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Statistical Demography and Forecasting

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To Irja and Donna

Preface

Statistics and demography share important common roots, yet as academic disciplines they have grown apart. Even a casual survey of leading journals shows that cross-references are rare. This is unfortunate, because many social problems call for a multi-disciplinary approach. Both statistics and demography are necessary ingredients in any serious analysis of the sustainability of pension or health care systems in the aging societies, in the assessment of potential inequities of formula-based allocations to local governments, in the estimation of the size of elusive populations such as drug users, in the investigation of the consequences of social ills such as unemployment, and so forth. This book was written to bring together much of the basic statistical theory and methodology for estimating and forecasting population growth and its components of births, deaths, and migration. Although relatively simple mathematical methods have traditionally been used to assess demographic trends and their role in the society, use of modern statistical methods offers significant advantages for more accurately measuring population and vital rates, for forecasting the future, and for assessing the uncertainty of the demographic estimates and forecasts.

For statisticians the book provides a unique introduction to demographic problems in a familiar language. For demographers, actuaries, epidemiologists, and professionals in related fields the book presents a unified statistical outlook on both classical methods of demography and recent developments. The book provides a self-contained introduction to the statistical theory of demographic rates (births, deaths, migration) in a multi-state setting. The book has a dual character. On the one hand, it is a monograph that can be consumed by a lone reader. There are many results that have appeared in journals or working papers only. Some appear here for the first time. The book is also useful as a classroom text, and includes exercises and complements to explore special topics in detail without interrupting the flow of the text. More than half of the book is readily accessible to undergraduates, but to fully benefit from the complete text may require more maturity.

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Contents

Preface	vii
Acknowledgments	ix
List of Examples	xix
List of Figures	xxv
Chapter 1. Introduction	1
1. Role of Statistical Demography	1
2. Guide for the Reader	4
3. Statistical Notation and Preliminaries	4
Chapter 2. Sources of Demographic Data	9
1. Populations: Open and Closed	9
2. <i>De Facto</i> and <i>De Jure</i> Populations	11
3. Censuses and Population Registers	15
4. Lexis Diagram and Classification of Events	16
5. Register Data and Epidemiologic Studies	19
5.1. Event Histories from Registers	19
5.2. Cohort and Case-Control Studies	19
5.3. Advantages and Disadvantages	20
5.4. Confounding	22
6. Sampling in Censuses and Dual System Estimation	24
Exercises and Complements	27
Chapter 3. Sampling Designs and Inference	31
1. Simple Random Sampling	32
2. Subgroups and Ratios	35
3. Stratified Sampling	36
3.1. Introduction	36
3.2. Stratified Simple Random Sampling	37
3.3. Design Effect for Stratified Simple Random Sampling	38
3.4. Poststratification	39
4. Sampling Weights	40
4.1. Why Weight?	40

4.2. Forming Weights	41
4.3. Non-Response Adjustments	43
4.4. Effect of Weighting on Precision	45
5. Cluster Sampling	46
5.1. Introduction	46
5.2. Single Stage Sampling with Replacement	47
5.3. Single Stage Sampling without Replacement	47
5.4. Multi-Stage Sampling	49
5.5. Stratified Samples	50
6. Systematic Sampling	52
7. Distribution Theory for Sampling	53
7.1. Central Limit Theorems	53
7.2. The Delta Method	55
7.3. Estimating Equations	56
8. Replication Estimates of Variance	61
8.1. Jackknife Estimates	61
8.2. Bootstrap Estimates	62
8.3. Replication Weights	63
Exercises and Complements	64
Chapter 4. Waiting Times and Their Statistical Estimation	71
1. Exponential Distribution	71
2. General Waiting Time	76
2.1. Hazards and Survival Probabilities	76
2.2. Life Expectancies and Stable Populations	79
2.2.1. Life Expectancy	79
2.2.2. Life Table Populations and Stable Populations	81
2.2.3. Changing Mortality	82
2.2.4. Basics of Pension Funding	84
2.2.5. Effect of Heterogeneity	85
2.3. Kaplan-Meier and Nelson-Aalen Estimators	85
2.4. Estimation Based on Occurrence-Exposure Rates	88
3. Estimating Survival Proportions	91
4. Childbearing as a Repeatable Event	93
4.1. Poisson Process Model of Childbearing	93
4.2. Summary Measures of Fertility and Reproduction	96
4.3. Period and Cohort Fertility	101
4.3.1. Cohort Fertility is Smoother	101
4.3.2. Adjusting for Timing	103
4.3.3. Effect of Parity on Pure Period Measures	104
4.4. Multiple Births and Effect of Pregnancy on Exposure Time	106
5. Poisson Character of Demographic Events	107
6. Simulation of Waiting Times and Counts	109
Exercises and Complements	110

