

# Introduction

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This edited volume consists of 30 original contributions in the two closely related research areas of empirical economic research and empirical financial research. Empirical economic research, also called empirical economics, is an important traditional sub-discipline of economics. The research activities in this area are particularly reflected by the journal “Empirical Economics” published by Springer-Verlag since 1976, and by the parallel series “Studies in Empirical Economics,” which consists of 21 volumes published from 1989 to 2009 on different topics in this area. In recent years research in empirical economics has experienced another booming phase due to easy availability of very large data sets and the fast increase of computer power. This trend is reflected by the fact that the Econometric Society has published a new journal in quantitative/empirical economics, called “Quantitative Economics,” since 2010. Stevenson and Wolfers (2012) note that the research in economics after the global financial crisis in 2008 is showing “a long-running shift toward a more empirical field, to the study of what hard data can tell us about the way the world really works.” On the other hand, empirical financial research, also called empirical finance, has a relatively short tradition but the development in this area seems to be even faster than that of empirical economics, because, as indicated

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by Campbell et al. (1996), “Financial economics is a highly empirical discipline, perhaps the most empirical among the branches of economics . . . . for financial markets are not mere figments of theoretical abstraction.” The rapidly growing research in empirical finance is of course also pushed by the empirical success of ARCH (autoregressive conditional heteroskedasticity, Engle, 1982), GARCH (generalized ARCH, Bollerslev, 1986) and SV (stochastic volatility) models (Taylor, 1986), and a huge number of extensions with a wide range of applications in financial research. A detailed review in this context may be found, for instance, in Andersen and Bollerslev (1998). No doubt, empirical economic and financial research are closely related disciplines. Firstly, there is a clear overlap between statistical and econometric methods employed in both areas. Secondly, sometimes topics from the two disciplines are or must be studied together. This is in particular true when the impact of financial markets on economy is considered or when the economic sources of financial market volatility are studied. See, e.g., the recent study of Engle et al. (2008) on the latter topic. From a general point of view, finance can also be viewed as a sub-discipline of economics and hence empirical finance can be understood as a sub-area of empirical economics.

As an edited volume in honor of the 75th birthday of Siegfried Heiler, the selected subject areas reflect the broad range of his research. He worked on different topics of empirical economics since the late 1960s. One of his main areas was the analysis of macroeconomic time series. The Berlin Method (BV, Berliner Verfahren, Heiler, 1969, 1970) and further extended versions (Heiler, 1976, 1977) have become standard methods of the German Federal Statistical Office since the early 1970s for calculating major business-cycle indicators. Its fourth version (BV4) is used by the German Federal Statistical Office since 1983 (see Heiler and Michels, 1994; Speth, 2006 and references therein), and also by the DIW-Berlin (German Institute for Economic Research) and other institutes involved in empirical economic research. Since then, further improvements of the BV have been worked out by Heiler and his students. For instance, optimal decomposition of seasonal time series using spline-functions is discussed by Hebbel and Heiler (1978, 1987a), smoothing of time series in an error-in-variables model was studied by Hebbel and Heiler (1985), decomposition of seasonal time series based on polynomial and trigonometric functions is proposed in Hebbel and Heiler (1987b). Also a generalized BV has been developed (see the next chapter for a detailed description and applications). The application of local regression with polynomials and trigonometric functions as local regressors is discussed in Heiler and Michels (1994), algorithms for selecting the bandwidth based on this approach are developed in Heiler and Feng (1996, 2000) and Feng and Heiler (2000). Other significant contributions include robust estimation of ARMA models (Allende and Heiler, 1992; Heiler, 1990) and related topics in economic time series analysis.

Since the early 1990s, Prof. Heiler’s research focused on further developments of nonparametric time series analysis, solving in particular the crucial problem of bandwidth selection (see Heiler, 2001 for an overview). New algorithms for bandwidth selection in nonparametric regression are published in Heiler and Feng (1998), Beran et al. (2009), and Feng and Heiler (2009). Nonparametric time series

models for empirical financial research may be found in Abberger et al. (1998), Abberger and Heiler (2001, 2002), and Feng and Heiler (1998). Another area Prof. Heiler was involved in is environmental statistics. Results in this context are summarized, for instance, in Heibel and Heiler (1988) and Heiler and Michels (1986, 1989) (also see his contribution in Ghosh et al., 2007). In the early years of his academic career, he also worked on some research topics in demography (Heiler, 1978, 1982). At that time, Heiler (1978) already indicated possible effects of the decline in the birthrate on the future of the German social security system.

The contributions to this volume are divided into three parts: (1) Empirical Economic Research; (2) Empirical Financial Research; (3) New Econometric Approaches. The first part, chapters “Decomposition of Time Series Using the Generalised Berlin Method (VBV)” through “The Precision of Binary Measurement Methods”, consists of methods most suitable for empirical research in economics. Properties of the methods are discussed and applications are illustrated by real data examples. This part also includes two case studies to show how a project in empirical economics can be carried out using existing methods in the literature. In the second part, chapters “On EFARIMA and ESEMIFAR Models” through “Zillmer’s Population Model: Theory and Application”, different new models with a clear emphasis on applications in empirical financial research are introduced. Their theoretical properties and practical implementation are discussed in detail, together with applications to real financial data. A case study on the development of a currency crises monitoring system is also included. Finally, the third part, chapters “Adaptive Estimation of Regression Parameters for the Gaussian Scale Mixture Model” through “On a Craig–Sakamoto Theorem for Orthogonal Projectors”, consists of general contributions to econometric and statistical methodology. Here the emphasis is on the discussion of theoretical properties. In some contributions theoretical results are confirmed by simulation studies.

The topics in the three parts are closely related to each other. Some contributions may be logically allocated to more than one part. Moreover, topics in environmental statistics and demography are also involved in some of the contributions, but these are not indicated separately. From the methodological perspective the contributions cover a wide range of econometric and statistical tools, including uni- and multivariate time series analysis, different forecasting methods, new models for volatility, correlations and high-frequency financial data, approaches in quantile regression, panel data analysis, instrument variables, and errors in variables models. The methodological characteristic was not a criterion for the allocation to Parts I, II, and III. Hence, contributions to specific statistical methods may occur in any of the three parts. Within each part, the contributions are, as far as possible, arranged following a methodological structure. In Part I the contributions are given in the following order (1) time series; (2) panel data; (3) other topics. Contributions in the second part are arranged in the sequence (1) univariate time series; (2) multivariate time series; (3) other financial data. The third part follows the sequence (1) cross-sectional data; (2) univariate time series; (3) multivariate time series; and (4) general econometric and statistical methods.

This book covers theory, methods, and applications of empirical economic and financial research. The purpose is to establish a connection between the well-developed area of empirical economic research and the emerging area of empirical financial research, and to build a bridge between theoretical developments in both areas and their application in practice. Most of the contributions in this book are originally published here. The book is a suitable reference for researchers, practitioners, and graduate and post-graduate students, and provides reading for advanced seminars in empirical economic and financial research.

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