Preface

When I began this book project, my intent was to address the importance of having an effective early warning system (EWS) for predicting financial and economic crises, especially the relatively frequent banking crises occurred in developing as well as developed countries. As an overview, the last decades had seen a number of financial and economic crises in emerging market economies (EMEs) with often devastating economic, social, and political consequences. There are various types of financial and economic crises such as, banking crisis, currency crisis, twin crisis, asset pricing bubbles and burst, stock market crash, sovereign debt crisis, external debt crisis, and private sector debt crisis. These crises were in many cases not confined to individual economies but spread contagiously to other markets as well. In particular, European Monetary System (ERM) crisis of 1992-1993, the collapse of the Mexican peso with “tequila effects” of 1994-1995, Asian flu of 1997-1998, Russia virus in 1998, Brazilian crisis in 1999, Turkish currency and banking crisis in 2001, and the subprime mortgage or credit crisis of the United States (U.S.) in 2008 affected a wide group of countries and had systemic repercussions for the international financial system as a whole. These crises played a significant role in the failure of key businesses, declines in consumer wealth estimated in trillions of US dollars, and a downturn in economic activity leading to the 2008–2012 global recession and contributing to the European sovereign-debt crisis.

Banking crisis especially is a continuous threat to the banking sector resilience. The crisis can be individual bank failure, systemic banking crisis, as well as twin crises or the simultaneous crises in banking and currency. Systemic banking crisis may jeopardize the function of the whole financial system and lead to severe distortion in economic activities. Banking crisis, therefore, remains as a critical concern of policy makers and the stakeholders of each bank, namely bank owners, shareholders, employees, clients, investors, governments, and banking system regulators. There were numerous historical episodes of banking crisis such as, in 1991, several banking crises took place in Finland, Georgia, Hungary, Liberia, Nigeria, Norway, Sweden, and Tunisia, respectively; further, in 1997, banking crisis hit a number of Asian countries, including Indonesia, Malaysia, Japan, Korea, Thailand, and Vietnam. Moreover, the aftermath of the U.S. subprime mortgage crisis in 2008 had remarkably heightened the global awareness of the possible devastating impact of a systemic banking crisis. The anticipated widespread impact of systemic banking crisis is ruinous to the financial system as the crisis may adversely affect all entities in an economy, simply through the resulted decline in national investments due to credit supply distortion and undermined market confidence in the banking institutions.

In view of the large costs associated with a financial or economic crisis, the question of how to predict the crisis has become central. This resulted in the construction of a monitoring tool, the so called EWS with the aim of anticipating whether and when individual countries may be affected by an upcoming crisis. Nonetheless, developing an effective EWS that can be relied on for predicting the arrival of a
crisis is a great challenge. It is tough to predict the occurrence of a specific type of crisis in a country. Furthermore, it is extremely difficult to identify the accurate timing of the crisis occurrence. Due to the continuous threat of financial and economic crises to global economies, an effective EWS has increasing value today. Thus, the task of EWS design has become more significant.

**Where the Topic Fits in the World Today?**

The basic motive for this book is of great importance. Early warning models (EWMs) and forecasting techniques exist primarily for the stability of the economy, financial system, as well as banking system of a country. The main goal of this book is to encourage the exchange of new ideas about challenges in avoiding crises (at the country and global levels) in banking, economic, and finance in the view of wide aspects of current economic and financial crises (public, corporate, and households etc.). Furthermore, recently policy makers, researchers, regulators, and academics have been exploring questions related to economic and financial stability, new indicators of economic and financial crises, systemic risk, and regulation. This special book addresses answers of these difficult questions. The accurate prediction of crises is an important issue yet to be adequately studied. The EWS and forecasting models can be made most useful to help sustain global growth and maintain financial stability, especially in light of the lessons learned from the current and past crises. The book gathers both theoretical and practical perspectives, by including research issues, methodological approaches, practical case studies, and uses of new policy and other points of view related to EWS models on banking systems, financial systems and economies.