Chapter 5. Regression Models for Counts and Survival	117
1. Generalized Linear Models	118
1.1. Exponential Family	118
1.2. Use of Explanatory Variables	119
1.3. Maximum Likelihood Estimation	119
1.4. Numerical Solution	120
1.5. Inferences	121
1.6. Diagnostic Checks	122
2. Binary Regression	123
2.1. Interpretation of Parameters and Goodness of Fit	123
2.2. Examples of Logistic Regression	124
2.3. Applicability in Case-Control Studies	129
3. Poisson Regression	130
3.1. Interpretation of Parameters	130
3.2. Examples of Poisson Regression	131
3.3. Standardization	133
3.4. Loglinear Models for Capture-Recapture Data	136
4. Overdispersion and Random Effects	138
4.1. Direct Estimation of Overdispersion	139
4.2. Marginal Models for Overdispersion	139
4.3. Random Effect Models	140
5. Observable Heterogeneity in Capture-Recapture Studies	143
6. Bilinear Models	146
7. Proportional Hazards Models for Survival	150
8. Heterogeneity and Selection by Survival	154
9. Estimation of Population Density	156
10. Simulation of the Regression Models	158
Exercises and Complements	159
Chapter 6. Multistate Models and Cohort-Component Book-Keeping	166
1. Multistate Life-Tables	167
1.1. Numerical Solution Using Runge-Kutta Algorithm	167
1.2. Extension to Multistate Case	168
1.3. Duration-Dependent Life-Tables	172
1.3.1. Heterogeneity Attributable to Duration	172
1.3.2. Forms of Duration-Dependence	173
1.3.3. Aspects of Computer Implementation	174
1.3.4. Policy Significance of Duration-Dependence	175
1.4. Nonparametric Intensity Estimation	175
1.5. Analysis of Nuptiality	177
1.6. A Model for Disability Insurance	179
2. Linear Growth Model	180
2.1. Matrix Formulation	180

2.2. Stable Populations	183
2.3. Weak Ergodicity	185
3. Open Populations and Parametrization of Migration	186
3.1. Open Population Systems	186
3.2. Parametric Models	186
3.2.1. Migrant Pool Model	187
3.2.2. Bilinear Models	187
4. Demographic Functionals	189
5. Elementwise Aspects of the Matrix Formulation	191
6. Markov Chain Models	191
Exercises and Complements	193
Chapter 7. Approaches to Forecasting Demographic Rates	198
1. Trends, Random Walks, and Volatility	198
2. Linear Stationary Processes	201
2.1. Properties and Modeling	202
2.1.1. Definition and Basic Properties	202
2.1.2. ARIMA Models	203
2.1.3. Practical Modeling	206
2.2. Characterization of Predictions and Prediction Errors	210
2.2.1. Stationary Processes	210
2.2.2. Integrated Processes	211
2.2.3. Cross-Correlations	216
3. Handling of Nonconstant Mean	216
3.1. Differencing	216
3.2. Regression	218
3.3. Structural Models	219
4. Heteroscedastic Innovations	220
4.1. Deterministic Models of Volatility	221
4.2. Stochastic Volatility	222
Exercises and Complements	223
Chapter 8. Uncertainty in Demographic Forecasts: Concepts, Issues, and Evidence	226
1. Historical Aspects of Cohort-Component Forecasting	228
1.1. Adoption of the Cohort-Component Approach	228
1.2. Whelpton's Legacy	228
1.3. Do We Know Better Now?	231
2. Dimensionality Reduction for Mortality	234
2.1. Age-Specific Mortality	234
2.2. Cause-Specific Mortality	236
3. Conceptual Aspects of Error Analysis	238
3.1. Expected Error and Empirical Error	238
3.2. Decomposing Errors	238
3.2.1. Error Classifications	238
3.2.2. Alternative Decompositions	240

