tinbergen *institute*

Programme of the Graduate School:

M.Phil. and Ph.D. in Economics
2008/2009

M.Phil. and Ph.D. in Finance
2008/2009

July 2008

Erasmus University Rotterdam
Erasmus School of Economics

Universiteit van Amsterdam
Faculty of Economics and Business

VU University Amsterdam
Faculty of Economics and Business Administration

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Preface

It is a pleasure to welcome you to a new year of graduate studies at the Tinbergen Institute, the graduate school and research institute of the economics departments of the Erasmus University Rotterdam, the Universiteit van Amsterdam, and the VU University Amsterdam. The Tinbergen Institute offers a five-year graduate programme consisting of two years of intensive coursework and research in its MPhil programme and three years of PhD thesis research.

The MPhil in Economics is a two-year research master in economics (including econometrics and financial economics) that is fully dedicated to preparing students for PhD thesis research in the three departments participating in the institute. Its first year provides rigorous training in the core of economics. In its second year students specialize in their choice from the institute's many fields of research through field course work and MPhil thesis research. A unique feature of the MPhil programme is that it provides MPhil students with ample opportunity to explore the wide variety of potential PhD advisors and research fields in the three departments before they commit to a PhD research position in one of them.

In an exciting new development, Tinbergen Institute will start a second MPhil and PhD track, focusing on research in finance, in cooperation with the new Duisenberg School of Finance. The taught part of this programme, the MPhil in Finance, will initially be offered as a variant of the MPhil in Economics. It will share its basic structure and regulations, but will allow for an earlier focus on the core aspects of finance. This way, it will offer a research training in finance more in line with the PhD training in finance offered in business schools. Tinbergen Institute will continue to offer the MPhil in Economics in its current setup. In particular, its optional specialization in finance will continue to be a path to a PhD in finance similar to that typically offered by economics departments.

Many of the institute's research fellows and guests will again contribute to the MPhil programme this coming year. You will find all details in this brochure. Pieter Gautier, who teaches a section of the macro core sequence, deserves special mention. He was elected *Tinbergen Professor of the Year* 2007/2008 by the first-year students. Siem Jan Koopman, who teaches advanced econometrics, was runner up in this election. In a new students' initiative, Markus Kirchner was elected *Tinbergen Teaching Assistant of the Year* 2007/08, with Marloes Lammers a good second.

Finally, I would like to draw your attention to the annual Tinbergen Institute Lectures. After three successful series of Lectures, by Robert Gibbons (MIT) on organizational economics in 2006, George Loewenstein (Carnegie Mellon) on behavioural economics in 2007, and Pierre-André Chiappori (Columbia) on family economics in 2008, Susan Athey (Harvard) will give three days of lectures on market design in June 2009. Susan Athey is an applied theorist, with a particular interest in industrial organization. She has made important contributions to economic theory, empirical economics, and econometrics. She was recognized as one of the best US economists of her generation when she was awarded the John Bates Clark Medal by the American Economic Association in 2007. Both her lectures' applied focus, market design, and her remarkable skill in bringing theory, data and econometrics together, will have broad appeal. I hope to see many of you there.

Amsterdam, July 2008

Jaap Abbring
Director of Graduate Studies

Contents

1. Introduction

The Tinbergen Institute (TI) is the graduate school and research institute of the economics departments of the Erasmus University Rotterdam, the Universiteit van Amsterdam, and the VU University Amsterdam.

The ***TI Graduate School*** offers a five-year graduate programme consisting of two years of intensive PhD-level coursework in its Master of Philosophy (MPhil) programme and three years of PhD thesis research. From September 2008, Tinbergen Institute offers separate economics and finance tracks of its graduate programme.

1. The MPhil in Economics is a research master in economics (including econometrics and financial economics) and prepares students for a PhD in economics. Its first year offers rigorous training in the core subjects of economics: microeconomics, macroeconomics, and econometrics. In its second year, students specialize in their choice from the institute's many fields of research through field course work and MPhil thesis research. The MPhil in Economics is connected to three-year PhD employment positions offered by the participating departments.
2. The new MPhil in Finance has the same basic structure and regulations as the MPhil in Economics, but focuses on a PhD in finance. Its first year concentrates on core courses in asset pricing and financial markets, microeconomics and corporate finance, and econometrics. In its second year, students complete a selection from a wide range of specialized courses in finance and economics, and write an MPhil thesis. The MPhil in Finance is offered in cooperation with the Duisenberg School of Finance and is connected to PhD employment positions in finance funded by the Duisenberg School of Finance.

Formally, both MPhil tracks are initially variants of the Tinbergen Institute Master of Philosophy in Economics programme, which has been accredited by the Accreditation Organisation for the Netherlands and Flanders (NVAO). Among other things, this ensures that all MPhil graduates obtain the rights connected to the legally-protected MSc degree. All courses are taught in English on the institute's premises in Amsterdam and Rotterdam. Students can also participate in a broad range of related activities organized by and at the institute, such as reading groups, seminars, and conferences. Details about the contents of both programmes and admission requirements follow in later sections of this brochure.

The MPhil programme's high standards are guaranteed by selecting teaching staff from the best researchers of the three economics departments participating in the institute and by inviting internationally renowned experts to serve as guest lecturers in their fields of research. The programme's high quality is also maintained by carefully selecting only the best students from a large international pool of applicants. Each year up to around 30 students are admitted to the MPhil in Economics. The MPhil in Finance takes in around 8 students in 2008 and will grow towards an intake of some 15 students by 2010. Altogether, some 180 MPhil and PhD students are currently affiliated to the institute.

Students who have completed the institute's MPhil in Economics (resp. MPhil in Finance) programme should have a thorough, up-to-date knowledge of economic theory (finance theory), empirical economics (empirical finance), and econometric methods. They should be able to read and understand top economics (finance) journals and to contribute to scientific discussions. Students should have sufficient knowledge, insight, and skills to carry out independent research in economics (finance), initially under appropriate academic supervision. The MPhil thesis, which serves as the final exam of the MPhil programme, is a first test of this. It should be written as a research paper that can be submitted to an international, peer-reviewed journal. It is supervised by a research

fellow of the institute, and can serve as a starting point for the PhD programme.
The MPhil programme is fully dedicated to preparing students for PhD thesis research in the three departments participating in the institute. Students who successfully complete the MPhil programme are expected to transfer to the PhD programme. The PhD programme takes three years and leads to a PhD degree. These three years are primarily spent on writing research papers for the PhD thesis and on participation in conferences, workshops, and seminars. In addition, PhD students can (optionally) follow additional courses from the institute's MPhil programme or from the programmes of the national educational networks. Also, the formal and informal research and training networks in which the institute and its research fellows participate facilitate longer study visits abroad.

The ***TI Research Institute*** aims to stimulate fundamental and applied research in economics at the three participating universities and to organize an excellent research training environment for the institute's students. The research programme consists of four themes, covering the whole spectrum of economic analysis, from theoretical research to empirical analysis and econometric methods:

1. *Institutions and Decision Analysis:* Theoretical and empirical analysis of individual and collective decision-making. Analysis of economic welfare, market structure and pricing. Game theory and the design of experiments. General equilibrium and disequilibrium.

2. *Financial and International Markets:* Analysis of the functioning of financial markets, the structure of financial systems and monetary policy. International finance, corporate finance and governance. Research on international trade and capital flows with a focus on the changing position of developing countries and economies in transition. Analysis of international environmental policies.

3. *Labour, Region and Environment:* Analysis of the functioning of labour markets with a focus on the Dutch labour market. Research on unemployment and vacancies, human capital and wages. Analysis of mobility within and between regions. Research on the interaction between labour market and mobility and on the environmental effects of changes in transportation patterns.

4. *Econometrics:* Research on the development and application of econometric methods for quantitative analysis of economic phenomena. In particular, research on dynamic econometric models, diagnostic testing, simulation methods and quantitative models for operational decision making.

The cooperation between the three economics departments in the institute offers many benefits. The best economists from the three participating universities are affiliated to TI as research fellows. TI offers them facilities for organizing conferences and seminars, and for inviting foreign guest researchers for short or long stays. TI has offices in both Amsterdam and Rotterdam, including seminar rooms and a dedicated support staff. The graduate (MPhil and PhD) students and many postdocs also have their own office space. The research atmosphere is active and lively.

Small-scale locations and the informal atmosphere at TI contribute to a wealth of contacts between students, teachers, research fellows, and visitors. The MPhil students often collaborate on various assignments and become a close-knit group. Yet, they also enjoy regular contacts with more senior (PhD) students and postdocs. At both locations (Amsterdam and Rotterdam), weekly student lunch seminars are organized; during these seminars students present their work and discuss their progress.

To disseminate research results and to enhance discussion among colleagues, Tinbergen Institute pre-publishes the results in a discussion paper series. See www.tinbergen.nl (> Publications).

2. Admission requirements and applications

Note: Up-to-date information on the application procedure for enrolment in September 2009 will be published at www.tinbergen.nl (> Graduate School > Application requirements) in September 2008.