**The Target Audience**

The book is intended for several groups of readers. The target audience of this publication is academics, researchers, financial analysts, portfolio managers, policy makers, and postgraduate students who engaged in various disciplines such as, international finance, international monetary arrangements, economic prognosis, international capital flow liberalization and regulation, bank asset and liability management, fiscal deficit, public debt, fiscal federalism, and fiscal unification.

**Contents and Organization**

The organization of the book reflects its purpose. The book is organized into three sections and twenty one chapters. Section 1 of the book is the introduction to banking and financial crises (Chapters 1-5). This section covers the reviews on concepts and theories of different financial and economic crises, the survey of empirical literature on crisis prediction through EWSs, and the evaluation of the existing EWMs. I presume the readers of the book already have a basic understanding of the subject matter of the book. The readers will be able to expand and improve their understanding with the materials provided in the introduction section. Section 2 compiles the chapters on indicators and prediction models for banking and currency crises (Chapters 6-13). Section 3 assembles the chapters on indicators and prediction models for economic and financial crises (Chapters 14-21). The organization of the book in Section 2 and 3 is to ease the categorization of various financial and economic crises, that is, by dividing all chapters into two main categories: 1) banking and currency crises, as these crises can be inter-related, for instance,
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the twin-crisis; and 2) economic and financial crises. The latter include a number of assorted economic and financial crises. A brief description of each of the chapters is as follows:

Chapter 1 presents an overview of the early warning systems (EWSs) applied to global banking crises. The chapter sheds light on the meaning, main causes, and impacts of banking crisis. Further, a review of empirical literature is included in the chapter with attention drawn on methodologies and indicators used to develop banking crisis EWSs. The authors highlight the difference between the EWS designs with and without incorporating the timing of crisis occurrence. By knowing the timing of crisis occurrence will make policy more effective as pre-emptive measures can be undertaken before the arrival of an anticipated crisis.

Chapter 2 focuses on the state of the art of EWSs. The chapter discusses the factors and symptoms of three types of crises, namely currency crisis, banking crisis, and external debt crisis, and the background as well as the construct of EWS. Further, the practical implications and recommendations associated with EWS are provided in the chapter. The author suggests that policy makers should take into account their objectives and related thresholds when developing the EWSs, because there exists a trade-off between correctly calling crises and false alarms.

Chapter 3 reviews the scholarly and practitioner literature used to conceptualize and to encapsulate the theoretical construct of EWS for systemic banking and financial crises. The discussion of the chapter includes financialization and global financial meltdown, theoretical overview from financial institutions to banking crises, key dimensions of international financial crises, base models and key indicators of financial meltdowns and systemic banking crises, asymmetries of information in the financial system, EWSs for predicting financial meltdown and systemic banking failure, key elements of an EWS, macroeconomic variables impacting financial instability, and systemic financial outages.

Chapter 4 addresses the prevailing skepticism related to the basic evaluation metrics such as the noise-to-signal ratio, and in turn to select benchmark models. The chapter presents an overview of the methodologies better suitable for measuring the goodness of EWMs as well as for constructing optimal monitoring tools. The specific topics covered in the discussion are the confusion matrix and the noise-to-signal ratio, the loss function and usefulness measures, and the area under the receiver operating characteristic (AUROC) curve.

Chapter 5 contains a review of the existing typologies of EWSs developed at the micro and macro prudential levels, and an assessment of the EWSs performance and methodological prospects. The assessment produces the insight of the EWSs failure in predicting the 2008 financial crisis, the EWSs methodological anatomy, and the EWSs prospect for development. This contribution has provided the answers to several questions regarding the low predictive power of EWMs with respect to the recent financial crisis.

