



47-818 – ECONOMICS OF CONTRACTS

LAURENCE ALES

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Office Hours: ANYTIME OR BY APPOINTMENT.

Class room number: 147

Class times: TUE-THU 1:30PM -3:20AM

Course Description

This course will cover the basics of contract theory and its application to economic problems. A contract is a set of rules that facilitates interaction among individuals beyond the simplest forms of barter. You have already encountered simple contracts; for example, in the form of spot labor contracts (exchanging leisure for goods) or borrowing and saving agreements (exchanging resources today for resources tomorrow). This course studies more involved contracts. The basic setup will feature the parties involved in the contract having conflicting objectives. In addition contracting will be limited by two types of frictions: we will look at environments where a party in the contract has some valuable, privately observed information; and we will consider environments where at least one party in the contractual relationship cannot credibly commit to it.

Course Goals

My goal in this course is twofold. First, present the theory behind the optimal design of contracts in environments with asymmetric information and limited commitment. Second, show how these optimally designed contracts can find application in different economic contexts. In particular, we will look at applications to optimal taxation, insurance, corporate finance and asset pricing.



By the end of this course you should be able to take an abstract contracting problem and define it formally as a solution to a dynamic program. Whenever possible you should be able to characterize some key properties analytically. Since this class might be one of the last you take in the program, I will emphasize throughout the course, how the tools and models studied might either be applied to your own research idea or used to start developing a research idea.

As a final note, given the time available, I will emphasize breadth of topics rather than depth. I will be available to discuss with you any details relative to the material covered at any time during or after the course.

Course Materials

This course will be centered mainly around journal articles (see reading list below). The required textbook is:

L. LJUNGQVIST AND T.J. SARGENT. *Recursive macroeconomic theory*. THE MIT PRESS, 2012

Additional useful textbooks (but not required) are:

P. BOLTON AND M. DEWATRIPONT. *Contract theory*. THE MIT PRESS, 2005

B. SALANIÉ. *The economics of contracts: a primer*. THE MIT PRESS, 1997

R.B. MYERSON. *Game theory: analysis of conflict*. HARVARD UNIVERSITY PRESS, 1997

Finally this syllabus will be continuously updated as the class proceeds, you can get the latest version on blackboard.

Prerequisites

The course will build upon the following topics (make sure to refresh them!)

- Game theory: Nash equilibria, sub-game perfection.
- Taxation: Ramsey taxation, refer to:

V.V. CHARI AND P.J. KEHOE. OPTIMAL FISCAL AND MONETARY POLICY. *Handbook of macroeconomics*, 1:1671–1745, 1999

- Asset pricing: basic results described in [LS12] chapter 8.



Grading

Grading will be based on:

1. Two homework
2. Presentation
3. Comprehensive final exam

In the last week of the course I will ask you to present to the class. I am thinking about individual presentations lasting 10/15 minutes. The idea is to present how you would apply the tools learned in class to your first summer paper. A successful presentation will highlight clearly: 1) why such an extension of your baseline model is interesting; 2) what are the impacts of such a change.

Schedule and course outline

The following is a tentative schedule organized by weeks. As we move along the class I will modify it listing the actual papers covered in each lecture.



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Lectures		
1 and 2	Introduction [Mye82]	Limited commitment benchmark model [LS12], [TW88]
3 and 4	Private information benchmark model [LS12], [TW90]	Private information benchmark model [LS12], [TW90]
5 and 6	Adverse selection benchmark model [RS76]	Decentralizing Contracts Markets as constraints [LJ92], [Tow82], [All85]
7 and 8	Applications to optimal taxation [Mir71], [CK99]	Applications to optimal taxation [Rog85a], [GTW06]
9 and 10	Applications to corporate finance [HR91], [AH04]	Applications to corporate finance [AH04]
11 and 12	Applications to corporate finance [BG89]	Applications to asset pricing [AJ00]
13 and 14	Applications to asset pricing [AJ00]	Student presentations http://lales.wikispaces.com/



1 Reading List

This is a restricted list of papers that we will touch during the course. It is not meant to be a summary of the current literature.

