

# Opening Remarks



## When Animal Spirits Attack

Despite one meltdown after another, the denizens of high finance continue to make reckless bets. Is biology to blame? By Drake Bennett

Wall Street is not known for self-examination. Colossally bad bets and spectacular losses are more often treated as individual failures than systemic ones; risky behavior is seen as a sign of intestinal fortitude, not foolishness. In the wake of the multi-billion-dollar trading loss at JPMorgan Chase—considered the best in the business at risk management—the financial industry has focused on who did what, when, and how big the losses might get. But that doesn't explain why the firm's traders and executives doubled down on a position

that, in hindsight, looked clearly doomed.

What were they thinking? That question, in essence, is what John Coates has devoted his life to answering. Coates once ran a derivatives desk at Deutsche Bank in New York, until he decided he was more interested in trying to figure out why people are such poor judges of risk than he was in trying to profit from it. Now a senior research fellow at the University of Cambridge, he is employing the tools of neuroscience to identify the biological basis of what John Maynard Keynes called the market's "animal spirits."

In particular, Coates focuses on two hormones: testosterone, which increases our appetite for risk, and cortisol, which makes us shy away from it. Drawing on his Wall Street connections, he has been able to treat the trading floors of investment banks as his labs. The an-

swers he's finding could help financial institutions understand how the banking culture exacerbates the very tendencies companies should be guarding against. There may not have been a way to prevent JPMorgan's "London Whale" from making his ill-fated bet on corporate bonds. But Coates's research does suggest that the trader's bosses should have seen the trouble coming.

Twelve years ago, Coates was flying home to New York from England and found himself sitting next to a young neuroscientist named Linda Wilbrecht. The two started talking. The dot-com bubble was reaching its high point, and what Coates was seeing around him on Wall Street had made him wonder about the chemical basis of the waves of exhilaration and despair that swept across the trading floor. Wilbrecht invit-

ed him to come by and view the work she was doing on how neurons form.

During lulls in the market, Coates started ducking out of Deutsche Bank's midtown office and catching a cab up to Wilbrecht's lab on the Upper East Side campus of Rockefeller University. He sat in on lectures and watched as she and her colleagues ran studies. After two years he quit finance and enrolled in the neuroscience Ph.D. program at the University of Cambridge, where he had years earlier earned a doctorate in economics.

The more Coates learned, the more he became convinced that traders were, as he put it, "a clinical population." The stimuli of a trading floor triggered chemical changes in people's brains, emotionally whipsawing them. During the tech bubble, he recalls, "People just really slipped their moorings: They were motor-mouthing, they weren't sleeping, they were on this high. It was initially reasonable to assume it was cocaine, but I don't know many traders that do that. There was something going on, it was just incredibly noticeable, and I realized that at times I had also felt that way."

Coates is best known for a study he carried out in 2005. As he describes it in his forthcoming book, *The Hour Between Dog and Wolf*, he took saliva samples over a two-week period from 250 traders at a London firm, all but three of them men. At the same time, he tracked the profit and loss on their trades. He found that when a trader's testosterone levels were particularly high in the morning, he went on to make more money than on days when his morning testosterone level was low. Coates calculated that on an annual basis, the differences between high-testosterone and low-testosterone days would add up to around a million dollars in take-home pay.

In species after species, biologists have documented something called the "winner effect." When two male elephant seals or bighorn sheep fight over females, the victor gets a sharp spike in his testosterone levels, while the loser sees his dramatically drop. The theory is that elevated testosterone levels in the bloodstream of the winner—which in some species last for months—will help him in his next bout. Testosterone doesn't just boost confidence, it raises the blood's oxygen-carrying capacity and lean-muscle mass. With each bout the process repeats itself: The winner's testosterone level keeps climb-

ing, making him fitter, stronger, and more confident, and raising his odds of winning.

With enough victories, though, testosterone can reach levels that make the animal act foolishly. He picks fights he can't win, tries to claim too much territory, and roams around in the open where predators might pick him off. A human being on a trading floor might take massive, risky bets on the strength of the American housing market or on U.S. corporate bonds. One of the traders Coates studied went on a hot streak, making twice his average profit-and-loss ratio for five days in a row. By the end of it his testosterone levels had risen 80 percent. If Coates had followed the trader long enough, he believes, there was a good chance "he would be irrationally exuberant and blow up."

For losers, the effect is the opposite: The stress and worry of losing money cause the endocrine system to flood the body with cortisol, which makes people afraid to take even favorable bets. In the wake of a financial crisis, it's not just Wall Street traders who suffer from this, but anyone making decisions about money, whether it's an employer who balks at hiring or a bank officer leery of making a loan even when the Federal Reserve is offering her free money to do so.

Coates's work reinforces the findings of behavioral economics, which looks at how actual human behavior—even that of financial professionals—fails to match up with the classical economic assumption that people are utility maximizers, dispassionately calculating costs and benefits. Because Coates focuses on biology rather than just behavior, his research suggests how these tendencies arise and a few ways we might better corral them. For one thing, he encourages financial firms to educate their employees about the effects hormones have on decision-making. "Traders need to be trained so they can recognize and handle the physiological changes resulting from their gains and losses, and from market volatility," he writes. Traders conditioned to spot the manic behavior of the winner effect might be more wary

**Traders are encouraged to take on more risk even as their hormones push them toward recklessness**

about taking risks they otherwise would have unthinkingly embraced.

To reduce volatility, banks should also strive for a sort of hormonal diversity. Testosterone levels decline as men enter middle age, and women have 10 percent to 20 percent the testosterone levels of men; both groups, Coates argues, should be better represented on trading floors. In his book he points to a study by the economists Brad Barber and Terrance Odean that shows that single women investors outperform single men over the long term (because they tend to trade their accounts less). Another study by Chicago-based Hedge Fund Research shows that hedge funds that were run by women significantly outperformed those run by men.

Whether this strategy would have saved JPMorgan its recent embarrassment is unclear. Ina Drew, the banker overseeing the office where the bad trades were made, is a woman—though, according to the *New York Times*, she was ill when the groundwork for the trades was being laid. Two of the strongest internal critics of the trades were women as well. (Coates is currently studying whether women are susceptible to the winner effect.)

At the very least, Coates says, JPMorgan should have been aware that it was fueling its employees' most counterproductive hormone-driven tendencies. Risk management systems at many banks give traders more leeway during bull markets and rein them in during bear markets. Compensation schemes similarly reward each year's winners and punish the losers. As a result, traders on a winning streak are allowed and encouraged to take on the most risk at exactly the time their biology is already pushing them toward recklessness. When the market turns, traders already gun-shy from cortisol are discouraged from taking any risk whatsoever, extending the downturn. Better, Coates says, to calculate pay based on longer timelines (a suggestion that plenty of non-neuroscientists have also proposed).

As for risk management, banks should start paying closer attention to those traders who are on a roll. "We have to start thinking of management as leaning against these tendencies, stabilizing the biology," Coates says. "Risk management should be looking at the stars. They're always the ones who succumb to this winner effect and end up blowing up the bank." **E**