14.772 Development Economics: Macroeconomics
14.129 Contract Theory
Spring 2018

Lectures:	Tuesdays and Thursdays 2:30-4:00, E51-151
Recitations:	Thursdays 12:00-1:00 (E51-151)
Instructor:	Robert Townsend. E52-538, rtownsen@mit.edu Office hours: Immediately after class on Thursday and by appointment
Teaching Assistant:	Gabriel Kreindler, E52-564, gek@mit.edu Office hours: by appointment

Website: http://stellar.mit.edu/S/course/14/sp18/14.772/index.html

Contents:
The course shows how contract and general equilibrium theory can help our understanding of the functioning of financial markets, financial access and individual welfare. We emphasize in particular how theory puts testable restrictions on data and on policy implications, guidance for intervention. Specifically, two topics will be covered in class lectures and a related third topic is covered via TA sessions, supplemental material and out-of-class meetings/discussion.

Objective and Requirements:
The objectives of the course are to acquire skills and to become knowledgeable of the literature, as usual, but more so, to actually engage in the research process: thinking and discussion, choosing topics, formulating specific questions, analysis, presenting and writing. The in-class lectures will feature specific papers but, and with as much emphasis, organized overviews of existing literature and other material, with references, to suggest possible research topics.

The course grade will be based on:

- Class participation, 14%
- Six problem sets, 6% each
- A research project with presentation to the class, 50%

More information about the research proposal will be distributed shortly. A research proposal draft (no more than two pages long) is due on Tuesday, March 6th and will be followed by a meeting with the instructor and teaching assistant. Final drafts of a paper will be due in the Spring before generals.

Class Lectures

Topic 1: Liquidity, Design of Payments Systems, and Monetary Policy: From Walras to Crypto-currency

13 in class lectures in first half of the semester

Topic 2: Intermediation, Innovation and Regulation, Optimal Design of Financial Systems: Trading Mechanism Within and Competition across Banks, Shadow Banks, and e-Platforms

In class lectures plus student presentations make up the second half of the semester

Supplemental: Models and Data for Emerging Markets and More Advanced Economies: Parallels and Synergies

This is material for TA sessions, occasional special discussion, and organized also for potential research topics

In More Detail

Topic 1: Liquidity, Design of Payments Systems, and Monetary Policy: From Walras to Cryptocurrency

Lecture 1: Introduction and Motivation

Methodology

Micro-founded general equilibrium models of liquidity and money provide rich frameworks for understanding the meaning of institutions and markets, and collecting and organizing data, all with important operational implications for understanding the notion of liquidity, the design of payments systems, and monetary policy. Unification of various topics and tools provides powerful artillery to address challenging and important questions. Micro economics is combined with macro economics, so that both are integral to each other; economic theory is combined with data, for realism, formulation, and testing; countries with seemingly advanced financial markets are compared side by side with countries with limited infrastructure where financial access and use are issues, yet this brings out common concepts and issues; historical episodes are used to place recent contemporary experiences in context, as otherwise issues are debated narrowly, in a country or recent-experience context. From this it becomes clear that liquidity, payments, and monetary policy are intimately linked.

Micro-Macro Interface: Illustrative Examples

Thus, as illustrative examples, we can look at the recent U.S. financial crisis and slow recovery, featuring the enlarged balance sheet of the Federal Reserve, yet find implications for micro

payments, so that monetary policy and payments system issues are merged; they should be considered jointly in any cost benefit analysis. On the micro side, there are fewer trade fails, and the Fed no longer has intraday credit exposure to banks as a primary concern. The conversation has shifted in payments from liquidity saving mechanisms to segregated reserve balance accounts, which can act as collateral. Still, back on the macro side there are worries about an expanded Fed balance sheet, even as the goal now is to reduce it. Or, another example, we can look at barter, currency, and media of exchange in low income countries and note the recent, dramatic rise of e-money, third-party payments, and fast payments, seemingly micro issues. And we can then turn to the U.S. where zero lower bound issues have given rise to the idea of Central bank e –currency. The idea is to replace paper currency using aspects of the new distributed ledger technology, first implemented with bitcoin.

Common Issues: Virtual e-worlds

Likewise, continuing to enumerate common issues, dealers in private e-money and paper currency in emerging markets face shortages of liquidity of one kind or another, one object or another, not unlike broker dealers in the NY financial markets who evidently face apparent frictions and experience shortages of various securities, so that in the end there are liquidity premia for assets that can be easily bought and sold. Innovative hybrid trading platforms in OTC markets in NY enhance liquidity and mitigate search frictions, are feasible in low and middle income countries, and perhaps even easier to introduce given the possibly of jumping to the latest technology without inherited, legacy systems, of the kind that Distributed Ledger Technologies, DLT, has the potential to replace. The idea here is to build infrastructure with a forward-looking view, informed by other countries that are, on the one hand, further along the path of development of financial markets but themselves constrained by out-dated legacy systems. From this discussion one gets the sense that a virtual world without paper currency, and with low transactions costs in securities approaching full neoclassical markets might seem to be close at hand. Scandinavian countries seem close to an e-world, indeed.