3.3. Acknowledging Model Error	240
3.3.1. Classes of Parametric Models	240
3.3.2. Data Period Bias	241
3.4. Feedback Effects of Forecasts	242
3.5. Interpretation of Prediction Intervals	244
3.5.1. Uncertainty in Terms of Subjective Probabilities	244
3.5.2. Frequency Properties of Prediction Intervals	248
3.6. Role of Judgment	249
3.6.1. Expert Arguments	249
3.6.2. Scenarios	250
3.6.3. Conditional Forecasts	251
4. Practical Error Assessment	251
4.1. Error Measures	252
4.2. Baseline Forecasts	253
4.3. Modeling Errors in World Forecasts	256
4.3.1. An Error Model for Growth Rates	256
4.3.2. Second Moments	257
4.3.3. Predictive Distributions for Countries and the World	259
4.4. Random Jump-off Values	261
4.4.1. Jump-off Population	262
4.4.2. Mortality	263
5. Measuring Correlatedness	264
Exercises and Complements	267
Chapter 9. Statistical Propagation of Error in Forecasting	269
1. Törnqvist's Contribution	269
2. Predictive Distributions	271
2.1. Regression with a Known Covariance Structure	271
2.2. Random Walks	274
2.3. ARIMA(1,1,0) Models	276
3. Forecast as a Database and Its Uses	277
4. Parametrizations of Covariance Structure	278
4.1. Effect of Correlations on the Variance of a Sum	279
4.2. Scaled Model for Error	280
4.3. Structure of Error in Migration Forecasts	283
5. Analytical Propagation of Error	284
5.1. Births	284
5.2. General Linear Growth	285
6. Simulation Approach and Computer Implementation	287
7. Post Processing	289
7.1. Altering a Distributional Form	289
7.2. Creating Correlated Populations	292
7.2.1. Use of Seeds	292
7.2.2. Sorting Techniques	293
Exercises and Complements	294

Chapter 10. Errors in Census Numbers	296
1. Introduction	296
2. Effects of Errors on Estimates and Forecasts	297
2.1. Effects on Mortality Rates	297
2.2. Effects on Forecasts	298
2.3. Effects on Evaluation of Past Population Forecasts	298
3. Use of Demographic Analysis to Assess Error in U.S. Censuses	299
4. Assessment of Dual System Estimates of Population Size	300
5. Decomposition of Error in the Dual System Estimator	303
5.1. A Probability Model for the Census	303
5.2. Poststratification	304
5.3. Overview of Error Components	305
5.4. Data Error Bias	308
5.5. Decomposition of Model Bias	309
5.5.1. Synthetic Estimation Bias and Correlation Bias	309
5.5.2. Poststratified Estimator	310
5.6. Estimation of Correlation Bias in a Poststratified Dual System Estimator	312
5.7. Estimation of Synthetic Estimation Bias in a Poststratified Dual System Estimator	314
6. Assessment of Error in Functions of Dual System Estimators and Functions of Census Counts	316
6.1. Overview	316
6.2. Computation	317
Exercises and Complements	319
Chapter 11. Financial Applications	327
1. Predictive Distribution of Adjustment for Life Expectancy Change	327
1.1. Adjustment Factor for Mortality Change	327
1.2. Sampling Variation in Pension Adjustment Factors	329
1.3. The Predictive Distribution of the Pension Adjustment Factor	330
2. Fertility Dependent Pension Benefits	332
3. Measuring Sustainability	335
4. State Aid to Municipalities	337
5. Public Liabilities	339
5.1. Economic Series	340
5.2. Wealth in Terms of Random Returns and Discounting	340
5.3. Random Public Liability	341
Exercises and Complements	342
Chapter 12. Decision Analysis and Small Area Estimates	344
1. Introduction	344
2. Small Area Analysis	345

