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WHY WE NEED TO TRANSFORM OUR VIEW OF RISK

A summary of the talk given by Andrew Lo at the 2009 SOA Annual Meeting in Boston

By Gary Hatfield

Among the many interesting sessions at the 2009 SOA Annual Meeting in Boston was a lecture presented by Professor Andrew Lo. I had the distinct pleasure of introducing Professor Lo to the audience. Andrew Lo is the Harris & Harris Professor of Finance at MIT's Sloan School of Management and the Director of the MIT Laboratory for Financial Engineering. His list of research accomplishments and awards is very impressive; I had to leave out most of the details and I will do so here as well. I will simply mention that he is a prolific author, edits several important finance journals, and has won many awards. Given his background, he did not disappoint. For me, it was one of the most entertaining and interesting presentations I have ever witnessed at a professional meeting.

He began with a summary of the crisis and the long list of people and institutions that share blame. He asked, "Is there a common denominator?" As a hint, he quoted from a very good article titled, "Confessions of a Risk Manager" that appeared in the Aug. 7, 2008 edition of The Economist. In that article, a risk manager of a large investment bank speaks frankly as to why risk management failed to stop the excessive risk-taking. An important point is that the banks often kept AAA tranches of the CDO's they created on their own balance sheets. A key quote, "We were most eager to sell the non-investment-grade tranches [of CDO's created by the investment bank], and our risk approvals were conditional on reducing these to zero." And who bought these non-investment-grade tranches? Hedge funds.

To better understand the importance of the above observations, Professor Lo gave a very simple example of how CDO tranching works. The example features two identical bonds that either pay $1000 with 90 percent probability or $0 with 10 percent probability. He then observes that the (expected) value of each bond is $900 (ignoring interest for simplicity). Now, assuming independence of defaults, a portfolio of two such bonds will have three possible payoffs: $2000 with 81 percent probability, $1000 with 18 percent probability and $0 with 1 percent probability. But if the portfolio is divided into senior and junior tranches of $1000 each, the payoffs are as follows: senior tranche pays $1000 with 99 percent probability and $0 with 1 percent probability while the junior tranche pays $1000 with 81 percent probability and $0 with 19 percent probability. So, under the independence assumption, the value of the senior tranche is $990 while the junior tranche is worth $810.

What's the point? The senior tranche is like the AAA CDO tranches retained by the investment banks and the junior tranche is like the non-investment-grade tranches sold off to hedge funds. Professor Lo then showed what happens when the independence assumption is wrong. To take it to an extreme, if we suppose that the bonds are 100 percent correlated, then the buyer of the senior tranche will have paid too much and the buyer of the junior tranche got a very good deal. And this is what happened to the banks. They lost on both counts—they held the overvalued tranches and sold the undervalued ones.

This leads to one of the key points of the lecture: risk is not just market risk; systemic risk matters. What is systemic risk? It is risk to the financial system. Systemic risk differs from market risk in a number of ways. Systemic risk arises from unexpected losses. The kinds of losses that the system was not designed to tolerate. Systemic risk is nonlinear, dynamic and complex. The markets have become increasingly complex in recent history. Indeed, the world itself has.

Professor Lo then asked, "Why does crisis happen in other technology-based industries?" Here, he is thinking about catastrophes such as Chernobyl and Three Mile Island, the shuttle disasters, and transportation failures like the Minneapolis bridge collapse. He also tells us about Perrow's (1984) Theory of Normal Accidents. According to the theory, whenever there are two conditions present, 1) complex systems (nonlinearities), and 2) tight coupling (i.e., high levels of interdependence), we should expect large failures. We should therefore prepare for these failures. He then gave a few examples from finance to illustrate the high level of complexity involved. He then added a third condition which he first proposed in 2004:

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absence of negative feedback over an extended period of time. Could the current financial crisis have been avoided? Not in his view, because we didn't know something was wrong. Indeed, he shows that more than one observer (including himself and Robert Shiller) raised an alarm as far back as 2005. However, he argues that foreknowledge of the danger could not have prevented the crisis because of what he calls the psychology of greed. In short, our psychological makeup prevents us from avoiding these kinds of risk. To set things up, he asked us to imagine the plight of a CRO at an investment bank in 2006. Suppose they correctly recognized the growing systemic risk from the subprime CDO business. They could have recommended an unwinding of the very business responsible for over half of the bank's profits for the decade. Or perhaps they could have ordered the exposure hedged with resulting losses over the next year or so. But no matter how you look at it, it is hard to come up with a course of action that would not have cost the CRO his or her job other than recommending to "stay the course."

To even more powerfully illustrate our limitations, he asked the audience to participate in a cognitive experiment. He showed a film of several college students passing around basketballs—some wearing black t-shirts while others were wearing white. The goal for the audience was to only count how many passes occurred between black t-shirted students. To make it even harder, Professor Lo randomly counted along but incorrectly. When the film was done, he polled the audience and got a dispersion of counts between 15 and 20. He then asked if anyone had seen something else of interest. One person shyly raised her hand and said, "There was some kind of monkey?" Upon inquiry, about 20 percent of the audience said they saw something like a monkey. Well over half did not. Upon replay, a man dressed in gorilla suit strolled into the center of the screen, turned to the camera, beat his chest, and walked off. Professor Lo quipped, "All this talk about Black Swans when we can't even see the black gorilla looking right at you and beating his chest." Humor aside, the point here is that we are incredibly good at focusing on the talk in front of us. So much so that we ignore things that are not part of the task. In the financial context, this means that managers with incentives to make earnings and revenue goals will not see the gorilla (systemic risk) looking at them and beating its chest.

So what are the implications? According to Lo, we need a central body responsible for systemic risk. But, he does not mean to assert that we need more regulation. What he has in mind is something more akin to the role the NTSB plays in aviation. After all, financial regulators often work to increase systemic risk rather than to decrease it. Like the NTSB, the body would objectively report on the causes of failures. And the regulators (e.g., FAA in the case of the NTSB) would not be immune from critique. In the end, crisis preparation may be as important (if not more) than crisis prevention.

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