ECONOMICS

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M.A., M.Phil., Ph.D.

Chair
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Associate Professors José-Antonio Espín-Sánchez, Zhen Huo, Ilse Lindenlaub, Elliot Lipnowski, Michael Peters, Pascual Restrepo, Nicholas Ryan

Assistant Professors Lauren Bergquist, Cody Cook, Max Cytrynbaum, Eduardo Davila, Mayara Felix, Joel Flynn, Charles Hodgson, John Eric Humphries, Victoria Marone, Yusuke Narita, Cormac O'Dea, Winnie van Dijk

FIELDS OF STUDY

Fields include microeconomics, macroeconomics, econometrics, labor, public finance, industrial organization, international trade and finance, financial economics, environmental economics, economic development, economic history, political economy, and behavioral economics.

SPECIAL REQUIREMENTS FOR THE PH.D. DEGREE

Exceptions to the requirements described below may be obtained only by vote of the Economics faculty and will be granted only in recognition of extenuating circumstances.

Prior to Registration for the Second Year

(1.1) Students must have taken for credit and passed at least six economics graduate courses. With the permission of the director of graduate studies (DGS), courses in related fields can be used to fulfill this requirement. (Courses in the International and Development Economics master's program do not satisfy this requirement.) (1.2) Students who earn a grade of HP- or better in each of the four first-year courses in microeconomics and macroeconomics may proceed directly to the second year. In June and August of each year, the department will give waiver exams in micro and macro, written and graded to the extent possible by a committee of faculty who have taught

the first-year courses in the previous year. First-year students who do not earn a grade of HP- or better in each of the first-year micro or macro courses must either take and pass the corresponding exam in June or take the exam in June and then (in the event of failure) take and pass the exam in August in order to continue in the program. A student who obtains an HP- or better in one term of a sequence, but not the other, must take (and retake, if necessary) only the waiver exam corresponding to the term in which they failed to obtain an HP- or better. Students who have not passed all the required examinations prior to the second year of study may register as master's candidates for the following fall term for the purpose of completing enough courses to be eligible for the Master of Arts degree.

Exceptionally well prepared incoming students may petition the DGS and the faculty in the field to take the waiver exam before their first year, with an eye toward placing out of either one or both terms of either of the first-year micro or macro courses. Incoming students taking the waiver exam will be exempt from the corresponding course only if their performance is an exemplary (rather than marginal) pass.

Prior to Registration for the Third Year

(2.1) Students must have met the graduate school's requirement of Honors in two courses. (2.2) Students must have taken at least fourteen term courses in economics and have received a grade of at least a P- in each of them. With the permission of the DGS, courses in related fields and independent reading courses can be used to fulfill this requirement. Workshops may not be used to satisfy it. (2.3) Students must have received an average of at least HP in the courses they have taken. The admissibility of courses for this requirement is the same as for the fourteen-course requirement, (2.2). Grades within the Economics department include pluses and minuses. The grade average is computed as follows. A failure counts as a zero, a P- as a 1, a P as a 2, a P+ as a 3, an HP- as a 4, and so on up to a 9 for an H+. The arithmetic average of these numbers must be at least 4.5. (2.4) All students must have submitted a draft of their empirical paper, discussed in (3.3) below. (2.5) All students must make their first attempt at each of two qualifying examinations by June 30 of their second year in the program. The examinations test a student's general analytic ability in economics and knowledge of two fields chosen by the student. Fields are typically drawn from microeconomics, macroeconomics, econometrics, labor, public finance, industrial organization, international trade and finance, financial economics, environmental economics, economic development, economic history, political economy, and behavioral economics. Students may request examination in a special field designed in consultation with Economics department faculty. The choice of fields must be approved by the DGS. Students may list two preferred examiners in each field. The DGS's office strives to satisfy these preferences subject to faculty availability and the number of students making similar requests. The nature and content of the field qualifying exams will be determined by the faculty in the field (i.e. these exams might require written work, depending on the field). If a student fails a field qualifying exam in the spring of the second year, the student must either retake the exam in that field or may take an exam in a different field. In either case, the student must pass this second attempt, whether in the same field or not, in the fall of the third year to remain in the program.