Chapter 6 introduces the application of self organizing maps for the Spanish savings banks. The empirical design of the proposed model involves the combinations of two methods on neural networks for bankruptcy prediction, namely, trait recognition, and self-organizing maps. The main advantage of the model is that, it can improve the policy makers’ oversight on the whole financial system, while enabling time pertinent answers with respect to some of the threats to financial stability.

Chapter 7 aims to provide a better understanding of the global financial crisis and the mechanisms of fair value accounting. The issue addressed by the chapter is that, there are contradictory conclusions about the role of fair value accounting and its link to the global financial crisis. The chapter provides discussion about the unanswered research questions, the implementation of fair value accounting, capital
regulations and conservative accounting, and a couple of selected accounting regulations (FAS 157 and IAS 39).

Chapter 8 addresses that a persistent challenge on the cost and revenue sides of a bank is customer churn, the movement of customers from one bank to another bank in search of better products and services. The chapter focuses on E-banking functionalities, combines customer usage data to analyze customer intention as well as forming up an idea for banking corporations on which functionality to invest on mostly by using the Analytic Hierarchy Process (AHP) techniques. As suggested by the authors, churn management can be considered as an efficient solution for a banking corporation to keep or promote its position in the market.

Chapter 9 develops a surveillance framework for the currency crises in Indonesia. The authors attempt to answer two questions, how to determine exchange market pressure (EMP), and to what extent the contribution of selected indicators to the prediction of currency crises. For the construct of EWS, the authors have taken into account various indicators (broad money over international reserves, real exchange rate, domestic credit growth, inflation, etc.). The chapter proposes macro prudential policy is used to be part of early warning mechanism particularly by using net open position instrument.

The main interest of Chapter 10 is on currency crisis in developing countries. The chapter reviews a number of the theoretical models that describe the mechanisms of currency crisis, including the first generation model, the second generation model, the third generation model, and the impossibility trinity. Furthermore, the chapter investigates the causes of currency and other associated crises such as banking crisis and sovereign debt default, evaluates the accuracy of empirical models in predicting the crises, and reviews the empirical works on measuring the consequences of crises on the real economy.

Chapter 11-13 is central on the currency and banking crises in Turkey. Chapter 11 proposes the EWS for Turkish currency and banking crisis in 2000 and 2001, by applying the KLR model or signaling window approach developed by Kaminski, Lorezondo and Reinhart (1998). In addition to this, the chapter provides a detailed discussion of the background covering the topics of economic crisis, early warning systems of financial crisis, and empirical review. Further, a review of the Turkey’s financial crisis of 2000 and 2001 is included in the chapter.

Chapter 12 aims to compare the performance of currency and banking crisis indicators within the Turkish economy which underwent severe financial crises in the last twenty years. The discussion of the background covers a brief history of the Turkish economy over the period 1980-2014 and a literature survey. The main focus of the chapter is on issues, controversies and problems. Further, the authors provide solutions and recommendations to the issues addressed.

In Chapter 13, a financial stress index is composed by using Turkish Lira interest rate and monthly data of global gross reserves belongs to $/TL exchange rate between 1997:1-2014:12 terms for Turkey. Before turning to the construct of the index, the author provides a detailed discussion of the financial crises in Turkey, financial crises indicators, financial stress index, and the empirical literature.

Chapter 14 looks at the decoupling hypothesis between emerging countries and the advanced world. The authors describe the changing world economic order as the advanced economies underwent economic slowdown while the emerging economies achieved sustainable economic growth. On the basis of quarterly data over the period 1995q1-2014q4, the chapter is presenting some evidence in favor of a decreasing vulnerability of emerging market economies to global economic and financial development, in particular, the emerging Asian economies.
Chapter 15 sheds light on twin deficit as an early warning sign of the Greek debt crisis. The early warning fiscal and financial signals are identified through the analysis of the causes and consequences of the debt crisis. In more details, the chapter emphasizes on the twin deficit role in the debt crisis, stylized facts of the Greek case, financial variables as early warning signals, and policy measures dealing with deficits and public debts in the Eurozone.