All prospective students who wish to pursue a PhD at the institute should apply to the MPhil programme following the procedure outlined in Section 2.1.1, and should meet the admission requirements of Section 2.1.2.[1] The MPhil programme is fully dedicated to preparing students for three-year PhD thesis research employment positions in the three departments participating in TI (see Section 2.2).

Prospective students can apply to the MPhil in Economics, the MPhil in Finance, or both. However, they can only be admitted to, and enrol in, one of the two tracks. Therefore, they should carefully consider their options before they apply:

a. Students who are interested in a PhD in economics (including econometrics), but not in a PhD in finance, should only apply to the MPhil in Economics. The MPhil in Finance is not designed to prepare students for a PhD in other fields. Moreover, the PhD employment positions dedicated to MPhil in Finance graduates are funded by the Duisenberg School of Finance and should typically be in finance.
b. Students who are only interested in a PhD in finance are advised to apply to the MPhil in Finance. The MPhil in Finance has been designed by the institute's finance professors to optimally prepare students for a PhD in finance.
c. Some students with an interest in both economics and finance may prefer to apply to the MPhil in Economics. It is possible to enrol in the MPhil in Economics, to subsequently take finance as a major or minor field, and to continue with a PhD project in finance. This may be a good approach to some finance research projects, and it keeps open the option to pursue a PhD in other fields of economics (including econometrics).
d. Most such students may however prefer to minimize the impact of the capacity constraints that the MPhil in Economics and the MPhil in Finance each have by applying to both.

It is not possible to apply to the institute for direct admission to three-year PhD research positions, or to skip the first, core year of the MPhil programme, based on earlier coursework at other institutions. MPhil courses are at an advanced, PhD level, and are challenging even to students who already hold advanced master degrees. TI facilitates students who nevertheless believe there is overlap with earlier coursework in two ways:

a. Admitted students who have successfully completed PhD coursework in economics at other institutions can earn exemptions for the 20 ECTS MPhil in Economics core sequences in Microeconomics, Macroeconomics, and (Advanced) Econometrics by passing the institute's Qualifying Exams in these sequences in the summer prior to enrolment. From the summer of 2009, a similar arrangement may be available for the MPhil in Finance core sequences. Students interested in this option should notify the institute when applying.
b. Alternatively, in the case of true overlap between individual MPhil courses and earlier coursework, exemptions from class attendance and homework assignments, but not from final exams, may be granted. This will be determined in an intake interview with the (appropriate) Director of Graduate Studies at the start of the academic year.

[1] This includes prospective students who have external funding for a PhD programme. If admitted, the Director of Graduate Studies (DGS) will assist such students in meeting the requirements of the external funding organization (such as finding a PhD thesis supervisor, etcetera).

There are two other ways to participate in the institute's educational programme:

a. PhD students appointed directly by the TI departments on four-year contracts are strongly advised to apply to the institute's MPhil programme and participate as regular MPhil students. However, such PhD students may participate in separate courses if they are not admitted to the MPhil (Section 2.3.1).
b. Individuals not affiliated to TI and who do not intend to pursue a PhD at TI may apply to participate in a selection of MPhil courses (Section 2.3.2).

2.1 MPhil programme

2.1.1 Application procedure

Applications for September 2009 enrolment will be taken from September 2008 and should be submitted using the online application form at www.tinbergen.nl (> Graduate School > Applications).

The online application procedure will ask for additional application documents to be sent by regular mail to the

Admission Board
Tinbergen Institute
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands

The application deadlines for enrolment in September 2009 are February 1, 2009 (all), April 1, 2009 (all), and June 1, 2009 (EEA[2] and Swiss nationals only). Application files that are complete by these deadlines will be processed in February, April, and June, respectively. All applicants are advised to submit their application by the early, February 1 deadline, because slots in the programme and funding opportunities are limited. In any case, non-EEA/non-Swiss nationals should apply before the April 1 deadline.

The institute and the international offices of the participating universities will help students who are admitted with immigration procedures, financial arrangements (see also 2.1.3 and 2.1.4), housing, etcetera.

Questions about and comments on the application procedure should be directed to the Graduate School Coordinator at applications@tinbergen.nl.

2.1.2 Admission requirements

The MPhil programme is a selective programme geared towards excellent students who want to pursue a PhD in economics (including econometrics) or finance at TI. Admissions are highly selective and competitive. A maximum of around 30 students may enrol each year in the MPhil in Economics; the MPhil in Finance can take at most 12–15 students. Students are selected by the institute's Admission Board in a rigorous and

[2] EEA countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, The Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, and United Kingdom.

careful process according to the following guidelines:[3]

1. Students must have at least a Bachelor's diploma, preferably in economics, econometrics, mathematics, or physics. The Bachelor's programme should be completed before the start of the MPhil programme.

2. Recent GRE (Princeton Graduate Record Exam) results are required from all (including Dutch) applicants. Scores that are more than two years old are not valid and will not be considered. Successful applicants typically perform among the top-10% of test-takers on the quantitative part of the GRE. Test scores should be sent directly to the institute by the testing service. TI's code number for the GRE is 3811.
3. An excellent command of English is crucial. Students whose native language is not English are therefore required to demonstrate English proficiency in one of two ways:

    a. by holding a degree from a Dutch university or an institution at which English is the language of instruction, or

    b. by scoring at least 600 on the paper-based Test of English as a Foreign Language (TOEFL), 250 on the computer-based TOEFL, or 7 on the IELTS (International English Language Testing System) test. Scores that are more than two years old are not valid and will not be considered. TI's code number for the TOEFL is 3811.

    Note: Chinese nationals should meet the institute's IELTS requirement, because this is a condition for obtaining a NESO Certificate (see 4).

4. Chinese nationals are required to register with the Netherlands Education Support Office (NESO) in Beijing to obtain a NESO Certificate.[4]

5. Students should be strongly motivated to pursue a PhD in economics or finance at the institute. Such motivation will be assessed by a written letter of intent. An interview with the Director of Graduate Studies and/or members of the Admission Board may be part of the selection procedure.
6. Applications should include two letters of recommendation supporting the capability and aspirations of the applicant (in sealed and signed envelopes if submitted by the applicant).

Other admission criteria being equal, preference is given to candidates who show capacity for higher academic performance.

2.1.3 Tuition fees

Students who are nationals of an EEA-country or Switzerland and are under 30 years of

[3] Details of these and other regulations concerning the MPhil programme can be found in the programme's Academic and Examination Regulations, which is available from the institute's intranet. In case of conflicts between this brochure and the Academic and Examination Regulations, the text of the Academic and Examination Regulations is binding.

[4] This document provides an assessment of the candidate's English language proficiency (based on the IELTS test) as well as of the educational degrees and diplomas that are required to gain admission to the MPhil programme. For detailed information about the NESO Certificate see www.nesochina.org.

age at the start of the academic year (September 1), are eligible for the standard tuition fee for higher education in the Netherlands. This fee ("*wettelijk collegegeld*") is determined annually by the Dutch government and equals € 1,565 for the 2008/2009 academic year.

The MPhil tuition fee for most other students is € 9,000 for the 2008/2009 academic year. This fee will be indexed annually to the standard fee ("*wettelijk collegegeld*").

MPhil tuition fees are due until all MPhil examinations, including the MPhil thesis (see Section 3.4.6), are passed.

2.1.4 Funding

Government support is available for some groups of MPhil students:

a. Full-time students who are Dutch nationals and are under 30 years of age may be eligible for government support ("*studiefinanciering*") in the form of a performance grant, a loan, and a public-transport card (see www.ib-groep.nl).
b. The same scheme is open for select groups of nationals of other countries (see *www.ib-groep.nl* > International visitors > Study grants).
c. Finally, EEA and Swiss nationals may be eligible for tuition fee restitution by the government (see www.ib-groep.nl > International visitors > Study in the Netherlands > grant for tuition or course fees).

The institute supports students with various facilities, such as office space at TI in Rotterdam or Amsterdam and reimbursement of travel expenses between Amsterdam and Rotterdam for MPhil coursework. Details are given in the separate brochure "Facilities - Funding - Refunding. Information for MPhil and PhD students", which is available from the institute's intranet.

In addition, the institute offers a limited number of scholarships to MPhil students. This includes scholarships sponsored by the Duisenberg School of Finance for students in the MPhil in Finance. Applicants who want to compete for a TI scholarship should indicate this on the online application form (see Section 2.1.1).

Finally, additional funding is offered by the institute and the departments through research and/or teaching assistantships. These jobs offer valuable teaching and research experience and are suitable for second-year students. The programme's second year leaves ample time for MPhil thesis research, which could be connected to a research assistantship. The core (first-year) programme leaves little or no time for any jobs.

Because the institute's resources are limited, prospective students are advised to apply for external funding as well (see e.g. www.grantfinder.nl). For example, recently the institute's students have been successful in securing prestigious scholarships in Nuffic's Huygens Scholarship Programme (see www.nuffic.nl/hsp).