Admission to Candidacy

The Economics department adheres strictly to the graduate school requirement that students be admitted to candidacy prior to registration for the fourth year of study. Students are recommended to the graduate school for admission to candidacy by vote of the Department of Economics faculty after having completed requirements (2.1), (2.2), and (2.3) above, the graduate school's prospectus requirement, and the following additional requirements. (3.1) Students must have completed two one-term prospectus workshops, one in each term of the third year. All prospectus workshops have the word "prospectus" in their title. If students can find no prospectus workshop corresponding to their interests, they may substitute other workshops to meet this requirement. In order for two workshops to count toward the prospectus requirement, students must make a presentation in each workshop and present original work in one of them. This stipulation applies even if a workshop is not labeled as a prospectus workshop. If students can find no workshop whatsoever in their area of interest, they may substitute an independent study course guided by a faculty member, provided the independent study leads to a dissertation prospectus that is accepted. (3.2) Students must receive a grade of HP- or better in ECON 5551 (Econometrics II) or ECON 5552 (Econometrics III). More advanced courses may be substituted for these with permission of the DGS. (3.3) Students must receive a grade of Satisfactory on an empirical paper, which is evaluated by a faculty adviser or an instructor of ECON 5556. In the paper, the student should (a) specify an economic model useful for the investigation of an interesting economic problem, (b) select data and econometric methods appropriate to the question, (c) conduct proper statistical analysis, and (d) interpret the results in an intelligent way. The paper may be written in the course ECON 5556 or independently with the help of a faculty adviser, the standards for a satisfactory paper being the same in both cases. The paper is not expected to be of publishable or nearly publishable quality but should demonstrate facility in the application of econometric methods to an economic question. *Note:* Jointly authored papers will not be accepted. (3.4) Students must complete with a grade of at least HP- a term of economic history, drawn from a list of courses approved by the DGS and the economic history instructors. (3.5) Students must pass two field qualifying examinations given by committees of faculty members. These exams are discussed in (2.5) above.

Additional Requirements

1. All students must give a dissertation prospectus to their advisory committee by the second Friday in May of their third year.
2. Students must provide, via email, the names of their advisory committee consisting of two members to the DGS's office by February 1 of the third year. The student should indicate which faculty member is the main advisor for the purpose of reviewing their annual DPR (Dissertation Progress Report).
3. In each academic year after the second, all students must regularly attend at least two workshops. At least one of them must be an "informal" prospectus workshop lunch or reading group, and at least one must be a "formal" research workshop. Each student must present at least once a year in one or other of the workshops that they regularly attend in the third and fourth years.

4. Third-year students who have not yet satisfied the empirical paper requirement must submit an empirical paper by February 1.

The Dissertation

The dissertation should make an original contribution to economics that demonstrates the student's mastery of relevant resources and methods. Although the dissertation may cover several related topics, it should have a unifying theme. The dissertation may consist of one or more than one essay. The dissertation is guided by a committee of two advisers, at least one of whom must be a member of the Economics department. The second adviser need not be from the Economics department or even from Yale University. Second advisers from outside the Yale Economics department must be approved by the DGS. The two advisers serve as readers. After the student has completed a first draft of the dissertation, the DGS appoints a third reader. The student and the committee may recommend third readers, but the choice remains with the DGS, since the third reader serves as an independent referee.

Collaborative Work in the Dissertation

The Economics department's objective regarding collaboration is to achieve a reasonable compromise between two goals. While the department wishes to encourage collaborative research among students and between students and faculty, a dissertation should demonstrate the student's ability to do independent research. The dissertation committee and the DGS must approve the inclusion of collaborative work in the dissertation, and students must acknowledge and describe any collaboration in the preface to the dissertation.

Expiration of Admission to Candidacy

Advancement to candidacy expires ten years after the date it is granted, if no dissertation has been submitted and approved in the intervening period.

Normal Sequence of Studies

What follows in the next three paragraphs are recommendations, *not* requirements.

During the fall term of the first year, students usually take ECON 5500 (General Economic Theory: Microeconomics), ECON 5510 (General Economic Theory: Macroeconomics), ECON 5550 (Econometrics I). In the following spring, they usually take ECON 5501 (General Economic Theory: Microeconomics), ECON 5511 (General Economic Theory: Macroeconomics), ECON 5551 (Econometrics II). Students who are well prepared in econometrics may take an advanced econometrics course instead of ECON 5500 in the fall of the first year after consulting the DGS and an appropriate econometrics faculty member.