Currency Remains Essential

However, as noted, there is evidence from developed economies that there is premium on money-like assets, and from emerging market economies that currency remains highly important. In the U.S., the premium on money-like assets appears on the very short end of the yield curve of U.S. debt, with a sharp decline in yields in the range of up to 26 weeks. Relatedly, U.S. treasuries have a very high velocity of circulation. These discounts seem to have some impact on commercial bond interest rates and hence suggest a pathway to real outcomes.

This however does beg the issue of whether monetary policy should be targeting, as is conventional, a representative interest rate, e.g., think about the natural real rate as being lower, for example, or should monetary policy be concerned explicitly with the yield curve and other policy options. In emerging markets, ‘experiments’ with a different policy motivation have been conducted, bans on the use of large-domination notes; there is some evidence this impacted production and trade, though the evidence is mixed. This policy of removing large denomination notes has been suggested for the U.S. Recent policy-induced inflations, and hyperinflations, in Argentina and Zimbabwe, are extreme but ironic examples of the continued reliance on currency-based systems in some countries.

Monetary Transmission Mechanisms and the Use of Micro Founded GE Models

Nevertheless, there is a commonality across all countries: micro data and knowledge of markets and institutions can reveal actual micro underpinnings, obstacles and frictions; help resolve anomalies; reveal the transmission pathway for monetary policy; and hence influence policy itself. This last part is an example of the general theme which we repeat here. Micro-founded general equilibrium models of liquidity and money provide rich frameworks for understanding the meaning of institutions and markets, and collecting and organizing data, all with important operational implications for understanding the notion of liquidity, the design of payments systems, and monetary policy.

Lecture 2: Bubbles with limited markets and limited participation Empirics: Assessing Dynamic Inefficiency

Lecture 3: The Fundamentals of Models of Money and Measurement: An Overview

Lecture 4: Money as a Pure Unit Of Account: Risk In Liquidity And Clearing, Trade Fails And Penalties, Systematic Risk And Complexity In Settlement

Lecture 5: Cash Management in Village Thailand: Positive and Normative Implications

Lecture 6: Money and Financial Markets with Transactions Costs and Search Frictions: An Overview

Lecture 7: Models of Money with Spatially Separated Agents

Lecture 8: Limited Repeat Interaction as with Spatial Separation: An Overview

Lecture 9: Circulating Private Debt

Lecture 10: High Velocity Circulating Private Debt, High Velocity Public Debt, Problems and Policies: An Overview

Lecture 11: Fragmentation by Market, Asset and/or Trade: Key Marginal Values, Notions of Financial Centrality, Provision of Liquidity

Lecture 12: Money and the Decentralization of Exchange

Lecture 13: E-payments, Crypto Currency, and Monetary Policy - The role of crypto currency with and without trust, both public and private

Topic 2: Intermediation, Innovation and Regulation, Optimal Design of Financial Systems: Trading Mechanism Within and Competition across Banks, Shadow Banks, and e-Platforms

Introduction to the Topic

Each country has its own take on financial regulation, though there are some common elements. In the US, a financial crisis triggered by mortgage securitization, the eventual failure of some large financial institutions, and runs on financial markets such as the repo market have given rise to new regulations and recommendations for market design. In particular, Dodd Frank legislation on over-the-counter, OTC markets, moved substantial activity to central-counter-party, CCP exchanges. An argument was made that increasing returns to scale and externalities on these platforms, plus the dominance of the two key investment banks who were running the platforms, imply that these markets should be regulated as public utilities. Other regulations such as leverage ratios may have acted as a tax on financial intermediation. In any event the centralized repo market is now down to one CCP.

Yet at the same time, the US continues to see private innovation which has arguably been helpful. In the NY markets we have witnessed the proliferation of alternative electronic trading venues for stocks, judged by some metrics to be efficient, and recent hybrid venues for bonds and risky securities, the latter intended to replace what some claim to be abusive OTC trade.

Shadow banks have been blamed as a cause of the crisis in the US, as they replaced in value terms regulated deposit-taking banks. Yet with the recent rise of Fin Techs, the role of the non-bank intermediation sector is arguable larger than it was prior to the crisis. This is the tension. About half of all US mortgages are now originated on e-platforms, though most of these assets are securitized and hence under Fannie Mae or Freddie Mac regulation. Another example of innovation in the U.S. a is provided by FinTechs running P2P platforms, largely for the refinancing credit card debt, though there are other loans such as small business lending. Though these e-platforms fall nominally under a myriad of laws and protections, there is in fact no consensus on how to regulate them, as securities companies or as banks. There is no framework. Traditional legislation deals with one market or security at a time.

The country best known for the rise of e-commerce and innovation is China, where there are a few dominate players and literally hundreds of P2P and B2B platforms. Large sum of money move from private investors, including some small value household investors, to small and medium if not larger business loans. On the one hand, with government banks judged to be inefficient, mandated to deal with state-owned enterprise, there is a role for an informal banking sector. On the other hand, there have been flagrant abuses and failures. Recently the government imposed a series of regulations severely restricting what these platforms are allowed to do. The backdrop to all of this is a concern for a hard landing from double digit growth bringing a financial crisis.