2.2 PhD programme

Students who perform well in the MPhil programme are expected to transfer to the three-year PhD programme. Students enrolling in the PhD programme will be assigned to one or more PhD thesis supervisors and should prepare a PhD thesis proposal. Ideally, but not necessarily, the MPhil thesis will be the basis of the PhD thesis proposal and the MPhil thesis supervisor will be a PhD thesis supervisor. The main PhD supervisor (the "*promotor*") should be a full professor in one of the three economics departments.

Students admitted to the PhD programme are typically employed by this department as a PhD researcher ("*promovendus*"). This is a full-time position that comes with all the benefits of employment, including a good salary. Thus, such PhD students are fully funded. Alternatively, students who complete the MPhil programme on a four-year or five-year external PhD scholarship may fund (part of) their PhD programme from this external source. Such students will be charged a fee for facilities.

After completion of the MPhil programme, students have complied with all coursework requirements of the graduate programme and typically spend most or all of their time on PhD research. Nevertheless, students are most welcome to participate in additional field courses during the later (PhD) years of their studies at the institute. PhD students should register for courses at the start of the academic year (see Section 3.2.2). In addition, students may attend courses offered by national educational networks such as the LNMB (www.math.leidenuniv.nl/~lnmb/), participate in national and international workshops, etcetera.

Some external educational activities involve fees, substantial travel, and other costs. Note that costs are reimbursed according to the regulations and procedures outlined in the separate brochure for TI students "Facilities- Funding -Refunding. Information for MPhil and PhD students" that is available from the institute's intranet.

2.3 Other ways to participate in the institute's educational programme

2.3.1 Participation of old-style PhD students in MPhil courses

PhD students appointed directly by the departments on four-year employment positions are usually affiliated as PhD students to the institute. The educational requirements for such "old-style" PhD students are set by the supervisors and departments, not by TI.

TI strongly advises all old-style PhD students to apply to the MPhil programme and, if admitted, participate as regular MPhil students. This way, they can claim all the privileges— regular access to the institute's courses, job placement services for PhD graduates, etcetera— that come with the MPhil student status and diploma. Ideally, old-style PhD students enrol with some prior exposure to PhD coursework and can earn some exemptions by passing one or more Qualifying Exams prior to enrolment (see Section 2).

Old-style PhD students who do not enrol in the MPhil programme this way typically follow a condensed course programme designed by the Director of Graduate Studies in coordination with the student and the supervisor. Old-style PhD students can participate in all courses for which they meet the entrance requirements, subject to capacity constraints.

TI PhD students should register for MPhil courses before the start of the academic year (see Section 3.2.2).

2.3.2 External participants in MPhil courses

Under certain conditions and subject to approval by the Director of Graduate Studies, individuals not affiliated to the Tinbergen Institute are allowed to attend MPhil courses.

External participants pay € 1,250 for a core course (one block of 8 weeks including one exam week; TI801-TI807) and € 1,000 for a field course (one block of 8 weeks including one exam week; TI811 and up, except TI866). Participation in the Tinbergen Institute Lectures 2009 (TI866) is free. Prospective external participants should register for courses (see Section 3.2.3).

TI also offers tailor-made course packages to selected partners. Please contact Carine Horbach at courses@tinbergen.nl for details.

3. The MPhil programme in 2008/2009

3.1 Course calendar 2008/2009

All regular TI courses are taught in blocks of eight weeks, with one 2.5-hour lecture in each of the first seven weeks; the eighth week of each block typically serves as an exam week. In addition, first-year (core) courses have weekly one-hour classes, taught by a teaching assistant, in which students work on and discuss homework assignments.

Intensive TI field courses, marked with a "*" in Section 3.4.1, and external courses have different formats (see the field course schedule for details).

The schedule for 2008/2009 is

Block I **Week 36-43**	**Block II** **Week 44-52**	**Block III** **Week 1-9**	**Block IV** **Week 10-17**	**Block V** **Week 18-25**
Sep 1-6	Oct 27-31	Dec 29-Jan 2 *Christmas Holidays*	Mar 2-6	Apr 27-May 1 *Spring Break*
Sep 8-12	Nov 3-7	Jan 5-9	Mar 9-13	May 4-8 *May 5*
Sep 15-19	Nov 10-14	Jan 12-16	Mar 16-20	May 11-15
Sep 22-26	Nov 17-21	Jan 19-23	Mar 23-27	May 18-22 *Ascension Day*
Sep 29-3	Nov 24-28	Jan 26-30	Mar 30-Apr 3	May 25-29
Oct 6-10	Dec 1-5	Feb 2-6	Apr 6-10	Jun 1-5 *Whit Monday*
Oct 13-17	Dec 8-12	Feb 9-13	Apr 13-17 *Easter Monday*	Jun 8-12
Oct 20-24 *Exams*	Dec 15-19 *Exams*	Feb 16-20	Apr 20-24 *Exams*	Jun 15-19
	Dec 22-26 *Christmas Holidays*	Feb 23-27 *Exams*		Jun 22-26 *Exams*

3.2 Registration for and withdrawal from courses

An online procedure for course registration is currently under development and will be available at www.tinbergen.nl (> Graduate School) from August 2008.

3.2.1 TI MPhil students

First-year MPhil students do not have to register for courses.

Second- and higher-year MPhil students should register for courses using the online course registration form for TI MPhil students before August 20, 2008.

MPhil students should ask the (appropriate) Director of Graduate Studies for permission to change their selection of courses (see Section 3.4).

3.2.2 TI PhD students

Old-style PhD students enrolled in the MPhil programme are bound by the registration requirements for MPhil students (see Section 3.2.1).

All other TI PhD students should register for courses using the online course registration form for TI PhD students before August 20, 2008. TI PhD students will only be admitted if they meet some equivalent of the TI course entrance criteria. Capacity restrictions apply to all courses, and are particularly relevant for core courses.

A separate application procedure applies for the Tinbergen Institute Lectures (TI866); details will be announced on the website and emailed to all students who express their interest through the regular course registration form.

TI PhD students who would like to withdraw from courses should notify Carine Horbach by email (courses@tinbergen.nl) no later than Sunday after the first lecture (all TI courses except intensive field courses) or the day of the first lecture (intensive TI field courses, marked with "*" in Section 3.4.1, only).

3.2.3 External participants

Prospective external participants should register for courses using the online course registration form for external students, and follow further instructions given there (which may include instructions to submit a CV and a transcript of relevant earlier coursework, with grades). External applicants will only be admitted if they meet some equivalent of the TI course entrance criteria. Capacity restrictions apply to all courses, and are particularly relevant for core courses. To ensure course availability, external applicants should register for MPhil courses as early as possible (and preferably respect the August 20, 2008, deadline for MPhil and PhD students).

A separate application procedure applies for the Tinbergen Institute Lectures (TI866); details will be announced on the website.

External participants who would like to withdraw from courses should notify Carine Horbach by email (courses@tinbergen.nl) no later than Sunday after the first lecture (all TI courses except intensive field courses) or the day of the first lecture (intensive TI field courses, marked with "*" in Section 3.4.1, only). Fees will be charged in the case of late withdrawal.

3.3 First year of the MPhil programme

In the first year of the MPhil programme students have to complete 60 ECTS[5] of core courses in either the standard track or the advanced-econometrics track. A core track is chosen in an intake interview with the appropriate Director of Graduate Studies (DGS) at the start of the academic year.

Halfway block V, all first-year students attend the two-day MPhil Fields Workshop organized by research fellows (professors) representing the various research

[5] Here, "ECTS" refers to course credits according to the European Credit Transfer System.

programmes and groups connected to the institute. This workshop allows students to explore potential supervisors and fields of specialization, and research fellows to meet the students who are about to enter the research phase of their studies.
At predetermined times throughout the first year, the DGS interviews students to discuss their progress in the programme. In July of each year, the institute's Examination Board issues a formal advice on continuation in the programme to all first-year students. In general, only students who have earned 48 core ECTS or more by July 1 of the first year (July 1, 2009 for the 2008 cohort) are advised to continue in the programme (see Section 3.3.3 for information on grading, credits, and retakes in the core). In any case, students will only be admitted to field courses when they have earned 48 core ECTS and meet any additional entrance requirements specific to each field course (see Section 4.3).

Funding options for the second year will be discussed between the DGS and first-year students near the end of the first year. Funding decisions are taken early July by the DGS (teaching assistantships) and the Admission Board (scholarships), and will be communicated in the course of July.

