

Liquidity and Financial Frictions in Macroeconomics

UCLA

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Content: This class covers recent theoretical research on liquidity and financial frictions and its effects on the Macroeconomy. The definitions of liquidity are very broad and imprecise. I view liquidity as being an informal term, that always summarizes a property of an asset. Liquidity can be formally defined as a property where an asset is said to be liquid if the *existence of gains* from trade are *sufficient conditions to observe trade*. If an asset is not traded at all or traded with some probability, then the asset is illiquid or partially liquid (p-liquid). Naturally, liquidity will be context specific—it will depend on the model.

We will study various models to understand the following questions:

1. How different financial frictions lead to liquidity differences across assets and over time?
2. What are the macroeconomic implications of changes in liquidity?
3. What types of economic inefficiencies show up?
4. What are the effects of policy interventions in illiquid asset markets?

Prerequisites: Students are assumed to have knowledge equivalent or above a first year PhD sequence in economics. I also expect students to be literate in Stochastic Calculus.

Grading Policy: Problem Sets (50%), Final Examination (50%)

Outline: We will follow the outline of the next pages, but not in strict order. The outline is overly ambitious, so we won't complete the material. However, I do want students to have an idea of the "full" picture.

Part I: Aggregation

The typical challenge of the macro-finance literature is to blend elements from corporate finance theory with macroeconomic models. The building block of finance is some form of intertemporal trade. Thus, this models require at least two agents. Macroeconomics in turn, is about general equilibrium, endogenous prices and allocations. With multiple agents and prices, models can become complex very quickly. A technical challenge is to find a way to introduce financial frictions while allowing for aggregation. Thus, a natural starting point in our lectures is the study of aggregation. Our first step is to study a class of preferences and technology that render aggregation feasible. We then connect that aspect to complete markets.

- **Lecture: Introduction + Aggregation Methods**

Goals:

- Introductory Concepts and Class Roadmap
- Properties of CES aggregators
- Epstein-Zin as a special case of CES
- Gorman Aggregation

References:

- Class Handout
- [Steele \[2004\]](#)
- [Acemoglu \[2009\]](#) (Ch. TBA)
- [Angeletos \[2007\]](#)

- **Lecture: Review of Complete Markets with Production**

Lecture Goals:

- Introductory Concepts and Class Roadmap
- Properties of CES aggregators
- Epstein-Zin as a special case of CES
- Gorman Aggregation

References:

- Class Notes

- Angeletos [2007]
- Ljungqvist and Sargent [2000]

Part II: Agency Frictions

This second part of the course begins presenting some models with financial frictions. There are many forms of frictions: multiple forms of moral-hazard and asymmetric information. We will cover some examples and study its consequences: incomplete risk-sharing, inefficient allocations.

- **Lecture: Incomplete Markets, an Example**

Goals:

- Study the model of Angeletos as another example of incomplete markets economies.
- Derive effects of an increment in idiosyncratic risk.
- Compare results and aggregation with Bewley models.

References:

- Lecture Notes
- [Angeletos \[2007\]](#)
- [Ljungqvist and Sargent \[2000\]](#) (chapter TBA)

- **Lecture: Limited Enforcement + Moral Hazard + Investment and Efficiency Wedges**

Goals:

- Introduce Investment Risk.
- Incorporate Limited Enforcement and Moral-Hazard to investment model
- Derive an investment wedge.

References:

- Class Notes
- [Kiyotaki and Moore \[2008\]](#)
- [Lorenzoni and Walentin \[2009\]](#)
- [Holmstrom and Tirole \[1998\]](#)
- [Alvarez and Jermann \[2000\]](#)
- Moll JMP

- **Lecture: Asymmetric Information I - Limited Risk-Insurance + Investment Wedge**

Goals:

- Introduce Private information about investment returns
- Endogenous liquidity
- Derive insurance risk coming from greater insurance risk
- Connect investment wedge to limited insurance

References:

- Class Notes
- [Eisfeldt \[2004\]](#)

• **Lecture: Asymmetric Information II + Labor Wedge**

Goals:

- Introduce Private Information about assets
- Derive Endogenous Liquidity
- Model effect on labor market
- Connect to Business Cycle Decomposition
- Side note on Costly State Verification

References:

- [Jermann and Quadrini \[2011\]](#)
- [Bigio \[2011\]](#)
- Christiano et al. (Lecture Notes)
- [Townsend \[1979\]](#)
- [DeMarzo and Duffie \[1999\]](#)

Part III: Physical Frictions

- **Lecture: Incomplete Contracts - Limited Liability and Debt-Overhang**

Goals:

- Study Incomplete Contracting
- Introduce Default Risk
- Introduce Debt-Overhang as limit to raise outside funding
- Explain connection with Debt Maturity

References:

- Jerman, Gomez Schmidt
- Diamond and He

- **Lecture: Segmented Markets and Intermediation**

Goals:

- Study models with exogenous technological differences
- Conditions under which wealth becomes a state variable
- Discuss Intermediary Asset Pricing

References:

- [HE and KRISHNAMURTHY \[2012\]](#)
- [Brunnermeier and Sannikov \[2012\]](#)
- Prestipino
- Silva

- **Lecture: Search**

A reason why assets cannot be traded is because buyers and sellers do not meet each other. One such instance where that occurs is in “over-the-counter” markets. This lecture will model fragmented financial market using search-and-matching techniques.

Goals:

- Introduce canonical model of search

- Search with aggregation
- Characterize liquidity, prices and dynamics

References

- DGP
- Shi

• **Lecture: Transaction Costs**

A reason why assets cannot be traded is because buyers and sellers have to pay an extrinsic cost to trade. Unlike search, where agents meet or don't, transaction costs are costs that can be paid to materialize those trades. However, agents may choose not to execute the transaction if gains from trade are not large enough. One market where this is prevalent is the housing market.

Goals:

- Explain how transaction costs affect liquidity
- Role of liquidity and asset-price premia

References:

- Stokey, Economies of Inaction Chapter 9
- Deaton and Laroque Model
- [Alvarez et al. \[2009\]](#)

Part IV: Externalities

In this block we will study two classes of externalities that render environments constrained inefficient: pecuniary externalities and demand externalities

- **Lecture: Pecuniary Externalities**

Goals:

- Explain what happens when incentive constraints depend on prices
- Role for Government Intervention

References:

- [Bianchi \[2011\]](#)
- Farhi Werning

- **Lecture: Demand Externalities**

Goals:

- Discuss a class of models where demand determines supply
- Effects of Demand Stimuli

References:

- [Diamond \[1982\]](#)
- [Korinek and Simsek \[2013\]](#)
- [Korinek \[2011\]](#)
- [Eggertsson and Krugman \[2010\]](#)
- Farhi and Werning (2012)

Part V: Abandoning Aggregation

- **Lecture: Heterogeneity**

Goals:

- Use of Kolmogorov Equations to characterize distributions
- Role of Heterogeneity?

References:

- Bigio & Sannikov notes
- Moll Lecture Notes

- **Lecture: Dynamic Contracts (History Dependence)**

Goals:

- Overview of dynamic contracts
- Effects of history dependence

References:

- [Atkeson and Lucas \[1992\]](#)
- [Sannikov \[2008\]](#)

Part VI: Money and Banking

- **Lecture:** Foundations of Monetary Economics: Liquidity Provision

Goals:

- Understand the foundation of money when frictions are present
- Role of government

References:

- [Kiyotaki and Moore \[2008\]](#)
- [Kiyotaki and Moore \[2002\]](#)
- [Kocherlakota \[2002\]](#)
- [Farhi and Tirole \[2012\]](#)
- [Miao and Wang \[2011\]](#)

- **Lecture:** Monetary Models with Search

Goals:

- Canonical Model of Money Search
- Study Policy implications

References:

- [Ljungqvist and Sargent \[2000\]](#)
- [Lagos and Wright \[2005\]](#)
- [Williamson \[2012\]](#)
- Lucas, Equilibrium in a Pure Currency Economy
- [Townsend \[1980\]](#)

- **Lecture:** Money and Banking

Goals:

- Why is Money Connected to Banking

References:

- [Piazzesi & Schneider](#)

- Bianchi & Bigio
- Gertler-Kiyotaki-Prestipinovic
- [Gertler and Kiyotaki \[2010\]](#)
- Silva JMP
- [Brunnermeier and Sannikov \[2012\]](#)
- [Berentsen et al. \[2007\]](#)
- [de Cavalcanti et al. \[1999\]](#)

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