Chapter 16 is focusing on developing EWS models for contemporary crises using extreme value binary models. The chapter proposes the Extreme Value Model (EVA) used previously for forecasting natural disasters and irregular phenomena. The model is examined using the sample of five countries severely hit by the recent Eurozone debt crisis during 2010’s, namely, Cyprus, Greece, Ireland, Portugal, and Argentina. Results are provided showing that EVA fits better forecast and give relatively calm signals than other binary models.

Chapter 17 serves as a beginning of merging the concepts of dynamic systems that may contain chaotic behavior and conventional macroeconomic models, in view of the need to understand how volatility has changed in modern economic system and how to recognize when volatility will occur. More specifically, the chapter is on an attempt to implement a Hicksian Accelerator to develop a framework for stylized facts of general dynamic macroeconomic behavior and uses the model to estimate the degree of and sensitivity to volatility in a macro economy.

Chapter 18 develops an understanding of the meaning and relevance of asset pricing bubbles, provides a synthesis of events that illustrate the significance of this anomaly, critically examines its causes and consequences, and analyzes the policy implications. The historical evidence of bubbles described in the chapter are such as Tulip mania in 1630’s, South Sea Company bubble of 1711-1720, Mississippi Company bubble of 1719-1720, Railway mania in 1840’s, U.S. real estate bubble in 1920’s, U.S. stock market bubble of 1925-1929, dot-com bubble that started around 1995, Japanese asset price bubble of 1980’s-1990, and U.S. housing bubble of 2006-2007.

The focus of Chapter 19 is on predicting financial failure in non-profit organizations. The chapter examines a number of past financial failures amongst non-profit organizations, reviews past literature on attempts to predict non-profit organization failure, and proposes an additional government-related factor with respect to the financial distress of non-profit organizations.

Chapter 20 assesses the financial vulnerability of sixteen emerging markets (Brazil, China, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, South Africa, Thailand, and Turkey). For the discussion of background, the authors provide descriptions for a number of concepts such as, capital inflows, unexpectedness, leveraged common creditor, herd behavior, portfolio adjustments, current account deficit, and debt position. The main focus of the chapter is on constructing a vulnerability index for the selected emerging countries by using various financial indicators such as, international reserves position, debt position, exports and GDP, and banking system health.

One major concern associated with financial and economic crises is the crisis contagious effect. Chapter 21 is focusing on the concept of financial contagion and how to use business network contagion patterns for predicting crisis. These patterns are the virus pattern, the intoxication pattern, the deficit pattern, the parasitic pattern, and the mixed pattern. The contents of the chapter include an overview over the usage of financial contagion in detecting crisis, a proposed conceptual framework for investigating financial abnormalities and their potential spread, a taxonomy for financial abnormalities, as well as a taxonomy of transmission channels for economic and financial abnormalities.
How the Book Impacts the Field?

This publication will raise the awareness among the readers of the book that banking, financial and economic crises remain as the current global challenges and the importance of an effective EWS design is undeniable. In addition, the book contributes toward extending the literature of crisis prediction through EWSs, thus supporting the future research in this field. The book has recorded a number of constructive recommendations as well as suggestions for future research direction provided by the authors of the book. This will definitely benefit academics, researchers, financial analysts, portfolio managers, and postgraduate students. In particular, the knowledge from this book helps to strengthen the analyses of financial analysts and portfolio managers. The stylized fact is that, corporations tend to be affected by any major financial or economic crisis. Likewise, portfolio managers need to take into account the impact of any upcoming financial or economic turbulence, as financial investments dealing with equity, bond, and foreign currency are vulnerable to the crisis impact. Further, policy makers may directly benefit from the newly proposed EWMs documented in this publication. They may apply the knowledge from the book to develop an EWS, as well as in setting pre-emptive measures for preventing and mitigating the impact of an anticipated financial or economic crisis. This in turn will help to maintain financial system resilience and economic stability.