3.	Formula-Based Allocations	346
3.1.	Theoretical Construction	346
3.1.1.	Apportionment of the U.S. House of Representatives	347
3.1.2.	Rationale Behind Allocation Formulas	348
3.2.	Effect of Inaccurate Demographic Statistics	349
3.3.	Beyond Accuracy	350
4.	Decision Theory and Loss Functions	351
4.1.	Introduction	351
4.2.	Decision Theory for Statistical Agencies	353
4.3.	Loss Functions for Small Area Estimates	357
4.4.	Loss Functions for Apportionment and Redistricting	359
4.1.1.	Apportionment	359
4.1.2.	Redistricting	360
4.5.	Loss Functions and Allocation of Funds	361
4.5.1.	Effects of Over- and Under-Allocation	361
4.5.2.	Formula Nonoptimality	362
4.5.3.	Optimal Data Quality with Multiple Statistics and Uses	363
5.	Comparing Risks of Adjusted and Unadjusted Census Estimates	363
5.1.	Accounting for Variances of Bias Estimates	364
5.2.	Effect of Unmeasured Biases on Comparisons of Accuracy	365
6.	Decision Analysis of Adjustment for Census Undercount	365
7.	Cost-Benefit Analysis of Demographic Data Exercises and Complements	367
		368
	References	371
	Author Index	397
	Subject Index	405

List of Examples

Chapter 2. Sources of Demographic Data	9
1.1. Who Counts in the U.S. Census?	10
1.2. Who Belongs to the Sami Population?	10
2.1. Accident Rates in Nordic Countries.	12
2.2. Undercount in U.S. Censuses.	12
2.3. What Is a Household?	14
2.4. Corporate Demography.	14
3.1. Nigerian Censuses.	15
5.1. British Doctors' Study.	20
5.2. Doll and Hill Study.	21
6.1. Underreporting of Occupational Diseases.	26
6.2. Numbers of Drug Users.	26
Chapter 3. Sampling Designs and Inference	31
1.1. The 1970 Draft Lottery in the U.S.	33
1.2. Child Stunting.	34
3.1. NELS:88 Base-Year School Sample.	37
3.2. Design Effects for NELS:88.	39
3.3. Poststratification in the 1990 U.S. Post Enumeration Survey (PES).	40
4.1. NELS:88 First Followup Schools.	41
4.2. Extreme Weights in the 1990 U.S. PES.	42
4.3. Nonparticipation in a Survey in an STD Clinic.	43
4.4. The Dual System Estimator as a Propensity-Weighted Census.	44
4.5. Extreme Weights in the Survey of Consumer Finance.	46
5.1. Survey of the Homeless in Chicago.	48
5.2. NELS:88 Sample of Students.	51
5.3. The U.S. Current Population Survey.	51
6.1. Systematic Sampling of Private Schools in the National Assessment of Educational Progress.	53
7.1. Model-Based Variance of the Dual System Estimator (DSE).	56
7.2. Design-Based Variance of the Dual System Estimator (DSE).	58

