Abstract In this talk I will describe a novel class of stochastic control problems arising in the theory of corporate finance.* These are problems in which a controller determines both the drift coefficient $\alpha$ and the volatility coefficient $\beta$ of a one-dimensional diffusion process. There are natural lower bounds on both $\alpha$ and $\beta$, strictly positive in the latter case, and to simplify the analysis one can impose upper bounds on $\alpha$ and $\beta$ as well. The controller’s reward structure is one that induces bang-bang control of both $\alpha$ and $\beta$, so as we relax the artificial upper bounds we approach a limit regime in which an optimal control chooses “infinite drift” in one part of the state space, and chooses “infinite volatility” in another part. The former notion was made rigorous in the 1980’s by the theory of optimal singular control, but a proper mathematical treatment of the latter notion has yet to be developed.