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Nota di contenuto	Intro -- Foreword -- Acknowledgements -- Contents -- List of Figures -- List of Tables -- List of Abbreviations -- List of Symbols -- 1 Introduction -- 1.1 Motivation -- 1.2 Problem statement -- 1.3 Outline of the thesis -- 2 Financial time series -- 2.1 Definitions and properties -- 2.2 Stylized facts -- 2.3 Model specification -- 2.4 Univariate GARCH models -- 2.5 Long-range dependence and structural breaks -- 3 Smoothing long term volatility -- 3.1 Multiplicative decomposition of the conditional variance function -- 3.2 Spline functions -- 3.2.1 Truncated power spline function -- 3.2.2 B-spline functions -- 3.3 Model review -- 3.3.1 Spline volatility models -- 3.3.2 Spline-GARCH model -- 3.3.3 B-spline-GARCH model -- 3.3.4 P-spline GARCH model -- 4 Free-knot spline-GARCH model -- 4.1 Optimization -- 4.2 Estimation methods -- 4.2.1 Least-squares -- 4.2.2 Least-squares with free-knots -- 4.2.3 Jupp transformation -- 4.2.4 Quasi-maximum-likelihood -- 4.3 Model selection -- 4.4 Forecast evaluation -- 4.5 Starting vector -- 5 Simulation study -- 5.1 Previous studies -- 5.2 Simulation setup -- 5.2.1 Data generating process -- 5.2.2 Computational aspects -- 5.2.3 Sample statistics -- 5.2.4 Asymptotic statistics -- 5.2.5 Specification -- 5.2.6 Starting vectors -- 5.3 Model selection -- 5.4 Finite sample properties -- 6 Empirical study -- 6.1 Previous studies -- 6.2 In-sample analysis --

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