3.3.1 MPhil in Economics

The standard core track of the MPhil in Economics consists of the following courses:

Code	Course name	Lecturer(s)	ECTS	Block
TI801/I	Microeconomics I (Individual Decision Making)	Janssen/Van der Laan	4	I
TI801/II	Microeconomics II (Game Theory)	Wakker	4	II
TI801/III	Microeconomics III (Information and Behavioural Economics)	Onderstal/Wakker	4	III
TI801/IV	Microeconomics IV (General Equilibrium and Welfare)	Van der Laan	4	IV
TI801/V	Microeconomics V (Industrial Organization)	Hinloopen	4	V
TI802/I	Macroeconomics I (Dynamic Stochastic General Equilibrium Models)	Den Haan	4	II
TI802/II	Macroeconomics II (Business Cycles and New Keynesian Macroeconomics)	Schabert	4	III
TI802/III	Macroeconomics III (Frictions and Resource Allocation)	Bartelsman/Gautier	4	IV
TI802/IV	Macroeconomics IV (International Economics)	Klaassen	4	V
TI802/V	Macroeconomics V (Asset Pricing)	Brevik	4	V
TI803/I	Mathematics I	Brinkhuis	4	I
TI803/II	Mathematics II and Computer Programming in Econometrics	Brinkhuis/Bos	4	I
TI804	Statistics	Spreij	4	II
TI805/I	Econometrics I	Heij	4	III
TI805/II	Econometrics II	Ooms	4	IV

Students with a sufficient background in statistics and econometrics (see Section 3.6) replace Statistics and Econometrics (TI804+TI805) with

Code	Course name	Lecturer(s)	ECTS	Block
TI806/I	Advanced Econometrics I	Bos	4	II
TI806/II	Advanced Econometrics II	Van Garderen	4	III
TI806/III	Advanced Econometrics III	Koopman	4	IV

Chronologically, by eight-week course block, this gives

Block	Microeconomics	Macroeconomics	Econometrics *or* Advanced Econometrics
I	Micro I (Ind. Decision)		Math I Math II & Comp. Prog.
II	Micro II (Game Theory)	Macro I (DSGE Models)	Statistics *or* Adv. Ectr. I
III	Micro III (Information)	Macro II (Business Cycles)	Ectr. I *or* Adv. Ectr. II
IV	Micro IV (GE & Welfare)	Macro III (Frictions)	Ectr. II *or* Adv. Ectr. III
V	Micro V (IO)	Macro VI (Int. Econ.) Macro V (Asset Pricing)	

Section 4.1 explains course codes and Section 4.2 provides course details. Section 4.2 does not explicitly state the core courses' entrance requirements. However, later course blocks often build on earlier course blocks within, and occasionally across, each of the four core sequences: Microeconomics (TI801), Macroeconomics (TI802), Econometrics (TI803+TI804+TI805), and Advanced Econometrics (TI803+TI806). See also Section 3.6 on academic preparations for the core.

3.3.2 MPhil in Finance

The standard core track of the MPhil in Finance consists of the following courses:

Code	Course name	Lecturer(s)	ECTS	Block
TI802/I	Macroeconomics I (Dynamic Stochastic General Equilibrium Models)	Den Haan	4	II
TI807/I	Finance I (Asset Pricing)	Beber	4	III
TI807/II	Finance II (Derivatives)	Vorst	4	IV
TI807/III	Finance III (Advanced Asset Pricing)	Driessen	4	V
TI807/IV	Finance IV (International Finance)	Perotti	4	V
TI801/I	Microeconomics I (Individual Decision Making)	Janssen/Van der Laan	4	I
TI801/II	Microeconomics II (Game Theory)	Wakker	4	II
TI801/III	Microeconomics III (Information and Behavioural Economics)	Onderstal/Wakker	4	III
TI807/V	Finance V (Contract Theory)	Biais	4	IV
TI807/VI	Finance VI (Corporate Finance)	Biais/Calcagno	4	V

TI803/I	Mathematics I	Brinkhuis	4	I
TI803/II	Mathematics II and Computer Programming in Econometrics	Brinkhuis/Bos	4	I
TI804	Statistics	Spreij	4	II
TI805/I	Econometrics I	Heij	4	III
TI805/II	Econometrics II	Ooms	4	IV

Students with a sufficient background in statistics and econometrics (see Section 3.6) again replace Statistics and Econometrics (TI804+TI805) with Advanced Econometrics (TI806).

Chronologically, by eight-week course block, and by core sequence this gives:

Block	Asset Pricing and Financial Markets	Microeconomics and Corporate Finance	Econometrics *or* Advanced Econometrics
I		Micro I (Ind. Decision)	Math I Math II & Comp. Prog.
II	Macro I (DSGE Models)	Micro II (Game Theory)	Statistics *or* Adv. Ectr. I
III	Finance I (Asset Pricing)	Micro III (Information)	Ectr. I *or* Adv. Ectr. II
IV	Finance II (Derivatives)	Finance V (Contract Th.)	Ectr. II *or* Adv. Ectr. III
V	Finance III (Adv. Ass. Pr.) Finance IV (Int. Finance)	Finance VI (Corp. Fin.)	

Section 4.1 explains course codes and Section 4.2 provides course details. Section 4.2 does not explicitly state the core courses' entrance requirements. However, later course blocks often build on earlier course blocks within, and occasionally across, each of the the four core sequences: Asset Pricing and Financial Markets (TI802/I+TI807/I-IV), Microeconomics and Corporate Finance (TI801/I-III+TI807/V-VI), Econometrics (TI803+TI804+TI805), and Advanced Econometrics (TI803+TI806). See also Section 3.6 on academic preparations for the core.

3.3.3 Grading, credits, and retakes in the core

All core courses are graded on a 0-10 scale, where 0 is reserved for students who have not really participated, 1 indicates very poor performance, 6 is the lowest passing grade, and 10 refers to outstanding performance.[6]

Performance in all core courses is assessed by a combination of sit-in written exams and homework assignments. The final grade for each core course block is a weighted average of the exam (75%) and the homework assignments (25%), rounded to the nearest integer (with ½ being rounded up).

Exams are typically graded within 15 days, and before 1 July. Students can review their graded exam papers at the local TI secretariat for up to four weeks after receiving their grade.

Students obtain 4 ECTS credits for each core course block that they have passed (grade 6 or up). Moreover, in each of the five-block Microeconomics (TI801), Macroeconomics

[6] Dutch grades are supposed to reflect performance according to some external standard and are not fully calibrated to reflect relative performance in the class. Therefore, Dutch grades do not correspond directly to ECTS grades (which are defined in terms of class percentiles). This being said, it is not uncommon to grade in two rounds and partially adjust first-round grades if these are considered to be too low.

(TI802), Econometrics (TI803+TI804+TI805), Advanced Econometrics (TI803+TI806), Asset Pricing and Financial Markets (TI802/I+TI807/I-IV), and Microeconomics and Corporate Finance (TI801/I-III+TI807/V-VI) core sequences, an additional 4 ECTS credits can be obtained for at most one course block with a grade of 5 if a grade of 7 or up is obtained for one other course block in the sequence, and grades of 6 or up for the remaining three course blocks. Thus, within each five-block core sequence, at most one 5 can be compensated this way.

Core exams cannot be retaken. Students should retake, in their second year, all course blocks for which they have not obtained credits in their first year. The compensation rule applies across years: Students can compensate a 5 in one year with a 7 in another year.

All credits expire 29 months after the date of the exam in which they were earned.

3.4 Second year of the MPhil programme

This section focuses on the second year of the MPhil in Economics (we provide a brief outline of the second year of the MPhil in Finance, which will be taught for the first time in 2009/2010, in Section 3.4.8).

Students should comply with the field-course requirements of the academic year that coincides with their second year in the programme. Thus, the rules in this section apply to the 2007 cohort of MPhil students.

At the start of the MPhil programme's second year, students choose a major and a minor field from

1. Econometrics
2. Empirical Microeconomics
3. Finance
4. Macroeconomics, Monetary Economics, and International Economics
5. Spatial and Environmental Economics
6. Applied Microeconomics
7. Behavioural Economics

Then, students have to

(i) complete 30 ECTS of specialized coursework, taking at least 4 courses in their major field and 3 courses in their minor field (the "fields requirement").

Courses in each of the seven fields that count towards the fields requirement (field courses) are listed in Section 3.4.1. Courses that are listed in multiple fields can only be used in one field. Students have the option to substitute a short (3 ECTS) field paper for a course in one or both of their fields (see Section 3.4.2). The remaining course credits can be obtained by following any other field courses listed in Section 3.4.1 (excluding field papers) or external courses and workshops not listed in Section 3.4.1 (see Section 3.4.4).

Field courses may be cancelled if less than five (internal and external) students sign up. To limit uncertainty about field-course offerings to a minimum, there are strict rules for registration by TI students (Sections 3.2.1 and 3.2.2). MPhil students are only allowed to register for a field course or paper if they have completed 48 core ECTS and meet the specific entrance requirements for that field course (see Section 4.3). At a minimum, students should register for a full *programme of field courses, that is a programme that satisfies the requirements stated above. Students need approval from the Director of Graduate Studies to sign up for or withdraw from field courses after the initial registration.*

(ii) write and publicly defend an MPhil thesis.

The MPhil thesis (30 ECTS; see Section 3.4.6) is the final examination of the MPhil programme.

Students should pass the entire core before they defend their MPhil thesis.