Other countries such as Mexico and India are concerned about under-financed SME's and set up financial platforms for them, in part with government support and central bank guidance. Innovation is used to try to mitigate financial access problems, enlarging the financial system.

Accounts receivables of small sellers of inputs can be sold to investors who then have a claim on larger, high-valued purchasers of those inputs, who owe the money. But India remains quite conservative.

Thailand is spooked by its own past. It suffered a financial crisis triggered by failing finance companies 20 years ago, which indeed gave rise to the larger Asia crisis. Thus Thailand has been leery of financial innovation, relying instead on a concentrated bank-based sector. The government has recently allowed Fin Techs featuring third party payments but is still deliberating what to do about P2P financial platforms.

Needed: A coherent Framework for Regulation, A Research Policy Algorithm

In summary, financial regulation is not uniform; it is driven by country-specific context and history, quite different from one country to the next, and within some countries varying over time. .Largely lacking is the use of a coherent framework for regulation, certainly not one that can be used across diverse countries. The goal here is to provide a framework for the design and regulation of financial systems, a framework based on first principles that are both operational and robust. With that in hand, it is possible to make specific recommendations. The recommendation may different if the environment of countries, and economic obstacle, differ but the algorithm for evaluation does not vary. The idea is straight forward: specify the elements of the economic environment, be clear about potential obstacles to trade such as transactions costs, private information, and limited commitment, derive the form of ex ante optimal arrangements within and competition across entities, then compare and contrast to the actual arrangements, current regulation, and policy thinking.

<u>Trade and Exchange Mechanisms: Within</u>

Trading Mechanisms within Platforms or Auctions, Small Numbers and Problematic Obstacles to Exchange, Conditions for Implementation of Walrasian Equilibria

Exchange Rules and Mechanism with Private Information and the Problem of Runs on Banks and Markets

<u>Configurations and Competition Across</u>

Competition across Exchanges in the Limit – Some Good Rules, Some Bad Forms of Competition, and Insights for Regulation

Decentralization with Private Information. Competition in the space of contracts with free entry into intermediation

Decentralization with Limited Commitment, solvency constraints

Platforms and Externalities, Solutions for Pricing in Two-Sided Markets and for Fire Sales

Financial Platforms: Single vs multiple vs Tiered, which to have, determined as optimal given key features of the underlying economic environment

Supplemental: Models and Data for Emerging Markets and More Advanced Economies: Parallels and Synergies

Motivation: Inequality, Financial Deepening and Financial Crisis

Distinguishing Micro Underpinnings with Macro Implications: Theory and Empirical Tests Risk Sharing and occupation choice with complete markets, transaction costs, private information, and limited commitment

Micro-Macro Synthesis: Instrumental Variables, Response to Exogenous Policy Shocks, Parallel underpinnings in life cycle and in village/community/regional models, micro foundations as in assumed model schemata versus data from interactive GIS data base archive, costly state verification as a foundation

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Syllabus
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Topic 1: Liquidity, Design of Payments Systems, and Monetary Policy: From Walras to Cryptocurrency

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Lecture 2: Bubbles with limited markets and limited participation Empirics: Assessing Dynamic Inefficiency

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Lecture 4: Money as a Pure Unit Of Account: Risk In Liquidity And Clearing, Trade Fails And Penalties, Systematic Risk And Complexity In Settlement

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Lecture 10: High Velocity Circulating Private Debt, High Velocity Public Debt, Problems and Policies: An Overview

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Lecture 11: Fragmentation by Market, Asset and/or Trade: Key Marginal Values, Notions of Financial Centrality, Provision of Liquidity

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Lecture 13: E-payments, Crypto Currency, and Monetary Policy - The role of crypto currency with and without trust, both public and private

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Topic 2: Intermediation, Innovation and Regulation, Optimal Design of Financial Systems: Trading Mechanism Within and Competition across Banks, Shadow Banks, and e-Platforms

To be added.

Supplemental: Models and Data for Emerging Markets and More Advanced Economies: Parallels and Synergies

Motivation: Inequality, Financial Deepening and Crisis

Topics: Income inequality, Income distribution, Developed countries, Economic growth, Income level, Developing countries, Economic trends, Income shares, Share distribution of income, Industrialization

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Macro Models based on Micro Underpinnings – Constrained Occupation Choice

Topics: Policy shifts, government policy toward banking; repression/liberalization; welfare gains, the distribution of gains and losses; growth, transition, business cycle frequencies, and financial variation; TFP and development accounting; calibration, estimation, maximum likelihood and econometrics, confidence region; micro self-selection and the distribution of wealth; models and quantitative predictions; risk sharing with fixed and marginal transaction costs and with limited commitment; heterogeneous vs representative agent models; cross regional variation; dual sector models;

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