1.1 Basics: theory and benchmark models

L. LJUNGQVIST AND T.J. SARGENT. *Recursive macroeconomic theory*. THE MIT PRESS, 2012

R.B. MYERSON. OPTIMAL COORDINATION MECHANISMS IN GENERALIZED PRINCIPAL-AGENT PROBLEMS. *Journal of mathematical economics*, 10(1):67–81, 1982

R.M. TOWNSEND. OPTIMAL MULTIPERIOD CONTRACTS AND THE GAIN FROM ENDURING RELATIONSHIPS UNDER PRIVATE INFORMATION. *The Journal of Political Economy*, PAGES 1166–1186, 1982

W.P. ROGERSON. REPEATED MORAL HAZARD. *Econometrica: Journal of the Econometric Society*, 53(1):69–76, 1985

J. THOMAS AND T. WORRALL. INCOME FLUCTUATION AND ASYMMETRIC INFORMATION: AN EXAMPLE OF A REPEATED PRINCIPAL-AGENT PROBLEM* 1. *Journal of Economic Theory*, 51(2):367–390, 1990

T.J. KEHOE AND D.K. LEVINE. DEBT-CONSTRAINED ASSET MARKETS. *The Review of Economic Studies*, PAGES 865–888, 1993

1.2 Important tools

S.E. SPEAR AND S. SRIVASTAVA. ON REPEATED MORAL HAZARD WITH DISCOUNTING. *The Review of Economic Studies*, 54(4):599–617, 1987

C. PHELAN AND R.M. TOWNSEND. COMPUTING MULTI-PERIOD, INFORMATION-CONSTRAINED OPTIMA. *The Review of Economic Studies*, PAGES 853–881, 1991

W.P. ROGERSON. THE FIRST-ORDER APPROACH TO PRINCIPAL-AGENT PROBLEMS. *Econometrica: Journal of the Econometric Society*, 53(6):1357–1367, 1985

C. SLEET AND S. YELTEKIN. CREDIBILITY AND ENDOGENOUS SOCIETAL DISCOUNTING. *Review of Economic Dynamics*, 9(3):410–437, 2006



1.3 Decentralization and market as constraints

M. ROTHSCHILD AND J. STIGLITZ. EQUILIBRIUM IN COMPETITIVE INSURANCE MARKETS: AN ESSAY ON THE ECONOMICS OF IMPERFECT INFORMATION. *The Quarterly Journal of Economics*, 90(4):629–649, 1976

E.C. PRESCOTT AND R.M. TOWNSEND. PARETO OPTIMA AND COMPETITIVE EQUILIBRIA WITH ADVERSE SELECTION AND MORAL HAZARD. *Econometrica: Journal of the Econometric Society*, 52(1):21–45, 1984

F. ALLEN. REPEATED PRINCIPAL-AGENT RELATIONSHIPS WITH LENDING AND BORROWING. *Economics Letters*, 17(1-2):27–31, 1985

H.L. COLE AND N.R. KOCHERLAKOTA. EFFICIENT ALLOCATIONS WITH HIDDEN INCOME AND HIDDEN STORAGE. *Review of Economic Studies*, 68(3):523–542, 2001

L. ALES AND P. MAZIERO. NON-EXCLUSIVE DYNAMIC CONTRACTS, COMPETITION, AND THE LIMITS OF INSURANCE. *Working Paper*, 2009

M. GOLOSOV AND A. TSYVINSKI. OPTIMAL TAXATION WITH ENDOGENOUS INSURANCE MARKETS. *The Quarterly Journal of Economics*, 122(2):487–534, 2007

1.4 Application to optimal taxation

J.A. MIRRLEES. AN EXPLORATION IN THE THEORY OF OPTIMUM INCOME TAXATION. *The Review of Economic Studies*, PAGES 175–208, 1971

M. GOLOSOV, A. TSYVINSKI, AND WERNING. NEW DYNAMIC PUBLIC FINANCE: A USER'S GUIDE [WITH COMMENTS AND DISCUSSION]. *NBER Macroeconomics Annual*, 21:317–387, 2006

