## Contents

List of figures .......................................................... vi
List of tables .......................................................... ix
Preface and acknowledgments ...................................... xi
Codes .................................................................... xvi
Some remarks about notation ..................................... xvii

1 Innovation and industrial evolution .......................... 1

2 History-friendly models: methods and fundamentals 22

3 The US computer industry and the dynamics of concentration 43

4 Vertical integration and dis-integration in the computer industry 93

5 The pharmaceutical industry and the role of demand 150

6 Reprise and conclusions ............................................ 217

References .............................................................. 248
Author index ........................................................... 263
Subject index .......................................................... 264
### Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Attributes and technological limits of computers with transistor and microprocessor technologies</td>
</tr>
<tr>
<td>3.2</td>
<td>Preferences and minimum thresholds of attributes requirements for the two user classes</td>
</tr>
<tr>
<td>3.3</td>
<td>Simulation time = 30</td>
</tr>
<tr>
<td>3.4</td>
<td>Simulation time = 70</td>
</tr>
<tr>
<td>3.5</td>
<td>Simulation time = 130</td>
</tr>
<tr>
<td>3.6</td>
<td>Herfindahl in PC and mainframe markets</td>
</tr>
<tr>
<td>3.7</td>
<td>Number of firms in mainframe market</td>
</tr>
<tr>
<td>3.8</td>
<td>Number of firms in PC market (Standard Set)</td>
</tr>
<tr>
<td>3.9</td>
<td>Market shares in PC market (Standard Set)</td>
</tr>
<tr>
<td>3.10</td>
<td>Herfindahl index in mainframe market with less importance of bandwagon in demand</td>
</tr>
<tr>
<td>3.11</td>
<td>Share of first-generation (TR) and second-generation (MP) firms in mainframe market</td>
</tr>
<tr>
<td>3.12</td>
<td>Herfindahl index in mainframe market: early entry of second-generation (MP) firms and high difficulty of adoption</td>
</tr>
<tr>
<td>3.13</td>
<td>Share of diversified firms in PC market</td>
</tr>
<tr>
<td>4.1.a</td>
<td>Herfindahl index (Standard Set)</td>
</tr>
<tr>
<td>4.1.b</td>
<td>Integration ratio (Standard Set)</td>
</tr>
<tr>
<td>4.1.c</td>
<td>Average number of firms (Standard Set)</td>
</tr>
<tr>
<td>4.2.a</td>
<td>Herfindahl index (No external market for semiconductor firms)</td>
</tr>
<tr>
<td>4.2.b</td>
<td>Integration ratio (No external market for semiconductor firms)</td>
</tr>
</tbody>
</table>
LIST OF FIGURES vii

4.3.a Herfindahl index (Low bandwagon for mainframe firms) 130
4.3.b Integration ratio (Low bandwagon for mainframe firms) 131
4.4.a Herfindahl index (Low bandwagon for semiconductor firms) 133
4.4.b Integration ratio (Low bandwagon for semiconductor firms) 133
4.5.a Herfindahl index (Minor discontinuity) 135
4.5.b Integration ratio (Minor discontinuity) 135
5.1 Therapeutic classes (TC) and molecules 168
5.2 Average Herfindahl index in TCs 181
5.3 Herfindahl index in the aggregate market 182
5.4 Number of active firms in the aggregate market, entry and exit 183
5.5 Number of innovative and imitative products 184
5.6 Share of total profits deriving from innovative products 184
5.7 Number of discovered TCs 185
5.8 Number of firms in each TC 186
5.9 Firm size distribution 187
5.10 Average price of products 187
5.11a Patent duration and average Herfindahl index in TCs 189
5.11b Patent duration and aggregate Herfindahl index 190
5.12a Patent duration and number of innovative products 191
5.12b Patent duration and number of imitative products 191
5.13a Patent duration and prices, $T^{PT} = 1$ 192
5.13b Patent duration and prices, $T^{PT} = 20$ 192
5.13c Patent duration and prices, $T^{PT} = 40$ 193
5.14a Opportunities and average Herfindahl index in individual TCs 195
5.14b Opportunities and aggregate Herfindahl index 195
viii  LIST OF FIGURES

5.15a Market fragmentation and average Herfindahl index in TCs  200
5.15b Market fragmentation and aggregate Herfindahl index  200
5.16 Aggregate Herfindahl index at the end of the simulation in different fragmentation settings  201
5.17a Average Herfindahl index in TCs under alternative distributions of the value of submarkets  202
5.17b Aggregate Herfindahl index under alternative distributions of the value of submarkets  202