

CONTENTS

	Page
INTRODUCTION	1
I. THE ECONOMIC DEVELOPMENT PROBLEM	6
1. Economic Development	6
2. A General Historical Sketch of Growth Theory	7
3. Development Indicators	13
4. Short Term versus Long Term	14
5. Fast Variable versus Slow Variable	17
6. Equilibrium versus Non-equilibrium	18
7. Stability versus Instability	19
II. GROWTH THEORY REVISED	
- FROM QUANTITATIVE ASPECT	22
1. The Neoclassical Approach to Growth	23
2. The One Sector Model of Technological Changes Within the Framework of the Neoclassical Approach	29
3. A Growth Model With Exhaustible Resources and Endogenous Population	30
4. Distribution of Income and Wealth in the Neoclassical One Sector Growth Model	34
5. The Two Sector Models	37
6. Multiple Sector Models	
- The extended neoclassical model	40
7. Production Functions in Growth Models	42
III. A REVISION OF REAL AND MONETARY DYNAMIC MODELS	47
1. Money in Economic Theory	48

2. The One Sector Model With Money Within the Framework of the Neoclassical Approach	56
3. On the Generalized Tobin Model	60
3-1. The generalized Tobin model	61
3-2. Short-run analysis	63
3-3. Long-run analysis	65
3-4. Instability and the business cycle	69
IV. PRICES, GROWTH RATES AND INTEREST RATES IN THE DYNAMIC CONTEXT OF MULTISECTOR MODELS	75
1. Introduction	75
2. The Input-Output System With Neoclassical Production Functions	78
3. The Existence of Short-Run Equilibria With Endogenous Interest Rate	85
4. The Existence of Equilibrium for a Fixed Interest Rate	89
5. The Interest Rate and Investment Coefficient Matrix	93
6. The Relations Between Growth, Interest and Inflation Rates in the von Neumann Dynamic Model	
- An extended concept of balanced growth	96
V. GROWTH RATE CONTROLLED AND ECONOMIC DYNAMICS IN A MULTISECTOR MODEL	101
1. Introduction	101
2. Economic Dynamics With Maximization of Welfare	103
3. Economic Cycles in the Case of One Sector	110
4. Properties of the Multiple Sector Model	113
5. Stabilization With Growth Rate Adjustment	115
6. Further Interpretations of the Dynamic System	118
7. Conclusions	122

VI. THE CHOICE OF TECHNIQUES	123
1. The Choice of Techniques in a Simple Growth Model	123
2. The Basic Model of Leontief Technology and Some of Its Fundamental Properties With One Technique	127
3. The Model of Leontief Technology With Many Alternative Techniques	133
4. Dynamic Behavior of the Model With Many Alternative Techniques	138
5. The Impossibility of Reswitching in the Continuous Substitution Model	139
VII. TECHNOLOGICAL POLICY AND ECONOMIC DEVELOPMENT	
- A NEOCLASSICAL APPROACH	143
1. Technological Change in Economic Development	143
2. The Model	145
3. Equilibrium and Stability	149
4. The Effects of Changes in Some Parameters	152
4-1. The effects of the knowledge workers' consumption	152
4-2. The effects of "learning by doing"	155
4-3. The effects of change of intellectuals' efficiency	156
4-4. The effects of population growth and population structures	157
5. Effects of Changes in the Population Growth Rate in the Case of Instability	158
6. Conclusions	162
VIII. TECHNOLOGICAL POLICY AND ECONOMIC DEVELOPMENT	
- MULTISECTOR APPROACH	165
1. The Basic Model	165
2. Some Properties of the Basic System	168

3. Technological Change of "Learning by Doing"	171
4. Technological Change due to Investment in Training	176
5. A Growth Model of "Hybrid" Technological Change	182
6. Some Comments	184

IX. CONCLUSION AND PROSPECTS FOR FURTHER RESEARCH 186

1. Summary	186
2. How To Close Dynamic Models	
- The neoclassical, neo-Marxian and neo-Keynesian approaches	188
(a) The neoclassical approach	190
(b) The neo-Marxian approach	193
(c) The neo-Keynesian approach	197
(d) Some comments	198

APPENDIX. NONLINEAR DYNAMIC SYSTEM THEORY 200

A.1. Ordinary Differential Equations and Existence of Solutions	200
A.2. Stability	202
A.3. Linearization Principle and Its Valid Domain	206
A.4. Limit Cycles in Two Dimension	
- The Poincaré-Bendixson theory	206
A.5. Bifurcations	209
A.6. Limit Cycles	
- The Hopf bifurcation theorem	211
A.7. Maps	213
A.8. Chaos	215
A.9. The Logistic Map	
- An example of chaos	219

REFERENCES 223