

A minute with Marcos Lopez de Prado

MARCOS LOPEZ DE PRADO is the Head of Quantitative Trading at Hess Energy Trading Company, the trading arm of Hess Corporation, a Fortune 100 company. Before that, Marcos was Head of Global Quantitative Research at Tudor Investment Corporation, where he also led High Frequency Futures Trading and several strategic initiatives. In addition to his 15 years of investment management experience, Marcos has received several academic appointments, including Postdoctoral Research Fellow of RCC at Harvard University, Visiting Scholar at Cornell University, and Research Affiliate at Lawrence Berkeley National Laboratory (U.S. Department of Energy's Office of Science). He holds a Ph.D. in Financial Economics (2003), a second Ph.D. in Mathematical Finance (2011) from Complutense University, is a recipient of the National Award for Excellence in Academic Performance by the Government of Spain (National Valedictorian, 1998) among other awards, and was admitted into American Mensa with a perfect test score. Marcos has an Erdős #3 and an Einstein #4 according to the American Mathematical Society, and has collaborated with more than 25 co-authors.

Marcos is a scientific advisor to Enthought's Python projects (NumPy, SciPy), to quantum computing firm 1QBit, and a member of the editorial board of several academic publications. His research has resulted in three international patent applications, multiple papers listed among the most read in Finance (SSRN), publications in the leading Mathematical Finance journals, three textbooks, etc. His most recent book was released a few weeks ago: "High-Frequency Trading: New Realities for Traders, Markets and Regulators" (Risk Books, 2013), co-edited with Profs. Maureen O'Hara and David Easley. The book includes contributions from leading practitioners and academics, like Robert Almgren, Terry Hendershott, Charles Jones, David Leinweber, Michael Kearns, Oliver Linton, Albert Menkveld, Richard Olsen, George Sofianos, Michael Sotiropoulos, Jean-Pierre Zigrand, etc.

Q1: What are your research interests right now?

During my tenure at Tudor Investment Corporation, I was asked to coordinate a group of about 20

senior discretionary portfolio managers (PMs) and quantitative researchers. The goal was to systematize the idea-generation process of discretionary PMs, what I call *Quantitative Portfolio Oversight* (QPO). The key principle behind QPO is that a team of discretionary portfolio managers can deliver systematic-style returns when coordinated through a quantitative process. Many people see quantitative investing as opposite to discretionary trading. However, one thing we learned from that project is that discretionary traders are much more systematic than they may be aware of. In other words, it is possible to distill the algorithms used by a discretionary trader to make decisions, which can then be deployed on many more securities and markets than a human is able to follow. In my experience, the hybrid of quant and discretionary investing, when implemented in a coherent and consistent process, delivers exceptional risk-adjusted returns.

This has been an incredibly challenging project, but we made significant discoveries. Some of our findings have been published in *Algorithmic Finance*, *Mathematical Finance*, *Quantitative Finance*, the *Journal of Risk*, etc. (see www.QuantResearch.info for references) This line of research has attracted a lot of interest among discretionary trading firms, and earlier this year I moved to Hess Energy Trading Company, where I continue to make progress on this subject.

Q2: What do you see as academically exciting?

In a recent article, *The Economist* argued that Science is in crisis. In the context of Finance, Prof. Campbell Harvey has asserted that "most claimed research findings are likely false". This problem should not affect mathematical discoveries, such as the ones published in *Algorithmic Finance*. Elsewhere, the implication seems to be that the peer-review process is severely flawed, which may explain why only a tiny fraction of academic work ends up becoming useful to practitioners. Academic finance is at risk of becoming a purely formalistic discipline, detached from reality, absorbed by internal controversies, an extreme example of which is medieval theology or astrology.

What is a crisis for some, may become an exciting opportunity for others. The goal of academic

financial research should not be reduced to publication, but more importantly researchers should strive for application. I encourage academics, especially the young ones, to engage and collaborate with financial firms. Financial firms are the only laboratories where academic financial theories can be reliably tested and validated. I think it is safe to assume that most academic theories and models not applied by financial firms are likely to be either impractical or wrong. Algorithmic Finance does a great service in this regard, because algorithms incorporate explicitly the rules for how to test a particular theory. For example, I would like to bring to the reader's attention the excellent paper published in your journal by Profs. Marco Avellaneda, Josh Reed and Sasha Stoikov (AF 1:1, 35–43): A truly remarkable theoretical contribution to the field of market microstructure, and one that is also being used by many practitioners.

This may be an unpopular position, but sciences are supposed to advance through experimental application. As intellectually pleasing as Einstein's theories were, they remained largely ignored for 14 years, until

a team of astronomers was able to verify some of his predictions during the 1919 solar eclipse.

Q3: What would you work on if you had lots of time?

I feel that I have the best job in the world. I have the ability of doing academic research, as I would do in a University, and to put it to the test in real financial markets, to see if it works, before committing to a publication. I'm not rewarded in any way for publishing, so my motivation is merely to hear from colleagues regarding suggestions and ideas for improvement. Previous trading firms I have worked for placed many obstacles to publishing, and even now I only publish a portion of what I find. Ultimately, my mandate is to do quantitative research and monetize it for a proprietary trading firm, which compensates me with a percentage of the profits I generate. It sounds like a difficult job, but the reality is that my colleagues are among the most successful discretionary traders, and often I just need to write the algorithms that replicate the actions that they know instinctively to be correct. If I had lots of time, I would probably do more of the same.