CONTENTS

		Page
1.	**THE NEED FOR A NONLINEAR THEORY OF ECONOMIC DYNAMICS**	
1.1	Introduction	1
1.2	Early Nonlinear Theories	3
1.3	Development of the Theory of Dynamical Systems	5
1.4	Problems in the Current State of Economic Dynamics	7
2.	**THE THEORY OF DYNAMICAL SYSTEMS**	
2.1	Introduction	11
2.2	Existence and Uniqueness Results	11
2.3	The Linear System $\dot{x} = Ax$	12
2.4	Nonlinear Systems on the Plane	17
2.5	Analysis of Limit Cycles	22
2.6	Relaxation Oscillations	28
2.7	Higher Dimensional Nonlinear Systems	32
Appendix 2.1		38
3	**A NEW LOOK AT SOME OLD ENDOGENOUS CYCLE THEORIES**	
3.1	Introduction	39
3.2	A General Model of Multiplier-Accelerator Interactions	40
3.3	Goodwin's Nonlinear Accelerator Model	43
3.4	A Saturation Type Nonlinear Accelerator	50
Appendix 3.1		53
Appendix 3.2		53

4 ANALYSIS OF THE EFFECTS OF TIME LAGS AND NONLINEARITIES IN MACROECONOMIC MODELS INCORPORATING THE GOVERNMENT BUDGET RESTRAINT

4.1 Introduction 55
4.2 Specification of the Model 56
4.3 Dynamic Behaviour of the Model 62
Appendix 4.1 67
Appendix 4.2 68

5 LIMIT CYCLES IN HIGHER DIMENSIONS - THE EFFECT OF TIME LAGS ON GOODWIN'S MODEL OF CYCLICAL GROWTH

5.1 Introduction 70
5.2 The Goodwin Model with a Time-Lag 71
5.3 Local Stability Analysis 73
5.4 Approximation of the Limit Cycle 75
5.5 Discussion 79
Appendix 5.1 81
Appendix 5.2 82
Appendix 5.3 82
Appendix 5.4 83
Appendix 5.5 84
Appendix 5.6 84
Appendix 5.7 85

6 THE COBWEB MODEL: ITS INSTABILITY AND THE ONSET OF CHAOS

6.1 Introduction 86
6.2 The Nonlinear Cobweb Model 87
6.3 Discrete Time Dynamics 90
6.4 Period Doubling to Chaos 93
6.5 Onset of Chaos in the Cobweb Model 96
6.6 Discussion 98

7 PERFECT FORESIGHT MODELS AND THE DYNAMIC INSTABILITY PROBLEM FROM A HIGHER VIEWPOINT

7.1 Introduction 100

7.2 The Basic Nonlinear Model of Monetary Dynamics 102

7.3 The Naive Dynamics of the Perfect Foresight Case; $\tau = 0$ 105

7.4 The Dynamics of the Adaptive Expectations Case; $\tau > 0$ 108

7.5 Adaptive Expectations as $\tau \to 0^+$ 111

7.6 The Discrete Time Model of Monetary Dynamics 116

7.7 Discussion 124

Appendix 7.1 127

Appendix 7.2 128

Appendix 7.3 130

Appendix 7.4 132

Appendix 7.5 133

Appendix 7.6 135

8 CONCLUSIONS AND FURTHER DEVELOPMENTS 137

REFERENCES 141