M. GOLOSOV, N. KOCHERLAKOTA, AND A. TSYVINSKI. OPTIMAL INDIRECT AND CAPITAL TAXATION. *Review of Economic studies*, 70(3):569–587, 2003

S. ALBANESI AND C. SLEET. DYNAMIC OPTIMAL TAXATION WITH PRIVATE INFORMATION. *Review of Economic Studies*, 73(1):1–30, 2006

N.R. KOCHERLAKOTA. ZERO EXPECTED WEALTH TAXES: A MIRRLEES APPROACH TO DYNAMIC OPTIMAL TAXATION. *Econometrica*, 73(5):1587–1621, 2005

N.R. KOCHERLAKOTA. *The New Dynamic Public Finance*. PRINCETON UNIV PR, 2010



1.5 Application to risk sharing and economic development

R.M. TOWNSEND. RISK AND INSURANCE IN VILLAGE INDIA. *Econometrica: Journal of the Econometric Society*, 62(3):539–591, 1994

E. LIGON. RISK SHARING AND INFORMATION IN VILLAGE ECONOMIES. *Review of Economic Studies*, 65(4):847–864, 1998

L. ALES AND P. MAZIERO. ACCOUNTING FOR PRIVATE INFORMATION. *Unpublished manuscript*, 2007

1.6 Application to corporate finance

G.L. CLEMENTI AND H.A. HOPENHAYN. A THEORY OF FINANCING CONSTRAINTS AND FIRM DYNAMICS*. *Quarterly Journal of Economics*, 121(1):229–265, 2006

R. ALBUQUERQUE AND H.A. HOPENHAYN. OPTIMAL LENDING CONTRACTS AND FIRM DYNAMICS. *Review of Economic Studies*, 71(2):285–315, 2004

T. COOLEY, R. MARIMON, AND V. QUADRINI. AGGREGATE CONSEQUENCES OF LIMITED CONTRACT ENFORCEABILITY. *Journal of Political Economy*, 112(4), 2004

B. BERNANKE AND M. GERTLER. AGENCY COSTS, NET WORTH, AND BUSINESS FLUCTUATIONS. *The American Economic Review*, 79(1):14–31, 1989

1.7 Application to asset pricing and International finance

F. ALVAREZ AND U.J. JERMANN. EFFICIENCY, EQUILIBRIUM, AND ASSET PRICING WITH RISK OF DEFAULT. *Econometrica*, 68(4):775–797, 2000

N. KOCHERLAKOTA AND L. PISTAFERRI. ASSET PRICING IMPLICATIONS OF PARETO OPTIMALITY WITH PRIVATE INFORMATION. *Journal of Political Economy*, 117(3), 2009

P.J. KEHOE AND F. PERRI. INTERNATIONAL BUSINESS CYCLES WITH ENDOGENOUS INCOMPLETE MARKETS. *Econometrica*, 70(3):907–928, 2002



