INVESTMENTS & WEALTH MONITOR

A reprinted article from July/August 2018

ARTICLE REVIEW

Moore's Law vs. Murphy's Law in the Financial System: Who's Winning?

By Andrew W. Lo, PhD

Reviewed by Devin Ekberg, CIMA®, CPWA®, CFA®

INVESTMENTS & WEALTH INSTITUTE® formerly IMCA

Moore's Law vs. Murphy's Law in the Financial System: Who's Winning? *By Andrew W. Lo, PhD*

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Technological change typically is accompanied by unintended consequences. This observation echoes throughout Andrew Lo's paper, "Moore's Law vs. Murphy's Law in the Financial System: Who's Winning?" (2017). Technology is enabling an explosion of new products and services in the financial industry such as automated algorithms, cryptocurrencies, and robo-advisors. Compared to previously disruptive technology such as high-speed communication, this new wave of technology is enabling the machines themselves to make high-speed decisions.

On the one hand, the financial industry weighs the emergence of computing breakthroughs that make things faster, cheaper, and smarter (Moore's Law) against the complexities of a human-infused financial system, where "whatever can go wrong, will go wrong faster and bigger when computers are involved" (Murphy's Law). Unintended consequences include, according to Lo, "firesales, flash crashes, botched initial public offerings, cybersecurity breaches, catastrophic algorithmic trading errors and a technological arms race." Lo argues that these challenges create systemic risk in the financial ecosystem and are unavoidable as finance plays an increasing role in an increasingly modern, digital society. Rather than fighting the trend, he argues, the solution is to develop more-robust technology capable of adapting to or accommodating human behavior.

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Lo correctly recognizes that, as participants in the financial markets, we ourselves are the test pilots for the accelerated pace of technological innovation. Fortunately, recent technology breakdowns were temporary in nature. But, unfortunately, the breakdowns seem to be occurring at an accelerated rate. The paper offers the following examples in detail:

- The Quant Meltdown (August 2007)
- The Flash Crash (May 2010)
- The BATS Global Markets and Facebook initial public offerings (March and May 2012)
- Knight Capital Group (August 2012)
- The Treasury Flash Crash (October 2014)
- The Bloomberg terminal outage (April 2015)

Of course, solving the issues that caused these failures is important. But Lo equates better software engineering to merely treating the symptoms of a disease—the real solution, he writes, is creating a sort of financial immune system that's able to adapt to circumstances and prevent system-wide catastrophes.

Lo proposes a handful of must-have features and provides examples of how technology already is solving for them in innovative ways. At the risk of oversimplifying, the proposed features of the solution can be summarized as the following:

Adaptive regulation. Adaptive regulation comprises risk management systems that include dynamic loss probabilities, but for the entire financial system including the macroeconomy. Systems such as this exist for smaller segments of the markets, particularly for liquid instruments, but they don't yet exist on the system as a whole due to informational limitations.

Code simplification. To regulate the financial system, the legal code on which it operates must be simplified to avoid potential unintended consequences due to its "thousands of pages of poorly documented codes, with a multitude of complex, spaghetti-like dependencies between individual components."

Transparency vs. privacy. The need for information is critical in such an adaptive solution; however, the industry participants will be reluctant to provide it if it cannot provide the right balance of transparency and privacy. Fortunately,

Continued on page 58 →

ARTICLE REVIEW: MOORE'S LAW VS. MURPHY'S LAW

Continued from page 53

developments in cryptography could provide techniques to accomplish this.

The complexity of the global financial system likely will continue to grow exponentially due to its symbiotic relationship with technology. Just as telephones and electronic communication catapulted Wall Street to new levels, new advances in computing hardware, software, and data analytics likely will fuel its continued growth. The problem with modern finance's modeling efforts rests in using "laws" created by humans for a system populated by humans. These are not laws in the same way that gravity is law. As economic and financial laws change and adapt, so too must our ability to anticipate the unintended consequences.

For practitioners, the challenge is not just anticipating the unintended consequences but proactively preparing for them. Consider the following: First, the increasing frequency of tail-risk events could mean constructing portfolios to specifically accommodate them. Second, advisors may need to get used to educating clients and correcting their behavior when new risks evoke their archaic instincts. Finally, now that technology is legitimately competing for advisors' alpha, advisors must align their services with their clients' life goals (both financial and non-financial) in a way that can't be commoditized.

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REFERENCE

Lo, Andrew W. 2017. Moore's Law vs. Murphy's Law in the Financial System: Who's Winning? *Journal of Investment Management* 15, no. 1: 17–38.

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