Martingales and Finance

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I discuss the reasons (financial and economical) for why the tool of martingale stochastic processes are crucial in finance. I start with a very simple motivational model, in which I show how the notion of martingales in financce emerges as a complete characterization of the fundamental economic principle of no arbitrage in financial markets. This is the so called Funadamental Theorem of Finance. I will then go on to discuss more general discrete and continuos time models of financial markets, I will elaborate on the generalization of the link between no arbitrage and martingales in these more general cases. Aalthough the talk will be mathematical in nature, I do not dwell on all the mathematical fine details but I would rather try to convey the economic reasoning that motivates the math.