Students typically also take a course in economic history in either the fall or spring term, that would satisfy the economic history requirement, (3.4) above, if a grade of at least HP- were obtained. Taking the history course in the spring may be more appropriate for students concerned about making the transition to graduate school in the fall.

During the second year, students normally take ECON 5556 and satisfy the empirical paper requirement. Students also take economics courses in specialized fields, such

as economic theory, macroeconomics, econometrics, labor, public finance, industrial organization, international trade and finance, financial economics, environmental economics, economic development, economic history, political economy, and behavioral economics. These courses serve as preparation for the qualifying examinations and allow students to identify potential areas of study for dissertation research. As they identify an area, students should locate a faculty adviser to advise them about their studies. Students may also take courses related to economics from other departments.

The third year is normally devoted to finding a dissertation topic and to beginning research on it. In this year, students are expected to make the transition from being a taker of classes to a participant in research. Important elements in achieving this transition are thinking critically about material learned, reading widely, choosing research topics that are feasible and of interest to the student, and gaining contact with faculty. Students should expect to take the initiative in making such contact.

COMBINED PH.D. DEGREES

A combined degree results in the award of one Ph.D. with two departments named. It is not two separate degrees, and the student is not expected to fulfill all the requirements of both departments.

Purpose Combined degrees are intended to provide a sufficiently broad training program for a student wishing to complete an interdisciplinary dissertation.

Program Design Combined-degree programs are designed on an ad hoc basis by the student, the DGSs of the two departments, and the appropriate associate dean of the graduate school.

Timing Most combined degrees are proposed by students during the summer after the first year of study. Students are not given extra time or funding to complete combined degrees. In particular, students must advance to candidacy by the end of their third year of study.

Degree of Integration A combined program should synthesize the knowledge and methods of the two departments into a single study. Ideally the dissertation should be equally strong in both fields. For example, a dissertation with the first half focused on economics and the second half focused on political science would not be acceptable.

Administrative Requirements An ad hoc combined degree program is established in the following steps.

1. A program is initiated by writing of a pre-prospectus by the student. This document describes how and why the two fields are to be integrated.
2. The student recruits a faculty dissertation adviser from each department and obtains their approval of the pre-prospectus, perhaps modified in response to their advice.
3. The student recruits two other faculty members to serve on the dissertation committee, one from each department.
4. The student discusses the requirements for a combined degree with both departmental DGSs.
5. The student prepares a comprehensive study plan that contains a list of courses and examinations agreed on by both DGSs and approved by both departments. The

goals of the course selection are to give some breadth of knowledge of both fields and prepare the student to complete the dissertation. A key to success in combined programs is not to require too many courses and to focus on preparation for dissertation research. Requirements include successful completion of ECON 5500, ECON 5501, ECON 5510, and ECON 5511 with grades of at least HP-; please see (1.2) for a complete description of the requirement. Normally the two departments administer qualifying examinations. This procedure may require the production of examinations that both departments evaluate simultaneously. The plan of study should contain the following: (a) a cover sheet for approvals by both dissertation advisers, both DGSs, and the appropriate associate dean of the graduate school, (b) an introduction where the student explains the rational for proposing the ad hoc combined degree, and (c) a term-by-term timeline listing all classes, teaching, and required examinations.

6. Both departments must accept the dissertation prospectus.
7. The plan of study is a contract, and the student must receive written permission in advance from both DGSs and the appropriate associate dean of the graduate school for any changes to the plan.
8. Once everyone agrees and the plan of study is approved, the combined program is recorded in Banner.

Funding and Teaching The department that first admitted the student is the "primary department." The student's funding is from the primary department, as is the teaching expectation. Ideally students should obtain teaching experience from both departments.

MASTER'S DEGREES

M.Phil. The M.Phil. degree is awarded to students in the Ph.D. program upon completion of all the requirements for advancement to candidacy for a doctorate in economics except the prospectus and prospectus workshop requirements.

