

## MACROECONOMICS III

### Syllabus

#### COURSE DESCRIPTION:

Most of the macroeconomic models you have examined so far are developed in the environments with complete markets – a framework that allows agents to insure against all idiosyncratic shocks. This, in turn, (a) often justifies the use of a "representative agent" in macroeconomic models and (b) implies that the allocation of agents' consumption and wealth depends only on the current aggregate shock and not on the history of the shock's realizations. However, many economists believe that the real world's insurance markets are *incomplete*, mainly because substantial wealth and consumption heterogeneity is always found in the data. The incompleteness of markets will be the focal point of this course.

#### COURSE OBJECTIVES:

- To learn the tools necessary to analyze the economies with incomplete markets
- To study various implications of market incompleteness
- To analyze why market incompleteness arises endogenously in the presence of enforcement and information problems

#### COURSE REQUIREMENTS:

There will be a lot of reading in addition to what will be covered in class.

There will be no exams.

The grade will be based on the following criteria:

1. (30% of the grade) One numerical homework  
This will be a large (most likely several-part) project, in which you will have to design and implement a numerical algorithm to solve a general equilibrium model(s) with incomplete markets.
2. (25% of the grade) One or two theoretical homeworks  
You will have to prove some theorems.
3. (35% of the grade) Presentation of and referee report on a recent working paper  
You will be required to present a recent working paper that has not been covered in class (extra classes will be scheduled if required) and, after receiving feedback from the audience, write a comprehensive referee report on the paper. To work through this task successfully you will have to master a particular topic of your choice, relevant to the material studied in class (e.g. "incomplete markets and asset prices," "inequality and growth," etc.). This will include:
  - reading many additional papers written in this area and writing a comprehensive literature review about them;
  - working carefully through all the details of the selected working paper;
  - presenting the paper to an audience, which is less familiar than you with the research in that particular area (such presentation must skillfully introduce the audience into a new field, position the paper clearly, and then discuss the paper in depth).

Several possible topics are suggested in the course outline below, but you are welcome to come up with your own proposals.

4. (10% of the grade) Class participation  
Mainly discussions during other students' presentations.

## **COURSE POLICIES:**

### 1. Academic Dishonesty:

While I strongly encourage you to discuss any homework assignment with other students, I expect you to be the sole author of any submitted solution, proof and numerical code. It is my sincere hope that no student in this class hands in work that is not his or her own. If two assignments are identical in appearance, either the semester grade of all students involved will be lowered by one full letter grade or they will receive a score of "0" on the assignment, whichever penalty is greater.

All incidents of cheating will be reported to the appropriate Dean (e.g. the Associate Dean for the Undergraduate Program in the College of Business) and the student may be placed on disciplinary probation for the remainder of his or her undergraduate work at the University of Iowa. All students taking this course are governed by the Honor Code for the Tippie College of Business, regardless of major. In order to determine the appropriate appeal process, please consult the Honor Code for the Tippie College of Business at <http://www.biz.uiowa.edu/upo/honorcode.html>.

### 2. Complaint Policy:

If you feel that I have treated you unfairly or acted unprofessionally or otherwise failed to meet my responsibilities as an instructor, please bring the matter to my attention so that we can work together to resolve the problem. If you remain unsatisfied you may contact the chair of my department, Beth Ingram, W207 PBB. If your concerns have still not been resolved at that point, you may submit a written complaint to the Associate Dean for Academic Programs, 120 Schaeffer Hall (335-2633).

### 3. Policy on Accomodation of Students with Disabilities:

I would like to hear from anyone who has a disability which may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please talk with me after class or during my office hours.

## **COURSE TEXTBOOKS:**

(LS) Ljungqvist, L. and T.J. Sargent (2004). *Recursive Macroeconomic Theory (Second Edition)*. MIT Press.

(SLP) Stokey, N., Lucas, R. and E. Prescott (1989). *Recursive Methods in Economic Dynamics*. Harvard University Press.

## **COURSE OUTLINE:**

The course can be roughly structured into two parts:

- I. *Exogenously* incomplete markets and their applications
- II. *Endogeously* incomplete markets

## **PART I: EXOGENOUSLY INCOMPLETE MARKETS**

Models of this class make some exogenous assumptions about the nature of market incompleteness (limited set of available assets, borrowing constraints, etc.) and analyze their implications for the behavior of individually chosen variables (e.g., wealth and consumption) as well as the equilibrium market outcomes (e.g., interest rates and asset prices)

### **1. Partial equilibrium models with incomplete markets:**

Chamberlain, G. and C. Wilson (2000). Optimal Intertemporal Consumption Under Uncertainty. *Review of Economic Dynamics* 3, 365-395.