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- [AJ00] F. Alvarez and U.J. Jermann. Efficiency, equilibrium, and asset pricing with risk of default. *Econometrica*, 68(4):775–797, 2000.
- [All85] F. Allen. Repeated principal-agent relationships with lending and borrowing. *Economics Letters*, 17(1-2):27–31, 1985.
- [AM07] L. Ales and P. Maziero. Accounting for private information. *Unpublished manuscript*, 2007.
- [AM09] L. Ales and P. Maziero. Non-exclusive Dynamic Contracts, Competition, and the Limits of Insurance. *Working Paper*, 2009.
- [AS06] S. Albanesi and C. Sleet. Dynamic optimal taxation with private information. *Review of Economic Studies*, 73(1):1–30, 2006.
- [BD05] P. Bolton and M. Dewatripont. *Contract theory*. The MIT Press, 2005.
- [BG89] B. Bernanke and M. Gertler. Agency costs, net worth, and business fluctuations. *The American Economic Review*, 79(1):14–31, 1989.
- [CH06] G.L. Clementi and H.A. Hopenhayn. A Theory of Financing Constraints and Firm Dynamics*. *Quarterly Journal of Economics*, 121(1):229–265, 2006.
- [CK99] V.V. Chari and P.J. Kehoe. Optimal fiscal and monetary policy. *Handbook of macroeconomics*, 1:1671–1745, 1999.
- [CK01] H.L. Cole and N.R. Kocherlakota. Efficient allocations with hidden income and hidden storage. *Review of Economic Studies*, 68(3):523–542, 2001.
- [CMQ04] T. Cooley, R. Marimon, and V. Quadrini. Aggregate consequences of limited contract enforceability. *Journal of Political Economy*, 112(4), 2004.
- [GKT03] M. Golosov, N. Kocherlakota, and A. Tsyvinski. Optimal indirect and capital taxation. *Review of Economic studies*, 70(3):569–587, 2003.
- [GT07] M. Golosov and A. Tsyvinski. Optimal Taxation With Endogenous Insurance Markets. *The Quarterly Journal of Economics*, 122(2):487–534, 2007.



- [GTW06] M. Golosov, A. Tsyvinski, and Werning. New Dynamic Public Finance: A User's Guide [with Comments and Discussion]. *NBER Macroeconomics Annual*, 21:317–387, 2006.
- [HR91] M. Harris and A. Raviv. The theory of capital structure. *Journal of Finance*, 46(1):297–355, 1991.
- [KL93] T.J. Kehoe and D.K. Levine. Debt-constrained asset markets. *The Review of Economic Studies*, pages 865–888, 1993.
- [Koc05] N.R. Kocherlakota. Zero expected wealth taxes: A Mirrlees approach to dynamic optimal taxation. *Econometrica*, 73(5):1587–1621, 2005.
- [Koc10] N.R. Kocherlakota. *The New Dynamic Public Finance*. Princeton Univ Pr, 2010.
- [KP02] P.J. Kehoe and F. Perri. International business cycles with endogenous incomplete markets. *Econometrica*, 70(3):907–928, 2002.
- [KP09] N. Kocherlakota and L. Pistaferri. Asset pricing implications of Pareto optimality with private information. *Journal of Political Economy*, 117(3), 2009.
- [Lig98] E. Ligon. Risk sharing and information in village economies. *Review of Economic Studies*, 65(4):847–864, 1998.
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- [LS12] L. Ljungqvist and T.J. Sargent. *Recursive macroeconomic theory*. The MIT Press, 2012.
- [Mir71] J.A. Mirrlees. An exploration in the theory of optimum income taxation. *The Review of Economic Studies*, pages 175–208, 1971.
- [Mye82] R.B. Myerson. Optimal coordination mechanisms in generalized principal-agent problems. *Journal of mathematical economics*, 10(1):67–81, 1982.
- [Mye97] R.B. Myerson. *Game theory: analysis of conflict*. Harvard University Press, 1997.
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- [Rog85a] W.P. Rogerson. Repeated moral hazard. *Econometrica: Journal of the Econometric Society*, 53(1):69–76, 1985.
- [Rog85b] W.P. Rogerson. The first-order approach to principal-agent problems. *Econometrica: Journal of the Econometric Society*, 53(6):1357–1367, 1985.
- [RS76] M. Rothschild and J. Stiglitz. Equilibrium in competitive insurance markets: An essay on the economics of imperfect information. *The Quarterly Journal of Economics*, 90(4):629–649, 1976.
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- [SY06] C. Sleet and S. Yeltekin. Credibility and endogenous societal discounting. *Review of Economic Dynamics*, 9(3):410–437, 2006.
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- [TW88] J. Thomas and T. Worrall. Self-enforcing wage contracts. *The Review of Economic Studies*, 55(4):541–553, 1988.
- [TW90] J. Thomas and T. Worrall. Income fluctuation and asymmetric information: An example of a repeated principal-agent problem* 1. *Journal of Economic Theory*, 51(2):367–390, 1990.