M.A. Students who withdraw from the Ph.D. program may be eligible to receive the M.A. degree if they have met the requirements and have not already received the M.Phil. degree. For the M.A., students must successfully complete at least eight term graduate courses in the Department of Economics. At least six of these courses must be Ph.D. courses in the Department of Economics (not courses from the International and Development Economics master's program). The average grade of all the graduate courses taken that are listed or cross-listed by the Department of Economics must be at least a High Pass, and at least two of these grades must be Honors. Students must complete at least two of the three first-year two-course sequences in microeconomics, macroeconomics, or econometrics. In computing the grade average, the relevant grades are those reported to the registrar and so do not include pluses or minuses. A Fail counts as a zero, a Pass counts as a 1, a High Pass counts as a 2, and an Honors counts as a 3. To say that the average grade must be High Pass means that the arithmetic average of these numbers must be at least 2. Candidates in combined programs will be awarded the M.A. only when the master's degree requirements for both programs have been met.

J.D./M.A. Degree Program Students working toward a J.D. in the Law School may earn an M.A. degree in Economics. The degree requirements that apply to these students are the same as those described above. Students wishing to join this J.D./M.A.

joint-degree program must apply for separate admission to the Economics graduate program; applicants should submit scores from the GRE General Test. Students admitted to this program pay three years of tuition to the Law School and one year of tuition to the graduate school. The graduate school does not offer fellowship support to J.D./M.A. candidates.

The M.A. in International and Development Economics is described under International and Development Economics.

COURSES

ECON 5500a and ECON 5501b, General Economic Theory: Microeconomics Staff
Introduction to optimization methods and partial equilibrium. Introduction to decision making under uncertainty. Theories of utility and consumer behavior production and firm behavior. General equilibrium and welfare economics. Allocations involving time and uncertainty and incomplete markets.

ECON 5510a and ECON 5511b, General Economic Theory: Macroeconomics Staff
Analysis of short-run determination of aggregate employment, income, prices, and interest rates in closed and open economies. Stabilization policies.

ECON 5520a, Advanced Microeconomic Theory I Philipp Strack
A formal introduction to game theory and information economics. Alternative non-cooperative solution concepts are studied and applied to problems in oligopoly, bargaining, auctions, strategic social choice, and repeated games.

ECON 5521b, Advanced Microeconomic Theory II Juuso Valimaki
Contracts and the economics of organization. Topics may include dynamic contracts (both explicit and implicit), career concerns, hierarchies, Bayesian mechanism design, renegotiation, and corporate control.

ECON 5522a, Microeconomic Theory Lunch Staff
A forum for advanced students to critically examine recent papers in the literature and present their own work.

ECON 5525a, Advanced Macroeconomics I Pascual Restrepo
Heterogeneous agent economics, investment, scrapping and firing, nonquadratic adjustment costs, financial constraints, financial intermediation, psychology of decision making under risk, optimal risk management, financial markets, consumption behavior, monetary policy, term structure of interest rates.

ECON 5526b, Advanced Macroeconomics II Ilse Lindenlaub and Joel Flynn
Macroeconomic equilibrium in the presence of uninsurable labor income risk. Implications for savings, asset prices, unemployment.

ECON 5530a, General Equilibrium Foundations of Finance and Macroeconomics John Geanakoplos
The course gives a careful mathematical description of the general equilibrium underpinnings of the main models of finance and the new macroeconomics of collateral and default. Part I is a review of Walrasian general equilibrium, including the mathematical techniques of fixed points and genericity, both taught from an elementary point of view. Part II covers general equilibrium with incomplete markets (GEI). Part III focuses on the special case of the capital asset pricing model (CAPM), including extensions to multi-commodity CAPM and multifactor CAPM. Part IV focuses on

the Modigliani-Miller theorem and generic constrained inefficiency. Part V describes collateral equilibrium and the leverage cycle. Part VI covers default and punishment and adverse selection and moral hazard in general equilibrium. Part VII describes monetary equilibrium.

ECON 5531b, Mathematical Economics II Herakles Polemarchakis
This course examines the foundations of money and finance from the perspective of general equilibrium with incomplete markets. The relevant mathematical tools from elementary stochastic processes to differential topology are developed in the course. Topics include asset pricing, variations of the capital asset pricing model, the "Hahn paradox" on the value of flat money, default and bankruptcy, collateral equilibrium, market crashes, adverse selection and moral hazard with perfect competition, credit card equilibrium, and general equilibrium with asymmetric information.