LS Chapter 16, SLP Chapter 9

## 2. General equilibrium models with incomplete markets:

Hugget, M. (1993). The Risk-Free Rate in Heterogenous-Agent Incomplete-Insurance Economies. *Journal of Economic Dynamics and Control* 17, 953-969.

Aiyagari, R. (1994). Uninsured Idiosyncratic Risk And Aggregate Saving. *The Quarterly Journal of Economics* 109, 659-684.

LS Chapter 17

SLP Chapters 11 and 12

## 3. Various applications:

Listed below are some of the numerous applications studied in the models with incomplete markets. Some of these topics will be discussed in class, others will be left for your presentations. You are welcome to suggest other relevant topics and papers for your presentations and referee reports.

### 1. Matching the wealth distribution

Hugget, M. (1996). Wealth Distribution in Life-Cycle Economies. *Journal of Monetary Economics* 38, 469-494.

Diaz-Gimenez, J. Quadrini, V. and J. Rios-Rull (1997). Dimensions of Inequality: Facts on the U.S. Distributions of Earnings, Income and Wealth. *Federal Reserve Bank of Minneapolis Quarterly Review* 21(2), 3-21.

Quadrini, V. and J. Rios-Rull (1997). Understanding the U.S. Wealth Distribution. *Federal Reserve Bank of Minneapolis Quarterly Review* 21(2), 22-36.

Krusell, P. and A. Smith (1998). Income and Wealth Heterogeneity in the Macroeconomy. *Journal of Political Economy* 106(5), 867-896.

Castaneda, A., Diaz-Gimenez, J. and J. Rios-Rull (2003). Accounting for the U.S. Earnings and Wealth Inequality. *Journal of Political Economy* 111(4), 818-857.

Cordoba, J. (2004). Debt Constraints or Incomplete Markets? A Decomposition of the Wealth and Consumption Inequality in the U.S. *Manuscript*.

### 2. Occupational choice models

Quadrini, V. (1999). Entrepreneurship, Saving and Social Mobility. *Manuscript*.  
<http://pages.stern.nyu.edu/~vquadrin/papers/redpap.pdf>

Bohacek, R. (2003). Financial Constraints and Entrepreneurial Investment. *Manuscript*.  
<http://home.cerge-ei.cz/RADIM/publications/fin.pdf>

Hopenhayn, H. and G. Vereshchagina (2005). Risk Taking by Entrepreneurs. *Manuscript*.  
[www.biz.uiowa.edu/faculty/gvereshchagina/risk\\_taking.pdf](http://www.biz.uiowa.edu/faculty/gvereshchagina/risk_taking.pdf)

### 3. Incomplete market models with aggregate shocks

(a) Computing the equilibria in GE models with incomplete markets:

Krusell, P. and A. Smith (1998). Income and Wealth Heterogeneity in the Macroeconomy. *Journal of Political Economy* 106(5), 867-896.

(b) Incomplete markets, borrowing constraints and business cycles

*There has been a debate in the literature regarding the role of incomplete markets and/or borrowing constraints in amplification and propagation of the temporary shocks. Here are a few papers on this subject:*

Kiyotaki, N. and J. Moore (1997). Credit Cycles. *Journal of Political Economy* 105, 211-248.

Kocherlakota, N. (2000). Creating Business Cycles Through Credit Constraints. *Federal Reserve Bank of Minneapolis Quarterly Review* 24(3), 2-10.

Arias, A. (2003). Quantitative Implications of the Credit Constraint in the Kiyotaki-Moore (1997) Setup. *Manuscript*.

Cordoba, J. and M. Ripoll (2004). Credit Cycles Redux. *International Economic Review* 45(4), 1011-1046.

Angeletos, G. and L. Calvet (2005). Idiosyncratic Production Risk, Growth and the Business Cycle. *forthcoming in the Journal of Monetary Economics*.

*Other papers focus on the propagation of the monetary shocks:*

Cordoba, J. and M. Ripoll (2003). Collateral Constraints in a Monetary Economy. *Manuscript*.

Bohacek, R. and Rodriguez, H. (2004) Credit Markets and the Propagation of Monetary Policy Shocks. *Manuscript*.

