Abstract: This paper considers a firm’s capacity expansion decisions under uncertainty. The firm has leeway in timing investments and in choosing how much capacity to install at each investment time. We model this problem as the sequential exercising of compound capacity expansion options with embedded optimal capacity choices. We employ the impulse control methodology and obtain a quasi-variational inequality that involves two state variables: an exogenous, stochastic price process and a controlled capacity process (without a diffusion term). We provide a general verification theorem and identify—and prove the optimality of—a two-dimensional (s,S)-type policy for a specific case. The firm delays investment in capacity to ensure that the perpetuity value of newly installed capacity exceeds the total opportunity cost, including the fixed cost component, by a sufficient margin. Our general model for “the option to expand” transcends a single-option exercise and yields predictions of both the optimal investment timing and the optimal scale of production.

C.V.: Dr. Benoît Chevalier-Roignant has been at King’s Business School, King’s College London since September 2016 (in the Accounting & Finance group). His research is at the intersection of corporate finance and industrial organisation, investigating how market uncertainty and strategic reactions affect a firm’s capital-budgeting decisions on capacity expansion, innovation investments, production flexibility and market entry in uncertain competitive environments. Benoît has published peer-reviewed articles in top journals such as Operations Research (ABS 4*) and the European Journal of Operational Research (ABS 4). He also co-authored “Competitive Strategy: Options and Games” (with Lenos Trigeorgis) published at The MIT Press. “Competitive Strategy” has been selected among the best books in strategy by strategy + business (Issue 69, Winter 2012), the management magazine published by the strategy consulting firm PwC Strategy&/Booz.

Beside his academic track record, Benoît has year-long professional experience in professional services firms such as L.E.K. Consulting, EY and Oliver Wyman, with an extensive expertise on private equity transactions. He obtained his PhD (“Dr.rer.pol.”) from WHU – Otto Beisheim School of Management, a diploma (“Diplom-Kaufmann”) from WHU and a Master’s in Management with a concentration in Finance from emlyon business school. Benoît was a postdoctoral fellow at the University of Texas at Dallas and a visiting scholar at MIT Sloan School of Management, The University of Chicago Booth School of Business and Kellogg School of Management (Northwestern University).