ECON 5538a, Microeconomic Theory Workshop Staff
Presentations by research scholars and participating students.

ECON 5540a, Student Workshop in Macroeconomics Staff
A course that gives third- and fourth-year students doing research in macroeconomics an opportunity to prepare their prospectuses and to present their dissertation work. Each student is required to make at least two presentations per term. For third-year students and beyond, at least one of the presentations in the first term should be a mock job talk.

ECON 5542a, Macroeconomics Workshop Staff
A forum for presentation and discussion of state-of-the-art research in macroeconomics. Presentations by research scholars and participating students of papers in closed economy and open economy macroeconomics and monetary economics.

ECON 5545a, Microeconomics Michael Boozer
A survey of the main features of current economic analysis and of the application of the theory to a number of important economic questions, covering microeconomics and demand theory, the theory of the firm, and market structures. For IDE students.

ECON 5546a, Growth and Macroeconomics Ana Fieler
This course presents a basic framework to understand macroeconomic behavior and the effects of macroeconomic policies. Topics include consumption and investment, labor market, short-run income determinations, unemployment, inflation, growth, and the effects of monetary and fiscal policies. The emphasis is on the relation between the underlying assumptions of macroeconomic framework and policy implications derived from it.

ECON 5547b, Social Networks and Economic Development Kaivan Munshi
The objective of this course is to study the emerging literature on social networks and economic development. Both theoretical and empirical research papers are covered, at a level that is suitable for the advanced undergraduate or graduate student. The course is divided into three sections: (1) Labor Markets and Migration: how community networks support their members in the labor market and how they support their spatial and occupational mobility during the process of development; (2) Commitment: how communities use social ties to solve commitment problems in developing economics, both in theory and in practice; (3) Inter-Group Interactions: community networks do not operate independently, and a nascent literature is starting to investigate the nature

of these group interactions. Time permitting, we examine the role played by networks in the diffusion of information at the end of the course. Prerequisites: intermediate microeconomics, introductory econometrics, and data analysis. Students are expected to be familiar with calculus, basic microeconomics, and basic econometrics.

ECON 5548b / PLSC 7210b, Political Economy of Development Rohini Pande and Gerard Padro

This course analyzes empirically and theoretically the political, institutional, and social underpinnings of economic development. We cover an array of topics ranging from power structures to corruption, state capacity, social capital, conflict, democratization, and democratic backsliding. We focus on recent advances to identify open areas for further research.

ECON 5550a, Econometrics I Staff

Probability: concepts and axiomatic development. Data: tools of descriptive statistics and data reduction. Random variables and probability distributions; univariate distributions (continuous and discrete); multivariate distributions; functions of random variables and transformations; the notion of statistical inference; sampling concepts and distributions; asymptotic theory; point and interval estimation; hypothesis testing.

ECON 5551b, Econometrics II Ed Vytlacil

Provides a basic knowledge of econometric theory, and an ability to carry out empirical work in economics. Topics include linear regression and extensions, including regression diagnostics, generalized least squares, statistical inference, dynamic models, instrumental variables and maximum likelihood procedures, simultaneous equations, nonlinear and qualitative-choice models. Examples from cross-section, time series, and panel data applications.

ECON 5552a, Econometrics III Yuichi Kitamura

The treatment of the subject is rigorous, attentive to modern developments, and proceeds to research level in several areas. Linear models from core curriculum. Topics include linear estimation theory, multiple and multivariate regressions, Kruskal's theorem and its applications, classical statistical testing by likelihood ratio, Lagrange multiplier and Wald procedures, bootstrap methods, specification tests, Stein-like estimation, instrumental variables, and an introduction to inferential methods in simultaneous stochastic equations.

ECON 5553b, Econometrics IV: Econometrics of Dependent Data Timothy Christensen

A sequel to ECON 551 or ECON 552, this research-level course explores the econometrics of dependent data. It introduces frontier theory and methods for a variety of data structures. Topics range from time-series and panel data through to data with spatial, cluster, or network dependence, but the specific focus may vary each year at the instructor's discretion. Applications span many fields of empirical economics, such as macro, trade, and industrial organization.