Students who are not able to finish the MPhil programme before the end of their second year can register with their university for a third year to complete the MPhil programme. However, students are strongly advised to avoid such an extension, because it complicates the matching to PhD employment positions and requires the payment of tuition fees for a third year (see Section 2.1.3). In any case, all students are advised to complete the programme within 30 months after enrolment (before February 28, 2011, for the 2008 cohort). It is next to impossible to complete the programme later, because all credits expire 29 months after the corresponding exam.

TI organizes two graduation ceremonies each year, one for all students who finish the MPhil programme within two years and another one for all other students.

3.4.1 Field courses

Course codes marked by "*" refer to intensive courses, in various formats. See the field course schedule for details.

1. Econometrics

Code	Course name	Lecturer(s)	ECTS	Block
PA810	Paper in Econometrics		3	
TI811	Advanced Time Series Econometrics	Boswijk/D. Van Dijk/Franses	3	II
TI812	Computational Econometrics	Paap	3	III
TI813*	Topics in Advanced Microeconometrics	Ridder	3	V
TI814	Dynamic Panel Data Methods	Kiviet	3	II
EU815*	Marketing Econometrics (EI/PUP Lectures 2009)	Rossi/H.K. van Dijk/ TI fellows	3	V
(TI806/I	Advanced Econometrics I	Bos	4	II
TI806/II	Advanced Econometrics II	Van Garderen	4	III
TI806/III	Advanced Econometrics III	Koopman	4	IV) [7]
TI821/I	Applied Microeconometrics I (Modern Econometric Techniques)	Van der Klaauw	3	I

[7] TI806 (Advanced Econometrics) can be followed for field credits by students who have not taken Advanced Econometrics as part of their core.

TI821/II	Applied Microeconometrics II (Longitudinal Data)	Lindeboom/Van den Berg	3	II

2. Empirical Microeconomics

Code	Course name	Lecturer(s)	ECTS	Block
PA820	Paper in Empirical Microec.		3	
TI821/I	Applied Microeconometrics I (Modern Econometric Techniques)	Van der Klaauw	3	I
TI821/II	Applied Microeconometrics II (Longitudinal Data)	Lindeboom/Van den Berg	3	II
TI822	Labour Economics	Bloemen/Hartog/ Hochguertel	3	I
TI823	Economics of Education	Oosterbeek/Plug	3	III
TI824	Health Economics	Van Doorslaer/ Lindeboom/Lundborg	3	III
TI825	Development Economics	Elbers/Gunning	3	III

3. Finance

Code	Course name	Lecturer(s)	ECTS	Block
PA830	Paper in Finance		3	
TI831	Advanced Derivatives	Vorst	3	II
TI832	Corporate Governance	Dittmann	3	I
VU833	Stochastic Processes for Finance	Camia	6	I/II
(TI807/II	Finance II (Derivatives)	Vorst	4	IV)[8]
TI807/III	Finance III (Advanced Asset Pricing)	Driessen	4	V
TI807/IV	Finance IV (International Finance)	Perotti	4	V
TI807/VI	Finance VI (Corporate Finance)	Calcagno/Biais	4	V

4. Macroeconomics, Monetary Economics, and International Economics

Code	Course name	Lecturer(s)	ECTS	Block
PA840	Paper in Macroeconomics, …		3	
TI841	Advanced Dynamic Programming	Den Haan	3	I
TI842	Public Finance	Jacobs	3	III
TI843	Topics in International Economics	Van Wijnbergen/Pozzi	3	II
UA844*	Topics in Macroeconomics	Christiano/Den Haan	3	V
UA845*	Solving and Estimating DSGE Models with Dynare	Juillard/Den Haan	3	I

[8] TI807/II (Derivatives) can be taken for field credits by students who do not take TI831 (Advanced Derivatives) for field credits.

TI825	Development Economics	Elbers/Gunning	3	III
TI852	Environmental and Resource Economics	Withagen/Van der Ploeg	3	IV

5. Spatial and Environmental Economics

Code	Course name	Lecturer(s)	ECTS	Block
PA850	Paper in Spatial and Environmental Economics		3	
TI851	Spatial and Transport Economics	De Groot/Verhoef	3	I
TI852	Environmental and Resource Economics	Withagen/ Van der Ploeg	3	IV

6. Applied Microeconomics

Code	Course name	Lecturer(s)	ECTS	Block
PA860	Paper in Applied Microeconomics		3	
TI861	Advanced Industrial Organization	Fershtman/Hinloopen	3	I/II
TI862	Public Economics	Van Winden	3	IV
TI863	Law and Economics	Dari-Mattiacci/ Demougin	3	III
TI864	Organizational Economics	Swank/Visser	3	III
TI865	Advanced Game Theory	Van den Brink/ Houba	3	II
TI866*	Market Design (TIL 2009)	Athey	3	V
TI807/V	Contract Theory	Biais	4	IV

7. Behavioural Economics

Code	Course name	Lecturer(s)	ECTS	Block
PA870	Paper in Behavioural Economics			
TI871	Risk and Rationality	Wakker	3	II
TI872	Experimental Economics	Sonnemans/Ule	3	III
UA873	Nonlinear Economic Dynamics	Hommes/Anufriev	5	I
UA874	Bounded Rationality	Anufriev	5	II
TI862	Public Economics	Van Winden	3	IV

8. Other courses

Code	Course name	Lecturer(s)	ECTS	Block
TI881	Recent History of Economics	Davis	3	II

3.4.2 Field papers

Regular TI field courses are assessed by an exam and/or take home assignments, but not full papers. Instead, second-year MPhil students have the option to write short field papers in one or both of their chosen fields for 3 ECTS field course credits. A field paper should be connected to one of the field's courses chosen by the student and will be graded by that course's lecturer. Note that the field paper counts as a separate course and does not substitute for the course's examination.

Students should register for field papers at the start of the year, but do not have to commit to a topic or course for the paper. Instead, students should contact the lecturer during the course to agree on a paper topic and deadline. Students should report the courses and lecturers for which they write their field papers to Carine Horbach (courses@tinbergen.nl) as soon as possible, and never later than block IV, so that the institute can arrange the registration of the field paper's grade.

Papers can only be written for courses with TI codes 811 and up. Moreover, it may not be possible (TI866) or practical to write a paper for courses taught by external lecturers.

3.4.3 Seminars

The institute's fellows and students organize a wide variety of seminar series. Student participation in seminars is highly recommended, but not rewarded with course credits in 2008/09.

Seminar schedules can be found at www.tinbergen.nl (> Events > Seminars).

3.4.4 Other courses and workshops

Courses organized by other graduate schools or by inter-university networks such as the LNMB (see www.math.leidenuniv.nl/~lnmb/) may qualify for field credits in the MPhil programme. Students who want to follow courses that are not listed in Section 3.4.1 for credits should contact the Director of Graduate Studies in advance.

Some courses and workshops involve fees, substantial travel, and other costs. Note that costs are reimbursed according to the regulations and procedures outlined in the separate brochure "Facilities - Funding - Refunding. Information for MPhil and PhD students" that is available from the institute's intranet.

3.4.5 Matching to an MPhil thesis and possible PhD thesis supervisor

Ideally, second-year students match up with an MPhil thesis supervisor before 1 January.

To support the matching process, the institute complements the first year's Fields Workshop (see Section 3.3) with information about the local (departmental) research programmes in each of the MPhil's fields on its intranet. Students can use this intranet service to check which local research groups and fellows are active in their fields of interest. Reversely, the intranet site will provide information to the fellows on the students that are active in each MPhil field.

MPhil students should bear in mind that the MPhil thesis is a first step towards a PhD thesis. Students are advised to check with their prospective MPhil thesis supervisor under what conditions they can transfer to a paid PhD position with that same supervisor. Together, the three departments have a sufficient number of three-year PhD employment positions available to offer to students who successfully complete the MPhil programme. However, for distributional reasons it may be harder to transfer with one supervisor in one departmental research group than with another supervisor in another group. Formalities concerning the possible transfer to a PhD position will be arranged in the MPhil Thesis Workshop on February 25-26, 2009 (see Section 3.4.6).

Students should inform TI as soon as they have found an MPhil thesis supervisor by sending an email to mphilthesis@tinbergen.nl. Students who have not found a supervisor by January 1 will be contacted by the Director of Graduate Studies. Of course, students should contact the Director of Graduate Studies before January 1 if they need help in finding a supervisor.

3.4.6 MPhil thesis

Half of the second year of the MPhil programme is devoted to writing a first major research paper, the MPhil thesis. The thesis is written under supervision of one of the institute's research fellows. It should be defended in a public one-hour seminar at the institute before a thesis committee consisting of the MPhil supervisor and two other research fellows of the institute.[9] A grade is awarded to the MPhil thesis at the end of the seminar. The thesis should have the format and size of a research paper that can be submitted to an international, peer-reviewed journal in economics. However, the committee should bear in mind that students only have half a year (30 ECTS) to work on their thesis. Therefore, the committee should expect a good first, but not a final, draft of such a paper. The draft should have sufficient quality to be publishable in such a journal after further polishing.

