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VOICES OF INNOVATION

Dr. Andrew Lo: Darwinian Investing
The MIT finance professor's market theory borrows from neuroscience, evolution, and econometrics

Can brain science unlock the secrets of success on Wall Street? And if so, will it transform the field of personal finance? These matters fascinate Andrew W. Lo, a finance professor at Massachusetts Institute of Technology's Sloan School of Management and director of its Laboratory for Financial Engineering.

Lo, 45, and a small band of economists are tapping into neuroscience and cognitive psychology to better understand how investors make financial decisions. In one early experiment, he and a colleague wired up 10 traders in Boston and monitored their breathing, body temperature, perspiration, pulse rates, and muscle activity as they risked real money in the markets. While the most seasoned traders in the group remained relatively calm, nearly everyone had sweaty palms and quickened pulses when the markets grew more volatile. "Even the best traders have significant emotional responses when they trade," says Lo.

This fights the stereotype of traders as rational, coolly analytical Vulcans of commerce. Lo's results, along with further studies using more sophisticated magnetic-resonance imaging on traders, also undercut a dominant theory known as the efficient market hypothesis (EMH), which holds that markets aggregate information efficiently and investors form their financial expectations rationally. The reality may be much messier.

Lo, who also serves as chief scientific officer at the hedge fund Alphasimplex, breaks with both EMH and behavioral economics in seeing emotions as central to survival in the market. But this is just one element in a theory Lo is developing called the Adaptive Market Hypothesis. It shows how investors use trial and error to establish rules of thumb when placing financial bets and then hone their skills amid disruptive changes. Think of the market as an ecosystem made up of hedge funds, mutual funds, retail investors, and other "species," all competing for profit opportunities. It's a Darwinian world where market shifts render some strategies obsolete, resulting in chances missed and money lost, says Lo. "The only way to maintain an edge is to continually innovate."

Lo is not the first to incorporate the insights of Charles Darwin in his models. Luminaries from Joseph Schumpeter to Gary Becker explored this territory in the past. But Lo's mingling of neuroscience, evolution, and financial econometrics is highly original. He predicts that the insights of evolutionary psychology will change individual wealth- and risk-management techniques, right down to how people handle 401(k) portfolios or deal with declining home prices.

Prepped with appropriate data from Lo's research, a simple computer program might one day provide invaluable financial advice. You would punch in basic information,

such as family status, life goals, the standard of living you would find acceptable in retirement, and the types of risks you can or can't tolerate. An algorithm would then tailor a portfolio for you and help you hedge against unwanted risks, such as a lost job or a wage cut. "Now, it sounds like science fiction," says Lo. "Not in 10 years."

Sci-fi was an important influence on Lo, whose family moved from Taiwan to Queens, N.Y., when he was 5. Raised by his mother, he became an academic star. He skipped eighth grade, sped through Bronx High School of Science and Yale University, and nabbed a PhD in economics from Harvard University at age 24. But it was Isaac Asimov's *Foundation* trilogy that steered him toward finance economics. Asimov sketched out a branch of mathematics called psychohistory, whose practitioners sample the proclivities of large numbers of people, then accurately predict the future based on what they learn. Sound familiar?

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