7.3.	Parameter Interpretation Under An Erroneous Model.	59
7.4.	Fieller Intervals for a Ratio Estimator.	60
Chapter 4. Waiting Times and Their Statistical Estimation		71
1.1.	Memorylessness of Exponential Waiting Time.	72
1.2.	Independent Causes of Death.	72
1.3.	Cross-Sectional Heterogeneity of Constant Hazard Rates.	75
1.4.	Gamma Distribution for Frailty.	75
2.1.	Weibull Distribution.	77
2.2.	Linear Survival Functions.	77
2.3.	Balducci Model for Survival Function.	77
2.4.	Competing Risks.	77
2.5.	Mortality and Marital Status in Finland.	78
2.6.	Effect of Changes in Hazards on Life Expectancy.	83
2.7.	Life Expectancy Calculation from Kaplan-Meier Estimates.	86
2.8.	Survival Probabilities for Habsburgs.	86
2.9.	Actuarial Estimator.	89
2.10.	Distribution of Death During First Year.	90
2.11.	Proportion of Deaths During First Days.	90
4.1.	Age-Specific Fertility Rates for Italy and the U.S.	95
4.2.	Finnish Fertility, 1776–1999.	97
4.3.	Time Trends in Sex Ratios in Finland.	98
4.4.	Alternative Measures of Mean Age at Childbearing, Finland 2000.	100
4.5.	Parity Progression Ratios.	105
6.1.	Simulation of Weibull Random Variates.	109
Chapter 5. Regression Models for Counts and Survival		117
1.1.	Exponential Distribution.	118
1.2.	Bernoulli Distribution.	118
1.3.	Leverage in Simple Generalized Linear Model.	122
2.1.	Sex Ratios of the Habsburgs.	124
2.2.	Child Mortality among the Habsburgs.	125
2.3.	Testing Effects of Exposure on Illness.	125
2.4.	Detecting Confounding.	127
2.5.	Choosing the Sword.	127
3.1.	Poisson Models for Births.	131
3.2.	Mortality of Young Widows.	132
3.3.	Age-Period-Cohort Problem.	132
3.4.	Number of the Habsburg Offspring.	132
3.5.	Regression Models for Rates of Small Areas.	132
3.6.	Relative Risk of Mortality for Unemployed.	135
3.7.	Triple Systems Estimates of Numbers of Drug Users.	138
4.1.	Overdispersion in Habsburg Cohort Sizes.	142
5.1.	Heterogeneity in Reporting of Occupational Disease.	145
5.2.	Heterogeneity in Census Enumeration Probabilities.	145

6.1. Lee-Carter Model for Mortality.	147
6.2. Mortality among Elderly.	149
7.1. A Simple Example of Cox Regression.	150
7.2. A Simple Example of Cox Regression with Censoring.	151
7.3. Changes in Mortality of the Habsburgs.	153
7.4. Time-Varying Covariates.	154
7.5. Likelihood for Matched Studies.	154
Chapter 6. Multistate Models and Cohort-Component Book-Keeping	166
1.1. Runge-Kutta Illustration.	167
1.2. A Three-State Labor Force Model.	169
1.3. Hazards Producing a Linear Solution.	170
1.4. Remarriage Probability Varies with Time Spent Non-married.	172
2.1. Two-Sex Problem.	183
4.1. Marriage Prevalence as a Functional.	190
4.2. Life Expectancy as a Functional.	190
4.3. Age Dependency Ratio.	190
4.4. A Relation between Prevalence and Incidence.	190
6.1. Metapopulation of Butterflies.	192
Chapter 7. Approaches to Forecasting Demographic Rates	198
1.1. Cohort Fertility Is Smoother.	199
1.2. Cholesky Decomposition.	201
2.1. MA(q) Processes.	203
2.2. AR(1) Processes.	203
2.3. EWMA Processes.	205
2.4. Vital Processes Appear Nonstationary.	207
2.5. Standard Error Under AR(1) Residuals.	211
2.6. Correlations of Forecast Errors For AR(1) Processes.	211
2.7. Correlations of Forecast Errors for Integrated AR(1) Processes.	212
2.8. Standard Error and Random Error.	212
3.1. Forecasting a Random Walk with a Drift.	217
3.2. Trend in Finnish Fertility up to 1930.	217
3.3. Alternative Time Series Forecasts of the U.S. Growth Rate.	219
3.4. Stochastic Local Level Process.	220
3.5. Stochastic Linear Trend Process.	220
4.1. A Heteroscedastic Process with Time Invariant Autocorrelations.	222
Chapter 8. Uncertainty in Demographic Forecasts: Concepts, Issues, and Evidence	226
1.1. Cohort Approach to Fertility Forecasting.	231
1.2. Effect of Marriage Duration on Fertility.	232
1.3. Was the Baby-Boom a Unique Phenomenon?	232