The MPhil thesis procedure is the following:

1. Students inform TI about their MPhil thesis supervisor before January 1 by sending an email to mphilthesis@tinbergen.nl (see Section 3.4.5).
2. The DGS establishes a thesis committee. Preferably, at least one of the committee members is affiliated to a different university than the supervisor. TI confirms the committee by sending an email to the student and all three committee members.
3. Students submit the MPhil Thesis and PhD Transfer Form to TI (by email to mphilthesis@tinbergen.nl) before February 1, and present their plans for the MPhil thesis, and a possible continuation in a PhD employment position, at the MPhil Thesis Workshop on February 25, 2009 (TIR) and February 26, 2009 (TIA).
4. TI organizes the allocation of departmental PhD employment positions to students who have expressed interest in such positions.
5. The supervisor informs TI (by email to mphilthesis@tinbergen.nl) as soon as (s)he believes the thesis is ready to be defended. If the thesis is not ready to be defended by 1 July, the student informs TI (by email to mphilthesis@tinbergen.nl) about the thesis' progress before 1 July.
6. The student plans a date for the seminar (in cooperation with the supervisor and the other thesis committee members) and informs TI (by email to mphilthesis@tinbergen.nl). TI publicly announces the seminar and informs the student and committee of further procedures,
7. The seminar itself takes one hour altogether, is chaired by the supervisor, and follows the following schedule:

[9] In exceptional cases, the committee may include members who are not research fellows of the institute.

0-45':	Presentation by the student (possibly interrupted by discussion).
45-55':	Comments and questions by, in particular, the committee.
55':	All except the committee members leave the seminar room.
55'-60':	The committee establishes the grade, completes the grade form.
60':	The student is called back in and the grade is discussed.

The student is responsible for distributing the MPhil thesis. The thesis should be sent to all committee members well before the defence (deadline to be decided by the supervisor). It should also be sent as a PDF file to mphilthesis@tinbergen.nl no later than one day before the defence.

The thesis supervisor is responsible for completing the MPhil Thesis Grade Form, to have the form signed by all committee members, and to send it directly (not through the student) to TIA within two weeks of the defence.

3.4.7 Grading, credits, and retakes in the fields

All field courses, field papers, and the MPhil thesis are graded on a 0-10 scale (see also Section 3.3.3).

Performance in field courses is assessed by a final (oral, take-home, or written sit-in) exam. Oral and written sit-in exams take place in the exam week; a take-home exam should have a deadline no later than three weeks after the course's final lecture. Home work assignments and class participation may contribute to the grade. See the individual courses' descriptions in Section 4.3 for details.

Exams are typically graded within 15 days, and before 1 July. Students can review their graded exam papers at the local TI secretariat up to four weeks after receiving their grade.

Credits are obtained for a field course block, a field paper, or the MPhil thesis only if it is completed with a final grade of 6 or up. Failing grades cannot be compensated.

There are no scheduled retakes in the second year. However, in exceptional cases, students who have participated fully in a field course may be given the opportunity to pass by handing in additional home work or retaking (part of) the exam.

All credits expire 29 months after the date of the exam in which they were earned.

3.4.8 Second year of the MPhil in Finance programme

The second year of the MPhil in Finance programme will be taught for the first time in 2009/2010. Here, we only provide a brief outline of the second year as it is currently set up. Further details will be available in the summer of 2009.

In the second year of the MPhil in Finance programme, students have to

(i) complete 30 ECTS of specialized coursework (subject to some distributional requirements) and
(ii) write an MPhil thesis (30 ECTS).

In 2009/10, field courses will be offered in a variety of Finance (sub-)fields, such as

1. Asset Pricing
2. Corporate Finance
3. Banking and Financial Intermediation
4. Risk Management and Derivatives
5. Law and Finance
6. Market Microstructure
7. International Finance
8. Behavioural Finance
9. Empirical Finance
10. Financial Econometrics

A selection of advanced, specialized courses from the MSc programmes of the Duisenberg School of Finance may be included as MPhil field courses. In addition, students can take field courses from the MPhil in Economics (see Section 3.4.1). Finally, students can write Papers for credits.

3.5 The Academic and Examination Regulations and the MPhil's boards

The MPhil's Academic and Examination Regulations provide details on the programme's admission and examination procedures and can be downloaded from the institute's intranet.[10]

Here, we will provide some additional information on the Admission Board (Section 3.5.1), the Examination Board (Section 3.5.2), and the Educational Board (Section 3.5.3).

3.5.1 Admission Board

The Admission Board consists of representatives of the three departments and the two Directors of Graduate Studies (DGS). The Admission Board decides on admissions to the programme and on funding.

Current students will only have to deal with the Admission Board when it decides on second-year funding. At the end of the first year, the DGS will discuss second-year funding with all first-year students and propose funding arrangements to the Admission Board. Students should not contact the Admission Board directly.

3.5.2 Examination Board

The Examination Board consists of representatives of the three departments and the Director, who is secretary to the board. The responsibilities and tasks of the Examination Board are explained in the Academic and Examination Regulations.

There are two reasons why a student may contact the Examination Board:

1. The Examination Board decides on deviations from the curriculum that may have a bearing on the diploma. Therefore, any request for replacement of parts of the curriculum through education provided by third parties, exemptions, postponement of deadlines, etcetera, should be sent to the Examination Board.

[10] This brochure explains some of these regulations and also serves as an appendix to these regulations (that is, it is the "Study Guide" referred to in the regulations). In case of conflicts between this brochure and the Academic and Examination Regulations, the text of the Academic and Examination Regulations is binding.

2. Students should try to settle disputes about examinations with the lecturer first, and contact the DGS if the dispute remains. Students may submit disputes that cannot be solved this way to the Examination Board for arbitration.

In both cases, an email to examinationboard@tinbergen.nl suffices.
Reversely, the Examination Board will provide the student with formal study advice (see Section 3.3) and may take measures against a student in the case of fraud or misbehaviour. Appeals against such decisions should be sent in writing to

Examination Board
Tinbergen Institute
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands

To speed up this process, students should also send their appeal by email to examinationboard@tinbergen.nl.

3.5.3 Educational Board

The Educational Board consists of three MPhil students and three TI fellows. The Directors of Graduate Studies are secretary to, but not members of, the Educational Board. The Educational Board provides advice, both solicited and unsolicited, to the Board of the Tinbergen Institute, the Faculty Boards and to the Faculty Councils on all matters concerning the educational programme. It meets twice a year or more often if considered necessary by one or more of the members.

The Educational Board has decided to organize its two regular meetings around the half-yearly MPhil evaluation meetings organized by the Students' Council. This provides students with a channel to voice their concerns about the MPhil programme. Students may also contact the Educational Board directly with general concerns about the educational programme. Students should not contact the Educational Board to solve individual disputes that are in the domain of the Examination Board.

3.6 Academic preparations

Depending on their educational background, students may want to prepare academically for one or more core sequences before they come to TI.

3.6.1 Microeconomics/Microeconomics and Corporate Finance

Students lacking a strong background in economics will benefit from studying some undergraduate text book in intermediate microeconomics before they come to TI, such as

- Perloff, J.M. (2003), *Microeconomics* (Third Edition), Addison Wesley
- Katz, M.L. and H.S. Rosen (1997), *Microeconomics* (Third Edition), McGraw-Hill
- Frank, R. (2002), *Microeconomics and Behavior* (Fifth Edition), McGraw-Hill
- Varian, H.R. (1999), *Intermediate Microeconomics* (Fifth Edition), Norton
- Baye, M. (2006), *Managerial Economics & Business Strategy* (Fifth Edition), McGraw-Hill

3.6.2 Macroeconomics/Asset Pricing and Financial Markets

Students without a strong background in economics are advised to study some undergraduate macroeconomics texts before the start of Macroeconomics I in November, such as

- Mankiw, N.G. (2002), *Macroeconomics* (Third Edition), Worth
- Blanchard, O. (2002), *Macroeconomics* (Third Edition), Prentice Hall
- Burda, M. and Wyplosz, C. (2001), *Macroeconomics: A European Text* (Third Edition), Oxford University Press

and ideally also

- Gärtner, M. (2002), *Macroeconomics*, Financial Times/Prentice Hall
- Jones, C.I. (2002), *Introduction to Economic Growth* (Second Edition), Norton

3.6.3 Mathematics

Mathematics I is an ambitious math refreshment course. This course should be useful to most students, but those with a very strong math background may be exempted from Mathematics I class attendance and home works (but not the exam). Mathematics II treats some methods of optimization and computer programming in econometrics.

All incoming students are supposed to be familiar with the basics of the usual maths courses for undergraduate students in economics:

a. Functions of one variable: linear functions, quadratic functions, polynomial functions, power functions, exponential functions, logarithmic functions, inverse functions.
b. Differentiation: relation with tangent, rules for differentiation (including product rule, quotient rule, chain rule), linear approximation, Taylor approximation.
c. Integration: indefinite and definite integrals, primitive of a function, relation with area.
d. Linear equations: matrix and vector notation, Gaussian elimination, matrix multiplication, transpose.

