

# **Dynamic Macroeconomic Theory**

**Thomas J. Sargent**

Harvard University Press  
Cambridge, Massachusetts  
and London, England

# Contents

## **Introduction 1**

References and Suggested Readings 8

## **Part I / Real Dynamic Macroeconomic Models**

### **1. Dynamic Programming 11**

A General Intertemporal Problem 12

A Recursive Problem 13

Bellman's Equations 16

Nonstochastic Examples 22

The Optimal Linear Regulator Problem 27

Stochastic Control Problems 29

Examples of Stochastic Control Problems 31

The Stochastic Linear Optimal Regulator Problem 36

Dynamic Programming and Lucas's Critique 40

Dynamic Games and the Time Inconsistency Phenomenon 41

Conclusions 47

Exercises 47

References and Suggested Readings 54

### **2. Search 57**

Nonnegative Random Variables 58

Stigler's Model of Search 59

Sequential Search for the Lowest Price 60

Mean-Preserving Spreads 63

Increases in Risk and the Reservation Price 65

Intertemporal Job Search	65
Waiting Times	70
Firing	70
Jovanovic's Matching Model	71
Conclusions	83
Exercises	85
References and Suggested Readings	91

### **3. Asset Prices and Consumption 92**

Hall's Random Walk Theory of Consumption	93
The Random Walk Theory of Stock Prices	94
Lucas's Model of Asset Prices	95
Mehra and Prescott's Finite-State Version of Lucas's Model	100
Asset Pricing More Generally	101
The Modigliani-Miller Theorem	115
Government Debt and the Ricardian Proposition	116
Remarks on Testing and Estimation	119
Conclusions	120
Exercises	121
References and Suggested Readings	128

## **Part II / Monetary Economics and Government Finance**

### **4. Currency in the Utility Function 133**

The Price of Inconvertible Government Currency in Lucas's Tree Model	133
Issues and Models in Monetary Economics	137
Government Debt in the Utility Function	140
Government Currency in the Utility Function	142
Seignorage and the Optimum Quantity of Currency	145
A Neutrality Proposition	148
Conclusions	152
References and Suggested Readings	153

### **5. Cash-in-Advance Models 155**

A One-Country Model	156
Fisher Equations	165
Inflation-Indexed Government Debt	166
Interactions of Monetary and Fiscal Policies	168
Interest on Reserves	177
A Two-Country Model	182
Exchange Rate Indeterminacy	188
Conclusions	192
Exercises	192
References and Suggested Readings	198

### **6. Credit and Currency with Long-Lived Agents 199**

The Physical Setup	200
Optimal Allocations	201

Competitive Equilibrium	202
A Digression on the Balances of Trade and Payments	207
The Ricardian Doctrine about Taxes and Government Debt	207
The Model with Valued Currency and No Private Debt	212
An Interventionist Optimal Monetary Equilibrium	220
Townsend's "Turnpike" Interpretation	224
Conclusions	226
Exercises	226
References and Suggested Readings	230

## **7. Credit and Currency with Overlapping Generations 231**

The Overlapping-Generations Model	232
The Ricardian Doctrine about Taxes and Government Debt Again	244
A Ricardian Proposition	250
Currency, Bonds, and Open-Market Operations	253
Computing Equilibria	257
Interpretations as Currency Equilibria	264
Optimality	266
Four Examples on Inflation and Its Causes	269
Seignorage and the Laffer Curve	275
Dynamics of Seignorage	281
Forced Saving	283
International Exchange Rates	285
Conclusions	289
Exercises	290
References and Suggested Readings	301

## **8. Government Finance in Stochastic Overlapping-Generations Models 304**

The Economy	305
Some Examples	309
A General Irrelevance Theorem	319
Wallace's Modigliani-Miller Theorem for Open-Market Operations	323
Chamley and Polemarchakis's Neutrality Theorem	324
Interpretation as a Constant Fiscal Policy	327
Indexed Government Bonds	328
A Ricardian Proposition	331
Further Irrelevance Theorems	333
Conclusions	333
Exercises	334
References and Suggested Readings	337

## **Appendix. Functional Analysis for Macroeconomics 339**

Metric Spaces and Operators	340
First-Order Linear Difference Equations	345
A Formula of Hansen and Sargent	350
A Quadratic Optimization Problem in $R^n$	352
A Discounted Quadratic Optimization Problem	354

Predicting a Geometric Distributed Lead of a Stochastic Process	357
Discounted Dynamic Programming	360
A Search Problem	361
Exercises	362
References and Suggested Readings	363

<b>Index</b>	<b>365</b>
--------------	------------