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in 1973 f. black and m. scholes published their pathbreaking paper [bs 73] on option pricing. the key idea -- attributed to r. melton in a footnote of the black-scholes paper -- is the use of trading in continuous time and the notion of arbitrage. the simple and economically very convincing ''principle of no-arbitrage'' allows one to derive, in certain mathematical models of financial markets (such as the samuelson model, [s 65], nowadays also referred to as the "black-scholes" model, based on geometric brownian motion), unique prices for options and other contingent claims. this remarkable achievement by f. black, m. scholes and r. merton had a profound effect on financial markets and it shifted the paradigm of deal-ing with financial risks towards the use of quite sophisticated mathematical models.

Let us turn back to the no-arbitrage theory developed in Chap. 2 to raise again the question what can we deduce from applying the no-arbitrage principle with respect to pricing and hedging of derivative securities

While we obtained satisfactory and mathematically rigorous answers to these questions in the case of a finite underlying probability space in Chap. 2 we saw in Chap. 4 that the basic examples for this theory the Bachelier and the BlackScholes model do not fit into this easy setting as they involve Brownian motion.

In Chap. 4 we overcame this difficulty either by using well-known results from stochastic analysis e.g. the martingale representation Theorem 4.2.1 for the Brownian filtration or by appealing to the faith of the reader that the results obtained in the finite case also carry over —— mutatis mutandis —— to more general situations as we did when applying the change of num~raire theorem to the calculation of the Black-Scholes model.

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