Syllabus, Theory of Income, Macroeconomics I

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- Grades = three exams, problem sets are not mandatory.
- Exams = two midterms and a comprehensive final. No make ups.
- TA will discuss answers to (non-mandatory) problem sets.
- Class notes and problem sets on canvas. highly recommended
- Class MW 9:30-10:50
- We will also have lectures on most, but not all Fridays (same time and place). We will arrange it every week.
- Review sessions on Mondays or Wednesday from 12:30-3:00 or Wednesdays from 12:30-4:30 (to be arranged starting second week)
- Final exam (tentatively, to be confirmed by the Registrar) : Either FRI 10:30 AM - 12:30 PM Exam week (December 10th - December 14th).

Brief Description of Lectures Notes

- *Lecture Notes 1:*
  - Math review (envelope theorem, hyperplane separation theorem)
  - (Abstract) Definition of Economy, Competitive Equilibrium (CE), Pareto Optimal (PO) allocations
  - 1st and 2nd Welfare Theorem
- *Lecture Notes 2:*
  - OLG pure exchange example
  - Social Security and 1st welfare theorem
  - Privatization of Social Security, Ricardian Equivalence
- *Lecture Notes 2': Perpetual Youth model*
  - Capital Accumulation
  - Fiscal Policy

- *Lecture Notes 3:*
  - PO allocations, CE allocations and Representative Agent.
  - Aggregation (λ-weights and Gorman)
  - Interpretation of Prices: Scarcity, Tastes, and Distribution.
- *Lecture Notes 4:*
  - Uncertainty, risk aversion and risk sharing.
  - Asset Pricing and Arbitrage in static (1 period) setting.
  - Complete vs Incomplete Markets, Constraint efficiency.
  - Risk premium.
  - Privatization of Social Security, again.

- *Lecture Notes 5:*
  - Representation of Optimal Control Problems
  - Euler Equations (EE) and Transversality (TC) for Optimal Control Problems. Necesity and Sufficiency. Examples.
- *Lecture Notes 6*
  - Continuous time case.
  - Hamiltonian vs Euler Equations.
  - Neoclassical Growth Model and other examples.

- *Lecture Notes 7:*
  - Introduction to Bellman Equations. Euler equations, again.
  - Discrete vs Continuous time. Interpretation of co-state and Hamiltonian.
- *Lecture Notes 8:*
  - Local stability of Optimal Trajectories (discrete and continuous time).
  - Stable and unstable roots. Linearization.

- *Lecture Notes 9:*
  - Adjustment cost, Q-theory, and Capital Utilization and Variable labor supply.
  - Quadratic problems and Certainty equivalence.
- *Lecture Notes 10:*
  - Neoclassical Growth Model: Planning Problem vs CE.
  - Income Taxes, Gov. Purchases and Steady States. Calibration.
- *Lecture Notes 11:*
  - Stochastic Euler Equations.
  - Examples: Asset Pricing and Permanent Income Hypothesis.

Problem Sets (there may be more!):

- OLG models, Privatizing Social Security
- Aggregation, CE and Risk Sharing
- No Arbitrage and Asset Pricing.
- OLG and Asset Pricing.
- Neoclassical Growth Model and Balanced Growth Paths
- Continuous time Budget Equations. Local Dynamics in the Neoclassical Growth model and comparative statics.

- More on local Dynamics in the Neoclassical Growth model and comparative statics: productivity, and investment shocks: speed of adjustment and impact effect.
- Habit formation. Durable goods.
- Capital Utilization and the Neoclassical Growth Model.
- Examples of Dynamic Problems: Lucas-Uzawa growth model, population growth.
- Fiscal Policy in Steady State in the Neoclassical Growth model.

While the lecture notes are self-contained, here there is some supplementary reading material.

- Math Review. Definition of and Economy Appendices MC, ME, MG, MJ, Mk, ML of MT.
- Welfare Theorem. Ch 16 of MT.
- Euler Equations and transversality in cts and discrete time, deterministic. Ch 2 LM, Ch 2 RMED, Ch. 2 EG
- Dynamic programming (deterministic) Ch 2 RMT, Ch 3 of RMED.
- Analysis of dynamics and comparative static of neoclassical growth model:
  - determinants of steady states, rate of convergence, etc (deterministic),
  - effect of transitory vs permanent productivity and government expenditure, etc..
  - Ch 2 EG, Ch 2 LM, Ch 6 RMED, Ch 5, 6, 7 of IEG.

- Other applications: adjustment cost on investment: q theory, OLG, and equilibrium search models . Ch 2 LM, Ch 3 EG, Ch 7 and 9 of IEG
- Introduction to stochastic models and Euler equations. Tobin's q revisited. Asset pricing, Hal's random walk Ch. 7 and Ch 10 RMT.
- Computation of linear approximations to resource allocation problems and equilibrium (1 class or less) Ch 4 RMT, Harald Uhlig code.

References

- MT: Microeconomic Theory, Andreu Mas Collel, Michael Whinston, and Jerry Green, Oxford.
- RMED: Recursive Methods in Economic Dynamics, by Stokey and Lucas with Prescott. Harvard.
- RMT: Recursive Macroeconomic Theory, by L. Ljungqvist and T. Sargent, MIT press.
- LM: Lectures on Macroeconomics, by O. Blanchard and S. Fischer. MIT Press.
- EG: Economic Growth by Barro and Sala-i-Martin, Mc Graw Hill.
- IEG: Introduction to Modern Economic Growth, by Daron Acemoglu, Princeton Universtity Press.