Editorial: 25th anniversary of *Finance and Stochastics*

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In 2021, *Finance and Stochastics* celebrated its 25th year of publication. This Special Issue, the first in year 26 of the journal's life, is a tribute to the journal and its publisher Springer, to the many authors who published in it, to the Editorial Board and all the referees who worked hard and helped make the publications possible and better, and last but not least to the field of mathematical finance itself. Very special thanks go to Dieter Sondermann, the founding editor, and to Catriona Byrne from Springer, who both in a decisive manner made *Finance and Stochastics* start and flourish.

Twenty-five years, a quarter of a century, is a long time for a still relatively young field. It seems appropriate to make a pause and look back and ahead. As always and everywhere, looking back is much easier, and one can see in retrospect what was important, gave impetus and so on. In contrast, especially in finance, giving a prognosis or even making a prediction is fraught with uncertainty and risk. So we largely refrain from that here and only steal a few words and phrases from the articles in this Special Issue. In terms of finance and economics, current and future challenges will come from areas like digital goods, cryptocurrencies, energy markets, healthcare economics, global warming and the environment, and others. In more mathematical terms, current and new directions include optimal transport, algorithmic trading and market microstructure, mean-field games, credit and systemic risk, model robustness, portfolio optimisation, and of course machine learning. We deliberately refrain here from making any statements about relative importance or potential.

Traditionally, a birthday celebration involves looking back at the past, and this Special Issue is no different. It contains two articles which give a historical perspective of the field of mathematical finance in its relation to *Finance and Stochastics*, two articles which build a bridge between the past over the present towards the future, and one article which extrapolates from the more recent past towards some questions and challenges for the future. In more detail, the articles are the following.

In *An Italian perspective on the development of financial mathematics from 1992 to 2008*, Wolfgang Runggaldier describes the history of mathematical finance and its

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connections to *Finance and Stochastics* as it evolved from the perspective of Italian conferences. There were a lot of these conferences when the field was developing, Wolfgang was a driving force behind many of them, and in consequence helped shape the evolution of the field through facilitating exchanges between researchers. For those (like myself) who were present at one or several of these conferences, the article will surely bring back fond memories; for the younger generation, it may serve as a shining example of steadfast contribution over a long period of time.

In *My journey through finance and stochastics*, Marek Musiela next describes his personal experiences with finance and stochastics, meaning not only the journal but actually the two fields themselves. Marek (together with Marek Rutkowski) not only wrote one of the first books on mathematical finance, but spent his entire career highly successfully going back and forth between academia and financial industry. Several of his ideas became industry standards, as well as standard terms in mathematical finance, and his unique combination of financial insight and mathematical intuition make the article marvellous reading.

It is often argued that the father of mathematical finance should be identified as Louis Bachelier (even if the idea of using call options, albeit without a model for pricing, can be traced back to Thales). In *From Bachelier to Dupire via optimal transport*, Mathias Beiglböck, Gudmund Pammer and Walter Schachermayer explain how an old idea appearing already in Bachelier's thesis led via work by Bruno Dupire to intriguing questions for which complete answers are still only just coming up or even still missing. This article is an excellent example of the frequently encountered situation in mathematical finance where a problem coming originally from a financial question leads to sometimes unexpected and very challenging and stimulating purely mathematical questions. Moreover, the article goes all the way from the origins of mathematical finance up to some of the very latest developments in the field.

A second bridge between past, present and future is spanned by René Carmona. His article *The influence of economic research on financial mathematics: Evidence from the last 25 years* provides a very personal review of the way that economic research influenced the agenda and topics in the field of mathematical finance, in particular when viewed through the lens of *Finance and Stochastics*. This gives a fresh and very stimulating outlook on how classical and new topics from economics and finance were picked up and developed by the mathematical finance community, and how more recent developments and ideas in economics already do or in the future might affect the shape and direction of the field.

Finally, in *Reinforcement learning and stochastic optimisation*, Sebastian Jaimungal presents an overview of some recent ideas and directions with a focus on questions and problems coming from a financial background. This article is neither a plea for, nor an appeal against, machine learning, but rather aims to give a balanced view of new ideas and approaches that one might want to use in solving problems from mathematical finance. At the same time, the article points out a number of open issues that one still needs to understand better for a well-informed decision and for applications of these tools. It may well be that this leads sooner or later to more research and more insights in this challenging and promising subarea of mathematical finance.

With this Special Issue, the entire Editorial Board want to congratulate *Finance and Stochastics* on its 25th anniversary. We wish it many more happy, fruitful and scientifically productive years to come!

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