## Contents

Preface	vi
Acknowledgments	i
List of Figures	χı
List of Tables	xvi
Prologue	1
Part I. Socio-Spatial Dynamics	4
A. Introduction	4
1. A Brief Look at the Literature	4
2. Some Simple Dynamic Models	9
3. The Location-Dependent Elements of a Theory of	
Socio-Spatial Dynamics	11
B. The Four Lenses to View Socio-Spatial Dynamics	11
1. The Absolute-Relative Lens	11
2. Continuous Dynamics	14
3. Discrete Dynamics: The Universal Discrete Relative Dynamics Model	19
Conclusions	23
Part II. One Stock, Two Regions	24
Summary	24
A. The First Iterate and Associated Analytical Properties of the Model:	
x(t+1) = 1/1 + AF[x(t)]	24
1. Overview	24
2. Fixed-Point Behavior and the Discrete Map	25
3. Competitive Exclusion Equilibria	31
4. Classification of Fundamental Relative Spatial Dynamics	32
B. Log-Linear Comparative Advantages Producing Functions:	
$F = x(t)^a [1 - x(t)]^b$	34
1. Interpretation and Discussion of the Log-Linear Model	34
2. Intervals of Stability of Equilibria	37
3. Analytical Properties of the Log-Linear Model	38
4. Geometric Description of the Iterative Process	43

xii Contents

C. Higher Iterates and Fundamental Bifurcations in	
Discrete Dynamics	49
1. The Second Iterate and Two-Period Cycles	49
2. Analytical Description of Two-Period Cycles	54
3. Period-Doubling and the Feigenbaum Slope-Sequences	59
4. Domains of Nonexistence of k-Period Cycles $(k \ge 3)$ and	
the Hopf Equivalent Bifurcation	63
D. The Exponential Locational Advantages Producing Function	68
Conclusions	70
Part III. One Stock, Multiple Locations	72
Summary	72
A. The General Model	73
1. Analytical Results	73
2. Ranking of Stocks According to Size	75
3. Trajectory Domains for the One-Stock, Three-Location Model	77
B. The Log-Linear Comparative Advantages Model	80
1. Analytical Properties	80
2. Numerical Analysis for the One-Stock, Multiple-Location Model	83
C. Empirical Evidence	120
1. The Nine U.S. Regions and Their Aggregations	120
2. The Time Step and the Forces at Work	122
3. U.S. Regional Relative Population Instability	122
4. The Statistical Tests of Significance	125
D. Border Sequences in the One-Stock, Multiple-Location,	
Log-Linear Model	127
1. Some General Results	127
2. Areas of State Variable Movement in the One-Stock,	
Three-Location, Log-Linear Model	128
E. One-Stock, Multiple-Location, Discrete-Time, Logistic Growth	130
1. Definition and Central Analytical Properties	130
2. The Jacobi Matrix	131
3. Equilibria	132
Conclusions	132
Part IV. Multiple Stocks, Multiple Locations	135
Summary	135
A. The General Model	135
1. Analytical Results	135
2. The Log-Linear Specification	137
B. The Two-Stock, Two-Location Model	138
1. The General Case	138
2. The Log-Linear Specifications	140
3. An Example	141
4. Numerical Results for the Two-Stock, Two-Location,	
Log-Linear Model	142

Contents	xiii
C. The Two-Stock, I-Location Case	144
1. The General Specifications	144
2. The Log-Linear Specifications	149
D. The Two-Stock, Multiple-Location, Discrete-Time,	
Logistic Growth Model	151
1. Definitions and Analytical Properties	151
2. The Jacobi Block-Matrix	153
3. Dynamic Structure of the Equilibria	154
Conclusions	155
Epilogue	157
1. Six Central Issues	157
2. Three Areas of Application	162
3. Further Research Suggestions	168
Appendix I	
Second-Order Determinants of the Three-Location, One-Stock Model	171
Appendix II	
The Determinant of the Log-Linear Model	173
References	175
10101011005	1/3
Author Index	179
Subject Index	181