*The following paper describes how precautionary motives (due to market incompleteness) can lead to endogenous fluctuations:*

Calvet, L. (2001). Incomplete Markets and Volatility. *Journal of Economic Theory* 28, 295-338.

4. Can incomplete market models help resolving asset prices anomalies?

Weil, P. (1992). Equilibrium Asset Prices with Undiversifiable Labor Income Risk. *Journal of Economic Dynamics and Control* 16, 769-790.

Aiyagari, R. (1993). Explaining Financial Market Facts: The Importance of Incomplete Markets and Transaction Costs. *Federal Reserve Bank of Minneapolis Quarterly Review* 17(1) 17-31.

Heaton, J. and D. Lucas (1996). Evaluating Effects of Incomplete Markets on Risk Sharing and Asset Pricing. *Journal of Political Economy* 104(3), 443-487.

Kocherlakota, N. (1996). The Equity Premium: It's Still a Puzzle. *Journal of Economic Literature* 34, 42-71.

Gollier, C. (2001). Wealth Inequality and Asset Pricing. *Review of Economic Studies* 68, 181-203.

5. Social policies and redistribution

Hugget, M. and G. Ventura (1999). On the Distributional Effects of Social Security Reform. *Review of Economic Dynamics* 2, 498-531.

Heathcote, J. (2003) Fiscal Policy with Heterogeneous Agents and Incomplete Markets. *Manuscript*.

Doepke, M. and M. Schneider (2003). Real Effects of Inflation: the Role of Redistribution through Nominal Debt. *Manuscript*.

6. Are incomplete markets good or bad for growth?

*This is probably one of the most recent papers on this subject, it also contains a good review of the existing literature:*

Angeletos, G. and L. Calvet (2005). Idiosyncratic Production Risk, Growth and the Business Cycle. *forthcoming in the Journal of Monetary Economics*.

7. Human capital, inequality and growth

to be added...

8. Welfare costs of market incompleteness

Kubler, F. and K. Schmedders (2001). Incomplete Markets, Transitory Shocks, and Welfare. *Review of Economic Dynamics* 4, 747-766.

Levine, D. and W. Zame (2002). Does Market Incompleteness Matter? *Econometrica* 7(5), 1805-1839.

## **Part II. ENDOGENOUSLY INCOMPLETE MARKETS: INSURANCE VERSUS INCENTIVES**

It turns out that full insurance cannot be provided if the agents are not able to commit to participate in the insurance program (enforcement problems) or if the agents' type or action is not observed by the insuring agency (information problems). The reason is that agents must be faced with sufficient incentives in order to stay in the contract (in case of enforcement problems), honestly reveal its type (in case unobserved type) or take the prescribed action (in case of unobserved action). These theories have a very rich set of application in macroeconomics, industrial organization, finance, as well as many other areas.

### **1. Limited commitment**

#### **Basic theory:**

Kocherlakota, N. (1996). Implications of Efficient Risk Sharing without Commitment. *Review of Economic Studies* 63, 595-609.

LS Chapters 19, 20

#### **Application: Endogenous borrowing constraints**

##### at the individual level:

Azariadis, C. and L. Lambertini (2003). Endogenous Debt Constraints in Lifecycle Economies. *Review of Economic Studies* 70, 461-487.

Cagetti M. and M. DeNardi (2003). Entrepreneurship, Frictions, and Wealth. *Manuscript*.

Lustig, H. (2004). The Market Price of Aggregate Risk and the Wealth Distribution. *Manuscript*.

##### at the firm level:

Albuquerque, R. and H. Hopenhayn (2004). Optimal Lending Contracts and Firm Dynamics. *Review of Economic Studies* 71(2), 285-315.

Cooley, T., Marimon, R. and V. Quadrini (2004). Aggregate Consequences of Limited Contract Enforceability. *Journal of Political Economy* 112(4), 817-847.

at the country level:

Kehoe, P. and F. Perri (2002). International Business Cycles with Endogenous Incomplete Markets. *Econometrica* 70(3), 907-928.

Bai, Y. and J. Zang (2005). Financial Integration and International Risk Sharing. *Manuscript*.

Szentes, B. and N. Kovrijnykh (2005). Competition for Default. *Manuscript*.

Endogenous borrowing constraints and asset pricing:

Alvarez, F. and U. Jermann (2000). Efficiency, Equilibrium and Asset Pricing with Risk of Default. *Econometrica* 68(4), 775-797.

