

Production management on markets with transaction costs

Adrien Nguyen Huu

Université Dauphine, CEREMADE

and FiME-EDF R&D

Paris, France

E-mail:nguyen@ceremade.dauphine.fr

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This study is motivated by pricing issues on electricity markets, and represents an extension to continuous time of [1]. The non-storability of the underlying asset leads to consider the production in financial matters. Adding the possibility to produce assets by the way of general production means, we rise new questions about arbitrage pricing and optimization in this framework.

We consider the set A^R of portfolios of the form

$$V_t = V_t^F + \sum_{n \geq 0} R_{\tau_n}(\xi_{\tau_n}) - \xi_{\tau_n} + c_{\tau_n}$$

where V^F is a self-financing portfolio on a d -dimensional market with ϵ -transaction costs, see [3], and $(R_t)_{t \leq T}$ is a family of functions representing the production means. The process $(c_t)_{t \leq T}$ corresponds to a fixed cost. Here, with $(\tau_n, \xi_{\tau_n})_{n \geq 0}$, we deal with an impulse control approach of consumption into production management, but we allow for more general production systems.

We then extend the no-arbitrage condition of [3] for portfolios in A^R and prove that this condition is equivalent to the existence of a martingale deflator for the financial part and the production part also. In the line of [2], and under some assumptions on the production function R , this fundamental theorem of asset pricing implies some properties on the set of attainable claims : its Fatou-closedness and a dual representation by a superhedging theorem.

References

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