ECON 5554b, Econometrics V Xiaohong Chen

The first half of this course is about nonlinear parametric models. Specification, estimation, and testing within the Likelihood and Generalized Method of Moments frameworks. First-order asymptotics for both smooth and non-smooth objective functions. Efficiency and robustness. A short account of high-order asymptotics

for smooth problems. The second part is on nonparametric and semiparametric methods. Nonparametric estimation by kernels, series, splines, and other methods. Bias reduction and bandwidth selection. The course of dimensionality and additive models. Specification and estimation of semiparametric models. U-statistics and asymptotic properties. Efficiency and adaptation.

ECON 5556a, Topics in Empirical Economics and Public Policy Philip Haile, Charles Hodgson, and Joseph Altonji
Methods and approaches to empirical economic analysis are reviewed, illustrated, and discussed with reference to specific empirical studies. The emphasis is on learning to use methods and on understanding how specific empirical questions determine the empirical approach to be used. We review a broad range of approaches including program evaluation methods and structural modeling, including estimation approaches, computational issues, and problems with inference. Open only to doctoral students in the Department of Economics. Exceptionally, doctoral students from other departments may take the course for credit if a faculty member, normally from their department, can supervise and grade their term paper.

ECON 5558a, Econometrics Michael Boozer
Application of statistical analysis to economic data. Basic probability theory, linear regression, specification and estimation of economic models, time series analysis, and forecasting. The computer is used. For IDE students.

ECON 5559b, Development Econometrics (IDE) Michael Boozer
Development Econometrics (IDE)

ECON 5565b / CPSC 5630b, Algorithms via Convex Optimization Nisheeth Vishnoi
Convex optimization has played a major role in the recent development of fast algorithms for problems arising in areas such as theoretical computer science, discrete optimization, and machine learning. The approach is to first formulate the problem as a continuous (convex) optimization problem, even if the problem may be over a discrete domain, adapt or develop deterministic or randomized continuous-time dynamical systems to solve it, and then design algorithms for the problem via appropriate discretizations. The goal of this course is to design state-of-the-art algorithms for various classical discrete problems through the use of continuous optimization/sampling. The algorithmic applications include maximum flow in graphs, maximum matching in bipartite graphs, linear programming, submodular function minimization, and counting problems involving discrete objects such as matroids. We present approaches gradient descent, mirror descent, interior-point methods, and cutting plane methods. A solid background in calculus, linear algebra, and probability is recommended. It is intended for students who are comfortable with proofs.

ECON 5568a, Econometrics Workshop Staff
A forum for state-of-the-art research in econometrics. Its primary purpose is to disseminate the results and the technical machinery of ongoing research in theoretical and applied fields.

ECON 5570a, Prospectus Workshop in Econometrics Staff
A course for third- and fourth-year students doing research in econometrics to prepare their prospectus and present dissertation work.

ECON 5580a, General Economic History: Western Europe Jose-Antonio Espin-Sanchez
This course examines the economic development of Western Europe from the medieval period to modern times, with particular emphasis on institutional changes, technological progress, and structural transformation. The course explores major historical periods including the Commercial Revolution, the Black Death, and the Industrial Revolution while analyzing their causes and consequences. Students will engage with comparative perspectives that place Western European development in global context, particularly in relation to China, India, and Japan. The course covers key themes including demographic transitions, the evolution of markets and trade, state formation, financial innovations, labor institutions, human capital development, and historical patterns of inequality. Each week introduces a different empirical methodology commonly used in economic history research, showing how these approaches can be applied to historical questions using original data and case studies. Through analysis of these diverse topics and methods, students will develop a comprehensive understanding of how historical processes shaped modern economic growth and contemporary economic structures. Prerequisites: simultaneous enrollment in or successful completion of ECON 5500 and ECON 5510; permission of the instructor.

ECON 5581b, American Economic History Staff
This course examines both the long-term factors (such as industrialization and the development of markets) and the epochal events (such as the Revolution, Civil War, and Great Depression) that have shaped the development of the American economy. The objectives of this course are to familiarize students with the major topics and debates in American economic history. Prerequisites: concurrent enrollment in or successful completion of ECON 501 and ECON 510.