Endogenous borrowing constraints and government policies:

Krueger, D. and F. Perri (2001). Risk Sharing: Private Insurance Markets or Redistributive Taxes? *Manuscript*.

Lambertini, L. (1999). Social Security with Endogenous Debt Limits. *Manuscript*.

## **2. Hidden information**

### **Partial equilibrium:**

Thomas, J. and T. Worrall (1990). Income Fluctuations and Asymmetric Information: An Example of a Repeated Principal-Agent Problem. *Journal of Economic Theory* 51, 367-390.

LS Chapter 19

### **General Equilibrium:**

Atkeson, A. and R. Lucas (1992). On Efficient Distribution with Private Information. *Review of Economic Studies* 59, 427-453.

*Introducing capital accumulation:*

Khan, A. and B. Ravikumar (2003). Enduring Relationship in an Economy with Capital. *Manuscript*.

### **Confronting the Immiseration Result:**

(?) Aiyagari, R. and F. Alvarez (1995). Stationary Efficient Distributions with Private Information: A Tale of Kings and Slaves. *Manuscript*.

Phelan, C. (1998). On the Long Run Implications of Repeated Moral Hazard. *Journal of Economic Theory* 79(2), 174-191.

Farhi, E. and I. Werning (2005). Inequality, Social Discounting and Estate Taxation. *Manuscript*.

### **Application: unemployment insurance:**

Atkeson, A. and R. Lucas (1995). Efficiency and Equality in a Simple Model of Efficient Unemployment Insurance. *Journal of Economic Theory* 66, 64-88.

### **Application: optimal taxation:**

Golosov, M., Kocherlakota, N. and A. Tsyvinski (2003). Optimal Indirect and Capital Taxation. *Review of Economic Studies* 70(3), 569-588.

### **Models with hidden savings:**

Cole, H. and N. Kocherlakota (2001). Efficient Allocations with Hidden Income and Hidden Storage. *Review of Economic Studies* 68, 523-542.

### **Models with persistent shocks:**

Fernandes, A. and C. Phelan (2000). A Recursive Formulation for Repeated Agency with History Dependence. *Journal of Economic Theory* 91, 223-247.

Kapicka, M. (2004). Optimal Taxation with Persistent Shocks: A First Order Approach. *Manuscript*.

## **3. Hidden action**

### **Theory:**

Rogerson, W. (1985). The First Order Approach to Principal-Agent Problems. *Econometrica* 53(1), 1357-1368.

Spear, S. and S. Srivastava (1987). On Repeated Moral Hazard with Discounting. *Review of Economic Studies* 54(4), 599-617.

Marcet, A. and R. Marimon (1998). Recursive Contracts. *Manuscript*.

### **Numerical approach:**

Phelan, C. and R. Townsend (1991). Computing Multi-Period, Information-Constrained Optima. *Review of Economic Studies* 58(5), 853-881.

*Introducing capital accumulation:*

Bohacek, R. (2004). Capital Accumulation in Private Information Economies. *Manuscript*.

### **Applications: Endogenous borrowing constraints**

Atkeson, A. (1991). International Lending with Moral Hazard and Risk of Repudiation. *Econometrica* 59(4), 1069-1089.

Clementi, H. and H. Hopenhayn (2005). A Theory of Financing Constraints and Firm Dynamics. *forthcoming in Quarterly Journal of Economics*.

### **Application: unemployment insurance:**

Hopenhayn, H. and P. Nicolini (1997). Optimal Unemployment Insurance. *Journal of Political Economy* 105(2), 412-438.

Pavoni, N. (2003). On Optimal Unemployment Compensation. *Manuscript*.

### **Models with hidden savings:**

Abraham, A. and N. Pavoni (2005). Efficient Allocation with Moral Hazard and Hidden Borrow-

ing and Lending. *Manuscript*.

Werning, I. (2001). Repeated Moral-Hazard with Unmonitored Wealth: A Recursive First-Order Approach. *Manuscript*.

Werning, I. (2002). Optimal Unemployment Insurance with Unobservable Savings. *Manuscript*.

Kocherlakota, N. (2002). Simplifying Optimal Unemployment Insurance: The Impact of Hidden Savings. *Manuscript*.

**Models with persistence:**

Toshihiko, M. and S. Aysegul (2005). Repeated Moral Hazard with Persistence. *Economic Theory* 25(4), 831-854.

Jarque, A. (2005). Repeated Moral Hazard with Effort Persistence. *Manuscript*.