
Johannes Gutenberg University Mainz
Graduate School of Economics, Finance, and Management

Advanced Macroeconomic Theory 2 (Part 1)

2018 summer term

Klaus Wälde (lecture) and Hoang Khieu (tutorial)

Contents

1	Introduction	1.0
1.1	What is macroeconomics?	1.0
1.2	Who covers what?	1.1
1.3	Who covers what?	1.2
1.4	Which macroeconomic topics are covered here?	1.3
I	Economic growth	2.0
2	The convergence debate	2.0
2.1	Is there convergence?	2.0
2.2	Questions for economic theory	2.6
3	Neoclassical growth theory	3.0
3.1	Some background	3.0
3.2	The Solow-Cass-Koopmans-Ramsey model	3.1
3.2.1	The model and optimal behaviour	3.5
3.2.2	How to obtain Keynes-Ramsey-Rules: Hamiltonians [background]	3.12
3.2.3	How to obtain Keynes-Ramsey-Rules: Dynamic Programming [background]	3.14
3.2.4	Comparing dynamic programming to Hamiltonians [background]	3.21

3.3	A phase diagram analysis	3.22
3.4	More background on phase diagrams [background]	3.28
3.5	What have we learned?	3.33
4	New growth theory: Incremental innovations	4.0
4.1	Some background on the “new” endogenous growth theory	4.0
4.2	The principle of endogenous growth theory	4.3
4.3	The Grossman and Helpman model	4.6
4.4	Optimal behaviour	4.12
4.5	Equilibrium without choosing a numeraire	4.17
4.6	Phase diagram illustration	4.19
4.7	Knowledge spillovers yield long-run growth	4.21
4.8	Non-scale models	4.26
4.8.1	The empirical background	4.26
4.8.2	The theoretical explanation	4.30
4.9	What have we learned?	4.32
5	New growth theory: Major innovations	5.0
5.1	The questions	5.0
5.2	The production side	5.2
5.3	Excursion on Poisson processes [background]	5.4

5.3.1	What are stochastic processes? [background]	5.4
5.3.2	An intuitive understanding of a Poisson process [background]	5.8
5.4	Labour market	5.12
5.5	Consumers	5.13
5.5.1	Preferences and constraints	5.13
5.5.2	Stochastic differential equations (SDEs) [background]	5.16
5.5.3	Differentials for stochastic differential equations [background]	5.25
5.6	Maximization problem	5.32
5.6.1	Bellman equations for Poisson processes [background]	5.33
5.6.2	The maximization problem in the growth model	5.36
5.7	Equilibrium	5.39
5.8	What have we learned?	5.42
6	Time inconsistency	6.0
6.1	Some background	6.0
6.2	Time-inconsistency in continuous time	6.1
6.3	What have we learned?	6.13
7	Exercises and solution keys - economic growth	7.0
7.1	Exercises	7.0
7.1.1	Optimal Consumption	7.0

7.1.2	Properties of the CRRA utility function	7.1
7.1.3	Basics of dynamic programming	7.2
7.1.4	Money in the utility function	7.2
7.1.5	Phase diagrams: a general introduction	7.3
7.1.6	Budget constraints: where do they come from?	7.5
7.1.7	Innovation and growth: optimal demand for varieties	7.5
7.1.8	Innovation and growth: the Keynes-Ramsey rule	7.5
7.1.9	Innovation and growth: optimal behaviour of firms	7.6
7.1.10	Equilibrium and reduced form	7.6
7.1.11	Optimal saving under Poisson uncertainty	7.7
7.1.12	Additional exercises	7.9
II	Unemployment	8.0
8	Facts about unemployment	8.0
8.1	Definitions	8.0
8.2	Unemployment stocks	8.3
8.3	Unemployment flows	8.4
8.4	Questions for economic theory	8.5

9 Matching models of unemployment	9.0
9.1 The literature	9.0
9.2 Basic structure	9.1
9.3 Basic unemployment dynamics	9.2
9.3.1 An illustration	9.2
9.3.2 Notation	9.3
9.3.3 The dynamics of the unemployment rate	9.5
9.4 The Pissarides (1985) model	9.9
9.4.1 Match quality	9.9
9.4.2 The dynamics of the unemployment rate	9.11
9.4.3 Optimal behaviour of workers	9.12
9.4.4 Vacancies and filled jobs	9.15
9.4.5 Wages	9.19
9.4.6 Job rejection	9.21
9.4.7 Equilibrium and dynamic adjustment of the unemployment rate	9.22
9.4.8 Response to an output shock	9.24
9.5 What have we learned?	9.29
10 Search unemployment	10.0
10.1 The basic search model	10.0
10.1.1 The basic idea	10.0

10.1.2	Expected utility once employed	10.1
10.1.2	Expected utility once employed (cont'd)	10.2
10.1.3	The optimal search strategy	10.3
10.1.4	The discounted expected utility (value function) of a job seeker	10.4
10.1.5	Reservation wage	10.5
10.1.6	Hazard rates and average duration in unemployment	10.6
10.2	Non-stationary search	10.7
10.2.1	Institutional background	10.7
10.2.2	Empirical background	10.8
10.2.3	Two-tier unemployment benefit systems	10.10
10.3	What have we learned?	10.21
11	Search with Bayesian learning	11.0
11.1	Bayesian learning	11.0
11.1.1	The standard expected utility framework	11.0
11.1.2	Subjective expected utility theory	11.2
11.1.3	Bayes' theorem	11.3
11.1.4	Economic literature on Bayesian learning	11.10
11.1.5	Learning with continuous random variables	11.13
11.1.6	Bayesian learning in continuous time	11.17
11.2	Non-stationary search with Bayesian learning in equilibrium	11.22

11.2.1	The model	11.23
11.2.2	Workers	11.24
11.2.3	Optimal behaviour	11.28
11.2.4	Steady state solution	11.32
11.2.5	Solution for the steady state	11.34
11.3	What have we learned?	11.37
12	Search and matching and self-insurance	12.0
12.1	Some background	12.0
12.2	The structure	12.3
12.2.1	Labour income	12.3
12.2.2	The individual	12.4
12.2.3	Optimal behaviour	12.11
12.3	Consumption and wealth dynamics	12.18
12.3.1	Reduced form and phase diagram	12.18
12.3.2	Equilibrium	12.26
12.4	Quantitative findings	12.28
12.4.1	Optimal consumption paths	12.28
12.5	What have we learned?	12.29
13	Unemployment and stress	13.0

14 Exercises and solution keys - unemployment	14.0
14.1 Exercises	14.0
14.1.1 The matching model	14.0
14.1.2 Reservation productivity	14.1
14.1.3 Pure search model	14.1
14.1.4 Non-stationary search	14.2
14.1.5 Evolution of the belief	14.2
III Conclusion	15.0
15 What did we learn from the individual fields?	15.0
15.1 Economic growth	15.0
15.2 Unemployment	15.1
15.3 Wealth distributions and redistributions	15.3
15.4 Overall conclusion	15.3