ECON 5588a, Economic History Lunch Staff
A forum for discussion and criticism of research in progress. Presenters include graduate students, Yale faculty, and visitors. Topics concerned with long-run trends in economic organization are suitable for the seminar. Special emphasis given to the use of statistics and of economic theory in historical research.

ECON 5589a, Economic History Workshop Staff
A forum for discussion and criticism of research in progress. Presenters include graduate students, Yale faculty, and visitors. Topics concerned with long-run trends in economic organization are suitable for the seminar. Special emphasis given to the use of statistics and of economic theory in historical research.

ECON 6600a, Industrial Organization I Philip Haile and Charles Hodgson
Begins by locating the study of industrial organization within the broader research traditions of economics and related social sciences. Alternative theories of decision making, of organizational behavior, and of market evolution are sketched and contrasted with standard neoclassical theories. Detailed examination of the determinants and consequences of industrial market structure.

ECON 6601b, Industrial Organization II Steven Berry and Katja Seim
Examination of alternative modes of public control of economic sectors with primary emphasis on antitrust and public utility regulation in the U.S. economy. Public policy issues in sectors of major detailed governmental involvement.

ECON 6606a, Prospectus Workshop in Industrial Organization Staff
For third-year students in microeconomics, intended to guide students in the early stages of theoretical and empirical dissertation research. Emphasis on regular writing assignments and oral presentations.

ECON 6608a, Industrial Organization Seminar Staff
For advanced graduate students in applied microeconomics, serving as a forum for presentation and discussion of work in progress of students, Yale faculty members, and invited speakers.

ECON 6630a and ECON 6631b, Labor Economics Staff
Topics include static and dynamic approaches to demand, human capital and wage determination, wage income inequality, unemployment and minimum wages, matching and job turnover, immigration and international trade, unions, implicit contract theory, and efficiency wage hypothesis.

ECON 6638a, Labor and Population Workshop Staff
A forum primarily for graduate students to present their research plans and findings. Discussions encompass empirical microeconomic research relating to both high- and low-income countries.

ECON 6640a, Prospectus Workshop in Labor Economics and Public Finance Staff
Workshop for students doing research in labor economics and public finance.

ECON 6642a, Topics in Public Economics Winnie van Dijk
This course discusses a selection of topics related to the design and evaluation of government policy, with a focus on government expenditures, education, health, housing, and anti-poverty policies in high-income countries. We emphasize recent empirical research, and we discuss how the availability of new types of data, such as administrative datasets and customized survey and experimental data, have enabled researchers to use new empirical methods and to open up new areas of study. The course has two objectives. The first objective is to familiarize Ph.D. students with some of the theoretical frameworks, data, and empirical methods that are used in public economics research at the frontier. The second objective is to guide students in developing a proposal for an empirical research project. This course is intended for Ph.D. students in applied fields who are planning to do empirical research as part of their dissertation. The first-year Ph.D. sequence in economics (or equivalent) is a prerequisite.

ECON 6670a / MGMT 7204a, Financial Economics I Stefano Giglio
Current issues in theoretical financial economics are addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area.

ECON 6677a / MGMT 7206a, Financial Econometrics and Machine Learning Bryan Kelly
This course, taught in the first half of the term, provides a theoretical treatment of major topics in corporate finance and banking, including: capital structure; incomplete contract and ownership; agency theory, information, and financial contracting; corporate finance and financial market; banking and intermediaries; and recent topics relating to financial crises. Economics Ph.D. students need to take both this course and

Empirical Corporate Finance (ECON 676/MGMT 748) to obtain credit; then, together, they will be counted as one credit. ½ Course cr

ECON 6679a, Financial Economics Student Lunch Staff
This workshop is for third-year and other advanced students in financial economics. It is intended to guide students in the early stages of dissertation research. The emphasis is on presentation and discussion of materials presented by students that will eventually lead to dissertation topics. Open to third-year and advanced Ph.D. students only.

ECON 6680a, Public Finance I Orazio Attanasio and Felix Bierbrauer
Major topics in public finance including externalities, public goods, benefit/cost analysis, fiscal federalism, social insurance, retirement savings, poverty and inequality, taxation, and others. Applications are provided to crime, education, environment and energy, health and health insurance, housing, and other markets and domains. The course covers a variety of applied methods including sufficient statistics, randomized control trials, hedonic models, regression discontinuity, discrete choice, spatial equilibrium, dynamic growth models, differences-in-differences, integrated assessment models, applied general equilibrium, event studies, firm production functions, learning models, general method of moments, and propensity-score reweighting estimators.