A short test will be administered in the first lecture week to assess whether all students master these topics. The test will not contribute to the courses' grades; its sole purpose is to determine which students need some extra guidance early in the programme.

Students lacking a strong math background should prepare before they come to TI, using any textbook on mathematics for economists that treats these topics, such as

- Sydsaeter, K. and Hammond, P. (2002), *Essential Mathematics for Economic Analysis*, Prentice Hall
- Chiang, A.C. (1984), *Fundamental Methods of Mathematical Economics* (Third Edition), McGraw-Hill

or the textbooks on Calculus and Linear Algebra used for Mathematics I (see Section 4.2). An efficient way to prepare for the entrance test is to make as many exercises as possible on the topics above. One source of many useful exercises is a new book,

- Van de Craats, J. and R. Bosch (2005), *Basisboek Wiskunde*, Pearson (staff.science.uva.nl/~craats/)

This Dutch-language book is useful for all who need to prepare for the test, including those who cannot read Dutch. It is very compact and the left-hand pages of this book give many exercises, mostly in terms of mathematical symbols so that there is no need to understand the accompanying Dutch text. The problems on the test will be similar to the problems in this book. However, this book does not contain exercises on vectors and matrices. Schaum's Outline books on *Calculus and on Linear Algebra (Vectors and Matrices)*, published by McGraw-Hill, contain many useful exercises as well.

Finally, students are expected to have read

- J.A. Doornik and M. Ooms. *Introduction to Ox*. www.doornik.com/ox/OxIntro.pdf.

before the start of Mathematics II.

3.6.4 Econometrics

Students in the standard track should read Chapter 1 of the book used in this track's first course (TI604),

- Rice, J.A. (1994), *Mathematical Statistics and Data Analysis* (Second Edition), Duxbury

before the start of Statistics and Econometrics in November.

The advanced track aims at students who already master econometrics at the level of the standard track.

4. Course descriptions

4.1 Course codes

Course code prefixes indicate how and by whom courses are organized:

TI	Courses organized by the institute at TIR or TIA
EU	Course at the Erasmus University Rotterdam (taught at its campus near TIR)
UA	Universiteit van Amsterdam MSc courses (taught at its campus near TIA) and PhD lectures organized by Prof.dr. W.J. den Haan on his research project at UvA.
VU	VU University MSc course (taught at its campus near A'dam Zuid-WTC)
PA	Field paper

The numerical parts of the course codes reflect the academic year (first digit; 8 for 2008/2009, etcetera) and include a unique course or seminar number (last two digits; 00-09 are reserved for core courses and 10 and up for field courses).

4.2 Core courses

This section does not explicitly state the core courses' entrance requirements. However, all students in core courses should have the academic background expected from a successful MPhil applicant (see Section 2.1.2) and, if necessary, prepare as suggested in Section 3.6. Moreover, note that later core course blocks often build on earlier course blocks within, and occasionally across, each of the core sequences: Microeconomics (TI801), Macroeconomics (TI802), Econometrics (TI803+TI804+TI805), Advanced Econometrics (TI803+TI806), Asset Pricing and Financial Markets (TI802/I+TI807/I-IV), and Microeconomics and Corporate Finance (TI801/I-III+TI807/V-VI).

TI801/I MICROECONOMICS I (Individual Decision Making)

Lecturers: Prof.dr. M.C.W. Janssen (Vienna University) and Prof.dr.ir. G. van der Laan (VU)

Course description: This course provides an overview of the classical theory of consumer and producer theory, choice under uncertainty, and social choice. The main focus is to understand the (mathematical) relationships between different fundamental concepts.

Literature: A. Mas-Colell, M.D. Whinston, and J.R. Green (1995). *Microeconomic Theory*, Oxford University Press, Chapters 1-6

TI801/II MICROECONOMICS II (Game Theory)

Lecturer: Prof.dr. P.P. Wakker (EUR)

Course description: Game theory studies the optimal behaviour of agents in their interaction with a few other agents. This course provides a thorough understanding of how to define (non-cooperative) game situations and how games situations can be solved. We study games that have been most used in economic situations and look at conceptual issues and solution concepts related to games with perfect and imperfect information, repeated and sequential games. We also include examples in classroom situations.

Literature:
- Mas-Colell, M.D. Whinston, and J.R. Green (1995). *Microeconomic Theory*, Oxford University Press, Chapters 7-9
- R. Gibbons (1992). *A Primer in Game Theory*, Prentice-Hall

TI801/III MICROECONOMICS III (Information and Behavioural Economics)

Lecturers: Dr. A.M. Onderstal (UvA) and Prof.dr. P.P. Wakker (EUR)

Course description: Informational asymmetries are pervasive in economic relationships: In second-hand car markets, sellers have better information about the product for sale than buyers, agents take actions that are at least partly unobservable, and bidders in auctions know more about their valuation than the seller does. Both theoretical models of information economics and their experimental tests will be central in this course. The latter will lead to new (behavioral) models. In particular, in one part of the course Sander Onderstal will discuss adverse selection, moral hazard, signaling and auctions. In the other part of the course, Peter Wakker will analyze individual decisions when relevant information is missing ("uncertainty"), with empirical measurements of (irrational) attitudes towards such uncertainty confronted with theoretical derivations of optimal decisions.

Literature:
Compulsory:
- Elmar Wolfstetter (2000). *Topics in Microeconomics – Industrial Organization, Auctions, and Incentives,* Cambridge University Press
- Selected papers

Recommended:
- Bernard Salanié (2000): *The economics of contracts: A primer*, MIT Press

TI801/IV MICROECONOMICS IV (General Equilibrium and Welfare)

Lecturer: Prof.dr.ir. G. van der Laan (VU)

Course description: Micro IV is devoted to the examination of competitive markets from a general equilibrium perspective. From a methodological viewpoint, the general equilibrium approach views the economy as a closed and interrelated system in which the equilibrium values of all variables are simultaneously determined. So, a change in the economic environment affects all variables. This stands in contrast to the partial equilibrium theory, where all variables not directly related to the problem at hand are taken to be given. From a substantive viewpoint, general equilibrium theory is a theory of the determination of equilibrium prices and quantities in a system of perfectly markets. It attempts to predict the complete vector of final consumptions and productions from the fundamentals of the economy. Topics are existence, uniqueness and stability of general equilibrium; Edgeworth representation and the core; uncertainty and incomplete markets; dynamics and overlapping generations.

Literature: A. Mas-Colell, M.D. Whinston, and J.R. Green (1995). *Microeconomic Theory*, Oxford University Press, Part IV

TI801/V MICROECONOMICS V (Industrial Organization)

Lecturer: Prof.dr. J. Hinloopen (UvA)

Course description: This course is devised to give students an in-depth overview of the mainstream theory of Industrial Organization. After the course students should have a balanced notion of the main issues that industrial economists worry about. Students should also understand the details of a number of seminal papers that will be discussed in class. The course is primarily theoretical in that the theory of Industrial Organization is covered. At the same time, insofar available and time permits, empirical (econometric) and/or experimental results will be discussed to substantiate the numerous theoretical claims (theorems) that will be presented. The material will be presented during seven classroom meetings and six subsequent recitation classes. During the latter problems are solved and during three of these recitation classes an experiment is conducted. Students are asked to analyze the results of these experiments.

Literature:
Compulsory: Stephen Martin (2002). *Advanced Industrial Economics* (2nd edition), Blackwell
Recommended: Selected papers

TI802/I MACROECONOMICS I (Dynamic Stochastic General Equilibrium Models)

Lecturer: Prof.dr. W.J. den Haan (UvA)

Course description: This course develops tools to develop dynamic stochastic general equilibrium (DSGE) models. We start using dynamic programming to determine the first-order and transversality conditions for several important recursive social planner problems in discrete time and show how to determine the set of equations that determine the solution in models that are and are not social planner problems. Next, we show how you can study simple properties of the model without explicitly solving for the policy functions. Solving these models typically requires numerical techniques and the course teaches you a basic solution technique, value function iteration.

The course also teaches you commonly used tools to characterize business cycle properties in the data. Examples are filtering techniques, frequency domain analysis, and structural vector autoregressive models (VARs).

The second part of this course studies dynamic models that allow for growth. It studies several exemplary models of the growth literature and relevant empirical evidence.

Literature: Selected papers.

TI802/II MACROECONOMICS II (Business Cycles and New Keynesian Macroeconomics)

Lecturer: Dr. A. Schabert (UvA)

Course description: The course builds on Macroeconomics I and applies dynamic (stochastic) general equilibrium models to the analysis of short-run macroeconomic dynamics and optimal monetary and fiscal policy. It consists of four main parts. In the first part, a basic competitive equilibrium (real) business cycle framework is developed which serves a the main building block for the course. At this stage, solution methods for recursive equilibrium and impulse response functions will be presented. The second part focuses on the role of fiscal policy. Here, effects of government spending, the role of public debt, and optimal taxation under commitment will be discussed. The third part introduces money into the framework and derives principles for optimal monetary policy under perfectly flexible prices. Further, the issues of monetary policy implementation and the determination of the price level will be addressed. The last part extends the policy analysis to the case where prices are imperfectly flexible. Within this (New Keynesian) framework optimal monetary policy under commitment and discretion will be examined, and interactions between monetary and fiscal policy will be discussed.

