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Implicit Transaction Costs and the Fundamental Theorems of Asset Pricing

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Abstract : This paper studies arbitrage pricing theory in financial markets with transaction costs. We extend the existing theory to include the more realistic possibility that the price at which the investors trade is dependent on the traded volume. The investors in the market always buy at the ask and sell at the bid price. Transaction costs are composed of two terms, one is able to capture the implicit transaction costs and the other the price impact. Moreover, a new definition of a self-financing portfolio is obtained. The self-financing condition suggests that continuous trading is possible, but is restricted to predictable trading strategies which have left and right limit and finite quadratic variation. That is, predictable trading strategies of infinite variation and of finite quadratic variation are allowed in our setting. Within this framework, the existence of an equivalent probability measure is equivalent to the absence of arbitrage opportunities, so that the first fundamental theorem of asset pricing (FFTAP) holds. It is also proved that, when this probability measure is unique, any contingent claim in the market is hedgeable in an L2-sense. The price of any contingent claim is equal to the risk-neutral price. To better understand how to apply the theory proposed we provide an example with linear transaction costs.

Keywords : arbitrage pricing theory, transaction costs, fundamental theorems of arbitrage, financial markets
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