The Econometrics of Individual Risk: Credit, Insurance and Marketing. By Christian Gourieroux & Joann Jasiak (Princeton University Press, 2007)

This book provides an introduction to the analysis of individual risks using various econometric models and estimation techniques. It examines three key domains of applications: credit, insurance and marketing. A wide collection of statistical methods and econometric models can be found, but the authors have set the expectations early that finer details of these methods or models are beyond the scope of this book.

To appreciate better the contents of this book, the reader is expected to be familiar with the basics of mathematical statistics and to have some background in econometrics. This book provides a good balance between theory and application, and has many empirical examples across major fields, such as finance and insurance.

Chapter 1 introduces the notion that any risk is associated with an individual who bears the risk or is perceived as risky by another individual. The authors highlight that risk needs to be quantifiable before it can be modelled and managed using econometric analysis.

Econometric models involving dichotomous variables are discussed further. The focus of discussion surrounds the linear discriminant model and the logit model. The authors point out the practical relevance of such models in credit assessments performed by banks, finance companies and other lenders, where available sources of information can be quantitative or qualitative. The authors also share the development of scoring methodology for the prediction of corporate failures, and the reasons why logit models are superior to linear discriminant models for the prediction of corporate failures. An illustration of the logit-based computation of a mortgage score from a sample of home buyers is also provided in this chapter.

Graphical presentations of performance and selection curves of score performance are presented. These curves are essentially goodness-of-fit measures which can be used to monitor the customer-selection procedures and to detect distortions in credit scores. This section of the book illustrates theoretical monitoring techniques. From a practical viewpoint, such techniques are less reflective of actual monitoring mechanisms used in practice, which could involve more judgement.

Moving away from topics on dichotomous variables, the authors proceeded to introduce the models for count variables, such as Poisson, negative binomial regression models, etc. Chapter 5 would be of interest to general insurance actuaries, as it provides simple illustrations on how negative binomial models are used in automobile insurance to derive formulae for policy premiums under the bonus-malus scheme.

Chapter 6 examines the time-to-default, which is commonly encountered in insurance and finance, for example time-to-death of policyholder, time-to-

default on a loan and time-to-prepayment of mortgages, etc. The basic exponential and semi-parametric models with accelerated and proportional hazards are discussed. This chapter helps the reader to obtain a broad understanding of various applications of such tools, for instance in pension funds, corporate bonds and consumer loans.

The authors move on to discuss the problems related to endogenous selection of samples of individuals for risk modelling. Endogenous stratification introduces selectivity bias, which entails biased risk estimators. Some examples of endogenous selection and the associated bias-correction techniques are presented. The reader may need to have a prior understanding of the difference between truncation and censoring, as these definitions in the duration models are rather simplified.

Chapter 8 introduces the transition models for dynamic analysis of individual risks. The authors provide some comments on the corporate rating dynamics of major credit rating agencies, but the reader will not expect to find a detailed writeup on the credit rating methodologies of these rating agencies.

Practitioners may be interested in Chapter 9, where multi-score analysis is covered. Multiple scores are used in credit analysis to assess probabilities of risk, such as default, prepayment and time-to-maturity. The chapter also highlights how redundant information can be eliminated via a multi-score reduction technique to improve the efficiency of analysis.

Finally, the authors end the book with a discussion on credit risk management. Basic Value-at-Risk (VaR) methodology related to credit risk is discussed. The reader can acquire some basic understanding of the mandatory rules imposed under the Basel Accord for determining capital reserves.

This strength of this book is that it provides a good overview of the issues arising from risk modelling. It gathers results on individual risks, and reshapes them into a system of econometric methods. In addition, this book serves as a simplified introduction to the technical progress of financial institutions and insurance companies. The mixture of finance, insurance and marketing examples makes the book an interesting read. Furthermore, readers can refer to the end-of-chapter sources of reference to explore further details which are beyond the coverage of this text.

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