On dynamic portfolio choice with price impact

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We propose a variant of the limit order book model by Obizhaeva and Wang (2013) which allows for both selling and buying stock. Specifically, our price impact model determines bid- and ask-prices via a coupled system of controlled diffusions, allowing us to retain the possibility to specify market depth, tightness and resilience. We discuss the problem of optimal investment in this model. For arithmetic Brownian motion with drift as the unaffected price process and exponential utility, the resulting singular optimal control problem turns out to have a deterministic solution which we construct explicitly by methods from convex analysis. As expected by previous studies in the literature, it turns out to be optimal to trade towards the frictionless Merton portfolio taking into account the initial bid-ask-spread as well as the optimal liquidation of the position when approaching the terminal time. This is joint work with Peter Bank.