ECON 6681b, Public Finance II Christopher Neilson and Cody Cook
Major topics in public finance including externalities, public goods, benefit/cost analysis, fiscal federalism, social insurance, retirement savings, poverty and inequality, taxation, and others. Applications are provided to crime, education, environment and energy, health and health insurance, housing, and other markets and domains. The course covers a variety of applied methods including sufficient statistics, randomized control trials, hedonic models, regression discontinuity, discrete choice, spatial equilibrium, dynamic growth models, differences-in-differences, integrated assessment models, applied general equilibrium event studies, firm production functions, learning models, general method of moments, and propensity-score reweighting estimators.

ECON 7706a, Prospectus Workshop in International and Spatial Economics Staff
This workshop is for third-year and other advanced students in international economic fields. It is intended to guide students in the early stages of dissertation research. The emphasis is on students' presentation and discussion of material that will eventually lead to the prospectus.

ECON 7720a, International Trade I Costas Arkolakis and Amit Khandelwal
The first part of this course covers the basic theory of international trade, from neoclassical theory where trade is the result of comparative advantage (Ricardo, Heckscher-Ohlin) to the "New Trade Theory" where trade is generated by imperfect competition and increasing returns to scale. Particular emphasis is placed on the implications of the different theories concerning the aggregate gains or losses from trade and the distributional implications of trade liberalization. The second part of the course explores new advances in the field. It covers the Eaton-Kortum (2002) and Melitz (2003) models; extensions of these models with many countries, multiproduct firms, and sectors; methods of quantitative trade analysis to revisit classic questions (gains from trade, distributional effects of trade, trade policy); and new advances in dynamic trade theory.

ECON 7721b, International Trade II Staff
The course covers empirical topics in international trade with particular emphasis on current research areas. Topics include tests of international trade theories; studies of the relationship between international trade, labor markets, and income distribution; recent trade liberalization episodes in developing countries; empirical assessment of various trade policies, such as VERs and Anti-Dumping; productivity (and its relation to international trade liberalization); and exchange rates, market integration, and international trade. Methodologically, the course draws heavily on empirical models used in the fields of industrial organization and to a lesser degree labor economics; taking these courses is thus recommended though not required.

ECON 7724a, International Finance Ana Fieler
A study of how consumers and firms are affected by the globalization of the world economy. Topics include trade costs, the current account, exchange rate pass-through, international macroeconomic co-movement, multinational production, and gains from globalization. Prerequisite: intermediate macroeconomics or equivalent.

ECON 7728a / MGMT 521a, Workshop: International Trade Staff
Workshop/seminar for presentations and discussion on topics in the field of international trade.

ECON 7730a, Economic Development I Mushfiq Mobarak and Mark Rosenzweig
Development theory at both aggregate and sectoral levels; analysis of growth, employment, poverty, and distribution of income in both closed and open developing economy contexts.

ECON 7731b, Economic Development II Lauren Bergquist and Nicholas Ryan
Analysis of development experiences since World War II. Planning and policy making across countries and time. Models of development, growth, foreign trade, and investment. Trade, capital, and technology flows and increasing interdependence. The political economy of policy making and policy reform.

ECON 7732b, Advanced Economic Development Michael Boozer
Examines the models of classical and modern economists to explain the transition of developing economies into modern economic growth, as well as their relevance to income distribution, poverty alleviation, and human development.

ECON 7750a, Trade and Development Workshop Staff
A forum for graduate students and faculty with an interest in the economic problems of developing countries. Faculty, students, and a limited number of outside speakers discuss research in progress.

ECON 7756a, Prospectus Workshop in Development Staff
Workshop for students doing research in development to present and discuss work.

ECON 7794b, International Trade Policy Giovanni Maggi
Theoretical and empirical research in international trade policy. The course focuses on welfare analysis of trade policies under perfect completion and under oligopoly; the political economy of trade policy; and the economics and political economy of international trade agreements. Prerequisites: ECON 500 and 501.

ECON 8899a or b, Individual Reading and Research Staff
By arrangement with faculty.