This thesis is composed of three chapters which propose some novel approaches to model and forecast financial time series. The first chapter focuses on high frequency financial returns and proposes a quantile regression approach to model their intraday seasonality and dynamics. The second chapter deals with the problem of forecasting the yield curve including large datasets of macroeconomics information. While the last chapter addresses the issue of modelling the term structure of interest rates.

The first chapter investigates the distribution of high frequency financial returns, with special emphasis on the intraday seasonality. Using quantile regression, I show the expansions and shrinks of the probability law through the day for three years of 15 minutes sampled stock returns. Returns are more dispersed and less concentrated around the median at the hours near the opening and closing. I provide intraday value at risk assessments and I show how it adapts to changes of dispersion over the day. The tests performed on the out-of-sample forecasts of the value at risk show that the model is able to provide good risk assessments and to outperform standard Gaussian and Student’s t GARCH models.

The second chapter shows that macroeconomic indicators are helpful in forecasting the yield curve. I incorporate a large number of macroeconomic predictors within the Nelson and Siegel (1987) model for the yield curve, which can be cast in a common factor model representation. Rather than including macroeconomic variables as additional factors, I use them to extract the Nelson and Siegel factors. Estimation is performed by EM algorithm and Kalman filter using a data set composed by 17 yields and 118 macro variables. Results show that incorporating large macroeconomic information improves the accuracy of out-of-sample yield forecasts at medium and long horizons.

The third chapter statistically tests whether the Nelson and Siegel (1987) yield curve model is arbitrage-free. Theoretically, the Nelson-Siegel model does not ensure the absence of arbitrage opportunities. Still, central banks and public wealth managers rely heavily on it. Using a non-parametric resampling technique and zero-coupon yield curve data from the US market, I find that the no-arbitrage parameters are not statistically different from those obtained from the Nelson and Siegel model, at a 95 percent confidence level. I therefore conclude that the Nelson and Siegel yield curve model is compatible with arbitrage-freeness.