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Optimal Accelerated Share Repurchase

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Abstract

An accelerated share repurchase (ASR) allows a firm to repurchase a significant portion of its shares immediately, while shifting the burden of reducing the impact and uncertainty in the trade to an intermediary. The intermediary must then purchase the shares from the market over several days, weeks, or as much as several months. Some contracts allow the intermediary to specify when the repurchase ends, at which point the firm and the intermediary exchange the difference between the arrival price and the TWAP over the trading period plus a spread. Hence, the intermediary effectively has an American option embedded within an optimal execution problem. As a result, the firm receives a discounted spread relative to the no early exercise case. Here, we address the intermediary's optimal execution and exit strategy taking into account the impact that trading has on the market. We demonstrate that it is optimal to exercise when the TWAP exceeds $\zeta(t, q_t), S_t$ where S_t is the midprice of the asset and ζ is a deterministic function of time and inventory. Moreover, we develop a dimensional reduction of the stochastic control and stopping problem and implement an efficient numerical scheme to compute the optimal trading and exit strategies. We also provide bounds on the optimal strategy, and characterize the convexity and monotonicity of the optimal strategies in addition to exploring its behavior numerically and through simulation studies.

Keywords: Accelerated Share Repurchase, Optimal Liquidation, American Option, Stochastic Control, Optimal Stopping

JEL Classification: C6, C61, C73, G12

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assume the scheme does converge to the viscosity solution and explore the resulting financial intuition gained from the simulations. The full QVI (4.4) can be solved using a similar scheme to one outlined above. References Almgren Posted: 1999-12

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