1.4.	Trend Extrapolation Versus Judgment.	232
1.5.	Counterintuitive Data on Economic Shocks and Demographics.	233
2.1.	Rates of Mortality Decline in Europe.	235
2.2.	Emerging Cause of Death.	237
3.1.	Sensitivity to Assumptions.	239
3.2.	Planning Optimism.	244
3.3.	Achieving Approximate Consensus on Probabilities.	246
3.4.	Elicitation of Probabilities via Betting.	247
3.5.	Assessing Prediction Intervals for ARIMA Forecasts.	248
3.6.	Mortality Differences Across Countries.	250
3.7.	Fertility in the Mediterranean Countries.	250
3.8.	Migration to Germany.	250
4.1.	Error Estimates for Fertility Forecasts in Europe.	254
4.2.	Error Estimates for Mortality Forecasts in Europe.	255
5.1.	Constant Correlations Across Ages.	265
5.2.	Constant Correlations Across Causes of Death.	265
5.3.	Uncorrelated Errors for Different Vital Rates.	265
5.4.	Constant Correlations Across Countries within a Region.	266
Chapter 9. Statistical Propagation of Error in Forecasting		269
2.1.	Posterior of an AR(1) Process With Known Autocorrelations.	274
2.2.	Conditional Likelihood of an AR(1) Process.	274
2.3.	Predictive Distribution of a Random Walk.	275
2.4.	Predictive Distribution of a Random Walk With a Drift.	275
4.1.	Independence, AR(1), and Perfect Dependence.	279
4.2.	Error in a Cohort Survival Setting.	279
4.3.	Autoregressive Model for Correlations Across Age.	281
4.4.	Specifying a Linear Process to Match Judgment.	282
5.1.	Representation of a Closed Female Population.	285
6.1.	Storage Space Required by the Database.	288
7.1.	Stochastic Forecast Database for Finland.	290
Chapter 10. Errors in Census Numbers		296
4.1.	Post Enumeration Surveys in the 1990 and 2000 U.S. Censuses.	300
4.2.	Post Enumeration Survey in the U.K. in 2001.	302
5.1.	Artificial Example of Probability Model for a Census.	304
5.2.	Error Components in the 1990 U.S. PES.	307
5.3.	Error Components in the 2000 U.S. A.C.E.	307
5.4.	Estimates of Correlation Bias Based on DA Totals.	312
5.5.	Estimates of Correlation Bias Based on DA Sex Ratios.	313
5.6.	Surrogate Variables for Undercount and Overcount in the 2000 U.S. Census.	315

Chapter 12. Decision Analysis and Small Area Estimates	344
4.1. Asymmetric Consequences of Forecast Error.	351
4.2. Posterior Risk Under Linear Loss.	353
4.3. When Policy Makers Prefer Error to Accuracy.	354
4.4. Non-Adjustment of Undercount Estimates for Correlation Bias.	356
4.5. Adjustment for Correlation Bias for Hispanics in the 2000 U.S. Census.	356
4.6. Alternative Estimates of Population.	357
4.7. Value Judgements in Sample Allocation.	358
4.8. Expected Loss of Adjusted and Unadjusted 2000 U.S. Census for Redistricting.	360
6.1. Expected Loss of Adjusted and Unadjusted 1990 U.S. Census.	365
6.2. Expected Loss of Adjusted and Unadjusted 2000 U.S. Census, A.C.E. Revision II.	366
7.1. Decennial Census.	367
7.2. Mid-Decade Census.	368

