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Optimal regime switching under risk aversion and uncertainty

M. Chronopoulos, S. Lumbreras

Abstract— Technology adoption is key for corporate strategy, often determining the success or failure of a company as a whole. However, risk aversion often raises the reluctance to make a timely technology switch, particularly when this entails the abandonment of an existing market regime and entry in a new one. Consequently, which strategy is most suitable and the optimal timing of regime switch depends not only on market factors, such as the definition of the market regimes, as well as economic and technological uncertainty, but also on attitudes towards risk. Therefore, we develop a utility-based, regime-switching framework for evaluating different technology-adoption strategies under price and technological uncertainty. We assume that a decisionmaker may invest in each technology that becomes available (compulsive) or delay investment until a new technology arrives and then invest in either the older (laggard) or the newer technology (leapfrog). Our results indicate that, if market regimes are asymmetric, then greater risk aversion and price uncertainty in a new regime may accelerate regime switching. In addition, the feasibility of a laggard strategy decreases (increases) as price uncertainty in an existing (new) regime increases. Finally, although risk aversion typically favours a compulsive and a laggard strategy, a leapfrog strategy may be feasible under risk aversion provided that the output price and the rate of innovation are sufficiently high.

Index Terms— Investment analysis; Real options; Regime switching; Risk aversion; Dynamic programming

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