

Russell Cooper  
2019 Summer  
Proposed for Shanghai University of Finance and Economics

## Theory and Application of Dynamic Programming: Household Finance

### A. Description

These lectures study decision problems of households and firms in a dynamic stochastic setting. To do so, the course will develop a number of tools and then apply them to the agents' choice problems and equilibrium. A primary tool is dynamic programming. The course will provide the basic foundations for dynamic programming, both in theory and through numerical analysis. Another tool is the use of simulated method of moments to estimate economic models.

After developing these two tools, the course turns to applications. Household dynamic choices will include intertemporal consumption, labor supply, portfolio adjustment and durable expenditures. The role of borrowing constraints will be explored. A theme will be the interaction of discrete and continuous choices.

### B. Course Plan

#### Lecture 1: **Overview of Dynamic Programming**

- Asset Pricing
- Value Function Iteration
- Simulated Method of Moments

Read:

1. Adda-Cooper, Chpts. 2-5
2. Cooper, R. "Overview of Dynamic Programming," June 2017

(posted)

## Lecture 2: **Household Finance: Portfolio Choice and Borrowing Constraints**

- Household Consumption/ Saving: the Euler Equation
- Household Portfolio Adjustment:
- Borrowing Constraints

Read:

1. Adda-Cooper, Chapt. 6
2. \*Cooper, R. and G. Zhu, "Household finance over the life-cycle: What does education contribute?" *Review of Economic Dynamics*, 20 (2016), 63-89.
3. \*Deaton, A. "Savings and Liquidity Constraints," *Econometrica*, 59 (1991), 1121-42.
4. Eichenbaum, M., Hansen, L. and K. Singleton, "A Time Series Analysis of Representative Agent Models of Consumption and Leisure Choice under Uncertainty," *Quarterly Journal of Economics*, 103 (1988), 51-78.
5. Gourinchas, P. and J. Parker, "Consumption over the Life Cycle", *Econometrica*, 70 (2002), 47-89.
6. \* Hall, R. "Stochastic Implications of the Life Cycle-Permanent Income Hypothesis: Theory and Evidence," *Journal of Political Economy*, 86 (1978), 971-87.
7. \* Hansen, L. and K. Singleton, "Generalized Instrumental Variables Estimation of Nonlinear Rational Expectations Models," *Econometrica*, 50 (1982), 1269-86.
8. \* Mankiw, N.G. "Hall's Consumption Hypothesis and Durable Goods," *Journal of Monetary Economics*, 10 (1982), 417-25.
9. Zeldes, S. "Consumption and Liquidity Constraints: An Empirical Investigation," *Journal of Political Economy*, 97 (1989), 305-46.

## Lecture 3: **Household Durable Expenditures**

- Continuous Expenditures
- Lumpy Investment
- Borrowing Constraints

Read:

1. Adda-Cooper, Chapt. 7
2. \*Adda, J. and R. Cooper, "Balladurette and Juppette: A Discrete Approach," *Journal of Political Economy*, August, 2000.
3. \* Mankiw, N.G. "Hall's Consumption Hypothesis and Durable Goods," *Journal of Monetary Economics*, 10 (1982), 417-25.
4. Fernandez-Villaverde, Jesus, and Dirk Krueger.  
"Consumption and saving over the life cycle: How important are consumer durables?." *Macroeconomic dynamics* 15.05 (2011): 725-770.

Optional Textbook: Jerome Adda and Russell Cooper *Dynamic Economics: Quantitative Methods and Applications*, MIT Press, 2003.