List of Figures

Chapter 2. Sources of Demographic Data	
1. Lexis Diagram.	17
2. Example of Confounding.	24
Chapter 4. Waiting Times and Their Statistical Estimation	
1. Log of Mortality Hazard for the Married, Widowed, and Single and Divorced Women in Finland, in 1998.	78
2. Log of the Hazard Increment of Mortality in Finland in 1881–1890 and 1986–1990, for Females and Males.	82
3. Survival Probabilities for Females and Males among the Members of the Main Line of the Family of Habsburgs.	87
4. The Distribution of Life Times of Those Born in 1994, Who Died in Age Zero, in Finland.	90
5. Total Fertility Rate in Finland in 1776–1999 and in the United States in 1920–1999.	97
6. Sex Ratio at Birth (Actual and Smoothed) in Finland in 1751–2000.	98
7. Approximate Completed Fertility for Birth Cohorts Born in Finland in 1905–1965.	102
Chapter 6. Multistate Models and Cohort-Component Book-Keeping	
1. Average Relative Risk of Remarriage Among Widowed and Divorced as a Function of the Duration of Widowhood and Divorce, Respectively.	173
2. Possible State Transitions in Nuptiality Processes.	177
3. Relative Risk of Death Among Married as a Function of the Duration of Marriage: Average, in Age 30, in Age 40, and in Age 50.	178
4. Distribution of Time Spent in the Divorced State, if Ever Divorced, for a Single at Age 17.	179

5. Average Density of Male Migration in Finland, Across Three Regions, During 1987–1997.	188
6. Two Most Important Patterns of Deviation from Average Age Distribution of Migration Intensity.	188
7. Coefficients of Deviations from the Mean for the Six Flows, During 1987–1997.	189
Chapter 7. Approaches to Forecasting Demographic Rates	
1. Hypothetical Cohort and Period Fertility Under a Pure Period Random Walk Model.	199
2. Hypothetical Mortality Rates and a Moving Average Estimate of their Level.	204
3. The Growth Rate of the U.S. Population in 1900–1999, and Three Forecasts: AR(1) and ARIMA(2,1,0) with and without a Constant Term.	208
4. Total Fertility Rate of Finland in 1920–1996, and its Forecast for 1997–2021 with 50% Prediction Intervals.	214
5. (A) Lag-Plot of the First Differences $Y(t)$ at Lag 1. (B) Lag-Plot of the First Differences $Y(t)$ at Lag 2.	215
6. Absolute First Differences of the U.S. Growth Rate in 1900–1999, and an Exponentially Smoothed Trend Estimate.	221
Chapter 8. Uncertainty in Demographic Forecasts: Concepts, Issues, and Evidence	
1. Smoothed Rate of Decline in Age-Specific Mortality for Females and Males and its Median Across 11 European Countries, for Females, and for Males.	235
2. Distribution of Absolute Errors of Decline in Growth Rate.	243
3. Change in the Expected Value for the Probability of Heads in a Sequence of Coin Tossing Experiments for an Individual with a Prior Expectation of 0.9 and an Individual with a Prior Expectation of 0.1.	247
4. Median Relative Error of Fertility Forecast as a Function of Lead Time for Six Countries with Long Data Series, their Average, and a Random Walk Approximation.	254
5. Median Relative Error of Mortality Forecast as a Function of Lead Time for Nine Countries with Long Data Series, their Average, and a Random Walk Approximation.	256
Chapter 9. Statistical Propagation of Error in Forecasting	
1. Predictive Distribution of a Fertility Measure and its Modified Distribution.	291
Chapter 11. Financial Applications	
1. Predictive Distribution of the Adjustment Factor in 2010–2060: Median, First and Third Quartiles, and First and Ninth Deciles.	332

2. Predictive Distribution of Old-Age Dependency Ratio (Ages 60+/Ages 20–59) in Finland in 2010, 2030, and 2050. 334
3. Pension Contributions, as % of the Total Wages of the Covered Employees, in Finland in 1995–2070, Under Current Rules and Under a Fertility Dependent Rule, if the Population Follows the High Old-Age Dependency Ratio Variant. 335
4. Replacement Rate and Contribution Rate Under Full Wages Indexation and Full Wage-Bill Indexation, and an Example of Potential Viable Region $\{(c, r) | c \leq 0.38, r \geq 0.28\}$. 336
5. Relative Burden of Social and Health Care Allocations in 1940–1997 in Finland, and the Median, Quartiles, and First and Ninth Deciles of its Predictive Distribution in 1998–2050. 339