

Applied Multiregional Demography Through Problems

Andrei Rogers

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A Programmed Learning Workbook
with Exercises and Solutions

 Springer

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*This book is dedicated to my three
“Top Gun” former Ph.D. students:
Jacques Ledent, James Raymer, and
Frans Willekens. I learned a great deal
from our collaboration over the years
and am grateful for their friendship.*

Preface

After teaching multiregional mathematical demography for over half a century, I have accumulated a large number of homework exercises and empirical illustrations that are my favorites. This book includes most of them and organizes them as a “sequence of problems where each is a self-contained puzzle, and the successful solution of each puts the student in a position to tackle the next, is a means of securing the active participation of the learner and so the mastery of a technical subject” (Keyfitz and Beekman, 1984, p. v). Problems, solutions, and empirical illustrations are featured in every chapter.

In 2015, I published a book entitled *Applied Multiregional Demography*. This book is its companion. Although the focus is the same, its content is distinctly different. The 2015 book focused on the use of models to illustrate various population issues. This book offers a programmed learning approach to the subject. Both mirror Keyfitz’s two books: *Applied Demography* (1977) and *Demography Through Problems* (1984). His focus on the uniregional case deals primarily with “age distributions related to mortality and natural increase in closed populations” (Keyfitz and Beekman, 1984, p. 56). Mine, however, focus on the multiregional case, in which migration is prominently featured. Each of the chapters in this book begins with a text, moves on to progressively more complicated exercises expressed in problem mode, and ends with their solution.

Programmed learning is a teaching method that sets out the material in a logical sequence. Useful questions found in the demographic literature are presented in a self-contained sequential form necessary for a workbook. Students are introduced into a set of underlying questions posed, and after each set of related steps are given a set of problems to test their comprehension of the material. Solutions are presented after the problems. The time schedule to cover the material is flexible and depends not on the instructor but on the student’s own progress.

This book proceeds in seven chapters. The degrees of difficulty increase with each chapter. The first two focus first on non-age-dependent uniregional exercises in Chap. 1 and then on their multiregional counterparts set out in Chap. 2. Although a number of useful results can be derived without introducing the age dimension into the analysis, serious attention normally is accorded only to demographic projections

that disaggregate population totals by age. Chapter 3 describes the demographer's classical age-disaggregated single-region approach to population projections. It sets out both the life table and the cohort-survival model and illustrates their application. Chapter 4 integrates the age dimension of the demographer with the locational dimension of the geographer. Populations disaggregated by age and region of residence are advanced over time and across space. Age dynamics are linked with spatial dynamics. Finally, the introduction to the basic mathematical models defining some of the spatial dynamics (Chaps. 1 through 4) is followed by three chapters on special advanced topics: stable population growth, birthplace-specific multiregional demography, and migration.

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Reference

Keyfitz, N., & Beekman, J. A. (1984). *Demography through problems*. New York: Springer-Verlag.

Acknowledgments

Over the past 50 years of published research, I have coauthored many articles with my graduate students. In particular, I received a great deal of help from first-rate students of different vintages, namely, **Jacques Ledent**, **Frans Willekens**, and **Luis Castro**, who came to me at Northwestern in the early 1970s and then followed me to IIASA in Austria, **Jani Little** who joined me in the mid-1980s during my early years in Boulder, and then **James Raymer**, who began his graduate studies at Boulder in the mid-1990s. Collectively, we coauthored dozens of articles in refereed journals and even published a few books. Not surprisingly, this monograph, reflecting five decades of my research, draws heavily on those coauthored works. I also have had help from a number of other former students of mine, namely, **John Watkins**, **Jennifer Woodward**, **Alain Belanger**, **Sabine Henning**, and **Lisa Jordan**. A few other graduate students at Colorado also contributed, particularly, **Kathy Gard**, **Cecile Hemez**, **Robin Wilson**, **Junwei Liu**, and **Bryan Jones**. To all, my sincerest thanks.

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Reference

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Contents

1	Uniregional Models with No Age Dependence	1
1.1	Mathematical Models: Rates of Increase and Population Growth ...	1
1.2	Problems	3
1.3	Solutions	6
2	Spatial Population Dynamics: Location Without Age	11
2.1	Mathematical Models: Urbanization.....	11
2.2	Problems	13
2.3	Solutions	23
	References	30
3	Uniregional Population Dynamics: Age Without Location	31
3.1	Mathematical Models: The Uniregional Projection and Life Table.....	31
3.1.1	The Projection Process	31
3.1.2	The Life Table and Survivorship	33
3.1.3	Fertility, Reproduction, and Growth	38
3.1.4	Relations Under Stability	41
3.2	Problems	44
3.3	Solutions	46
4	Multiregional Population Dynamics: Age with Location	49
4.1	Mathematical Models: The Multiregional Projection and the Life Table	49
4.1.1	The Multiregional Projection Model.....	49
4.1.2	The Multiregional Life Table Model.....	51
4.1.3	Estimating Life Table Probabilities	52
4.2	Problems	55
4.3	Solutions	57
	References	61

5	Multiregional Projection and Stable Growth	63
5.1	Mathematical Models: The Multiregional Projection Process	
	Once Again	63
5.1.1	The Multiregional Projection Process.....	63
5.1.2	Survivorship and Migration	64
5.1.3	Fertility and Reproduction.....	66
5.1.4	The Multiregional Projection Matrix	67
5.1.5	Projection to Stable Growth	67
5.1.6	Relations Under Stability	68
5.1.7	Spatial Zero Population Growth.....	71
5.1.8	Conditions for Spatial Zero Population Growth.....	72
5.1.9	The Redistributive Impacts of Two Alternative Spatial Patterns of Fertility Reduction	74
5.1.10	The Spatial Momentum of Zero Population Growth	75
5.2	Problems	76
5.3	Solutions	79
	References	80
6	Birthplace-Specific Life Tables and Projections	81
6.1	Mathematical Models: Birthplace-Specific Multiregional Demography	81
6.1.1	Introducing Birthplace-Specificity	81
6.1.2	Return Migration.....	83
6.1.3	Introducing Age Specificity	85
6.1.4	Immigration and the Foreign-Born Population: Introducing Origin Dependence.....	89
6.2	Problems	93
6.3	Solutions	96
	Reference	97
7	The Spatial Patterns and Structures of Migration	99
7.1	Describing Spatial Structures of Migration	99
7.1.1	Attributes of Migration Flows: Spatial Focus	100
7.1.2	The Method of Iterative Proportional Fitting (IPF)	102
7.1.3	The Spatial Structure of Migration Flows: The Log-Linear Model for a Two-Way Table	104
7.1.4	Describing the Age and Spatial Patterns of Migration: Model Schedules	107
7.2	Problems	118
7.3	Solutions	129
	References	133
	Correction to: Uniregional Models with No Age Dependence	C1
A	Sample Datasets and Figures	135
B	An Introduction to Matrix Algebra	143

- B.1 Definitions and Notation 143
- B.2 Simple Matrix Operations 145
 - B.2.1 Matrix Addition 145
 - B.2.2 Matrix Subtraction 145
 - B.2.3 Scalar Multiplication 145
 - B.2.4 Matrix Multiplication 146
- B.3 Special Matrices 149
- B.4 The Inverse of a Square Matrix 151
- B.5 Determinants 152
 - B.5.1 Definitions and Notations 152
 - B.5.2 Examples 152
 - B.5.3 Solving Homogeneous Linear Equation Systems 153
- References 154