, mystery still shrouds how computers and the algorithms running on them work — and why understanding them even matters.

Algorithms sometimes get a bad name. They are imagined as autonomous "black boxes" with no commonsense or reason driving them. Their inscrutability has led to an unfair double standard: despite our flaws, humans enjoy a baseline of trust, while algorithms, seen as detached from human-style reasoning, are deemed inherently less trustworthy.

Owing to this double standard, traditional investors often see a fundamental difference between a human decision to buy or sell a stock, and one executed by a computer. When markets become volatile, the knee-jerk reaction is to point accusingly towards "algos" as the cause. It is in our nature to look for scapegoats to explain confusing events, but that is no substitute for understanding.

So let's start with a definition: algorithms are sets of rules, often mathematical in nature and designed for computers to follow. The instructions on your shampoo — "lather, rinse, repeat" — are an example of an algorithm (though a poorly designed one; it would cause a computer to continue washing its hair forever).

Algorithms are far more complex than shampooing, but fundamentally they're just instructions. In many cases, humans can and often do perform the same tasks — such as identifying undervalued stocks — just more slowly and expensively. Like human investors, algorithms do this systematically, so good investments hopefully outnumber losing ones. There are, of course, some important differences between humans and algorithms.

Among the more obvious are that people get tired and distracted. Emotions and biases also come into play, especially in high-stress situations. Even humans' motives are not always constructive.

Algorithms, meanwhile, execute their instructions without bias or feeling; without the exuberance that comes with overconfidence or the fear that accompanies loss aversion. Stress never clouds their performance, and they never act on a hunch.

That's not to say algorithms don't perform poorly sometimes. And particularly in very complex applications, such as machine learning, interpreting exactly how an algorithm arrived at the conclusions it did can be challenging. Importantly, though, humans have the same shortcomings, as work in behavioural psychology by Daniel Kahneman, Amos Tversky and others has shown.

The main difference is that well-designed algorithms typically undergo constant iterations of testing and improvement. Compare human drivers to the software controlling self-driving cars. A human has to pass a single driver's test that proves next to nothing about his or her true abilities behind the wheel. Beyond that one measurement, it's anyone's guess how our new driver will do on the road.

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In contrast, self-driving cars' algorithms capture reams of data for every mile driven, which engineers use to improve performance. This process of testing and validation continues indefinitely, and for that reason, engineers have a much higher degree of confidence in what their algorithms can and cannot do.

This approach — in essence, the scientific method — is the most effective way to make progress on hard problems of virtually any kind. Formulating hypotheses and testing them rigorously, based on firm evidence, is in fact the only guarantor of integrity in decision-making available to us.

Moreover, having a scientific mindset means the process of inquiry is never complete; scientists arrive at the best conclusions our data and abilities allow, but our search for better answers is, by definition, never done.

The scientific method is the key to using algorithms safely and effectively, be it in the context of selfdriving cars or in investment management. Far from being autonomous black boxes, algorithms in these and other fields are the culmination of painstaking research by deeply experienced humans using enormous amounts of data and powerful infrastructure to process it.

Designed scientifically, these algorithms represent a significant step forward from the days when critical decisions were based on little more than intuition — usually supported by, at best, rudimentary evidence. Algorithms aren't as mysterious as they might seem, and they don't deserve a reputation as bogeymen.

While both humans and algorithms can perform poorly, that should not obscure the inherent advantages of algorithms in certain situations. Rather, we should acknowledge that they have an incredible amount to offer, and embrace them where they are fit for purpose.

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