The thesis shows the relationship between the persistence in the financial markets returns and their efficiency. It interprets the efficient markets hypothesis and provides various time series models for the analysis of financial markets. The concept of long memory is broadly presented and two main types of methods to estimate long memory are analysed – time domain and frequency domain methods. A Monte Carlo study is used to compare the methods and selected estimators are then used on real world data – exchange rate and stock market series. There is no evidence of long memory in the returns but the stock market volatilities show clear signs of persistence.