Literature:
Compulsory:
- Ljungqvist, L. and T. J. Sargent (2004). *Recursive Macroeconomic Theory, Second edition*, Cambridge Massachusetts: The MIT Press
- Walsh, C.E. (2003). *Monetary Theory and Policy*, Second Edition, Cambridge Massachusetts: The MIT Press

Recommended:
- Woodford, M. (2003). *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton: Princeton University Press

TI802/III MACROECONOMICS III (Frictions and Resource Allocation)

Lecturers: Prof.dr. E.J. Bartelsman (VU) and Dr. P.A. Gautier (VU)

Course description: Key macro indicators— unemployment, GDP, and productivity growth— may not follow the optimal paths determined in a frictionless economy. Recent models are much more careful in dealing with frictions agents face in reality, such as entry and exit fees, delays in finding transaction partners, information asymmetries, and limited contract enforcement. In this course, we explore the implications of heterogeneous agents facing various frictions that frustrate the allocation of resources in labor, capital and product markets.

By studying these models, students not only learn key aspects of three important topics in macroeconomics, namely labor market developments, business cycle analysis, and long-run growth, but also key building blocks that are useful by themselves.

We briefly discuss empirical regularities observed in the data regarding labor markets, firm demographics and productivity growth. After highlighting the difficulties of standard models to explain these regularities, we explore recent modifications. We start with growth models of heterogeneous firms and study the implications of frictions for static and dynamic efficiency.
Special attention will be paid to nonlinearities in tangible and intangible capital investment. Next, we turn to the labor market and discuss different ways to model how agents search, match, and bargain over prices. More specific examples are wage posting, Nash bargaining, and directed search.

Literature: Selected papers.

TI802/IV MACROECONOMICS IV (International Economics)

Lecturer: Dr. F.J.G.M. Klaassen (UvA)

Course description: This course studies a number of standard topics from modern international macroeconomics. The key feature of international macro, as it is practised

nowadays, is the use of solid micro foundations from which aggregate, macro-economic relations are derived. This leads to the view of the current account as a vehicle for "inter-temporal trade". We study the role of asset market completeness in international risk-sharing and inter-temporal trade. We also pay attention to capital market imperfections. Combining micro-foundations with rigidities in prices and/or wages leads us to the New- Keynesian open economy macroeconomics. The course outline is:
1. Intertemporal trade and current account (OR, Ch. 1).
2. Intertemporal trade and current account (OR, Ch. 2).
3. Real exchange rates (OR, Ch. 4).
4. Money, exchange rates and sticky prices (OR, Ch. 9 and 10).
5. Asset markets in the open economy (OR, Ch. 5).
6. Imperfections in international capital markets (OR, Ch. 6).
7. T.b.a.

Literature:
- Obstfeld, M. and K. Rogoff (1997). *Foundations of International Economics*, MIT Press (OR)
- Selected papers

TI802/V MACROECONOMICS V (Asset Pricing)

Lecturer: Dr. F. Brevik (VU)

Course description: This course is an introduction to equilibrium asset pricing using the stochastic discount factor (SDF) methodology. We will cover classical issues in asset pricing but with an emphasis on the link between macroeconomic risk and security prices.

Literature:
- John H. Cochrane (2005). *Asset Pricing (Revised Edition),* Princeton University Press
- Further reading to be confirmed

TI803/I MATHEMATICS I

Lecturer: Dr. J. Brinkhuis (EUR)

Course description:
- Week 1: Matrix Algebra
- Week 2: Vector Spaces
- Week 3: Linear Transformations
- Week 4: Differential Calculus
- Week 5: Advanced Tools of Marginal Analysis
- Week 6: Integrals
- Week 7: Differential Equations and Complex Numbers

Literature:
Compulsory:
- Howard Anton and Chris Rorres (2005). *Elementary Linear Algebra with Applications* (9th edition), Wiley
- Ken Binmore and Joan Davies (2001). *Calculus, Concepts and Methods*, Cambridge University Press

Recommended:
- Books on Linear Algebra and Calculus.

TI803/II MATHEMATICS II AND COMPUTER PROGRAMMING IN ECONOMETRICS

Lecturers: Dr. J. Brinkhuis (EUR, Mathematics II) and Dr. C.S. Bos (VU, Computer Programming in Econometrics)

Note: This course consists of two separate parts, on the mathematics of optimization (Brinkhuis) and computer programming in econometrics (Bos), that are jointly examined. The final mark consists of 25% homework exercises on the topic of Mathematics II, 50% exam on Mathematics II, and 25% exam on Computer Programming in Econometrics.

Mathematics II (Brinkhuis)

Course description:
- Week 1: Unconstrained Nonlinear Opimization: Theorems of Fermat and Weierstrass
- Week 2: Constrained Nonlinear Optimization:Theorems of Langrange, Karush-Kuhn-Tucker and Fritz John
- Week 3: Calculus of Variations: Euler's Equations, Transversality Conditions, Euler-Lagrange Equation
- Week 4: Optimal Control: Pontryagin's Maximum Principle
- Week 5: Dynamic Programming (Deterministic and Stochastic: Bellman's Principle

Literature:
Compulsory:
- Morton I. Kamien, Nancy L. Schwartz (1991). *Dynamic Optimization* (2nd edition), Elsevier
- Jan Brinkhuis and Vladimir Tikhomirov (2005). *Optimization: Insights and Applications*, Princeton University Press (ISBN-13:978-0-691-10287-0 or ISBN-10:0-691-10287-2)

Recommended:
- Alpha Chiang (1999). *Elements of Dynamic Optimization*, Waveland Pr Inc
- Fryer and Greenman. *Optimisation theory, Applications in OR and Economics*
- Sethi, S.P. and Thompson, G.L. *Optimal Control Theory: Applications to Management Science and Economics*
- Seierstadt, A. and Sydsaeter, K. *Optimal Control with Economic Applications*
- Andrzej Ruszczynski. *Nonlinear Optimization*
- Dimitri Bertsekas. *Dynamic Programming and Optimal Control* (two volumes)
- Delia Koo. *Elements of Optimization with Applications in Economics and Business*
- Hadley and Kemp. *Variational Methods in Economics*

Computer Programming in Econometrics (Bos)

Course description: In two of the first block's weeks, Mathematics II makes place for Computer Programming in Econometrics. This course discusses general concepts of programming, how to proceed from a set of equations via an algorithm to a valid program, robustness of programming, and other more practical topics related to Econometrics.

The course is split between a theoretical and a practical part. The theoretical part assumes a matrix-oriented programming language. It is not immediately related to a specific programming environment, though examples will be given in Ox. The practical part of the course necessarily focusses more on the syntax of Ox itself.

Students are expected to have read the 'Introduction to Ox' before the start of the course.

Literature:
Compulsory:
J.A. Doornik and M. Ooms. *Introduction to Ox*. www.doornik.com/ox/OxIntro.pdf
Recommended: Doornik, J.A. (2007). *Ox5: An Object-Oriented Matrix Language*, Timberlake Consultants Press (ISBN 978-0-9552127-5-8)

TI804 STATISTICS

Lecturer: Dr. P.J.C. Spreij (UvA)

Course description: This course is intended for students who have a deficiency in probability and statistics. It starts off with the very first principles of probability and quickly passes on to essential statistical techniques.
Estimation and testing theory will be reviewed, including maximum likelihood estimators, likelihood ratio test and (least squares) regression.
Information will also become available on
staff.science.uva.nl/~spreij/onderwijs/TI/statistics.html

Literature: John A. Rice (1995). *Mathematical Statistics and Data Analysis*, 3rd Edition, Duxbury Press, ISBN: 0-534-39942-8 (2nd Edition also allowed, ISBN: 0-534-20934-3)

TI805/I ECONOMETRICS I AND TI805/II ECONOMETRICS II

Lecturers: Dr. C. Heij (EUR, part I) and Dr. M. Ooms (VU, part II)

Course description: This course provides an understanding of basic econometric methods. Knowledge of this course allows one to understand modern empirical economic literature and to perform one's own analysis of economic and business data. The technique of regression is discussed, as well as various extensions that are needed in concrete applications to deal with, for example, heteroskedasticity, endogeneity, non-linearities, and time series aspects. The main emphasis of the course is on the interpretation of models and outcomes of estimation and testing procedures. The students practice this themselves by analyzing economic and business data by means of the econometric software package EViews and by interpreting and extending formulae for basic models and concepts.

Literature:
Compulsory:
- C. Heij, P.M.C. de Boer, P.H. Franses, T. Kloek, and H.K. van Dijk (2004). *Econometric Methods with Applications in Business and Economics*, Oxford University Press, Oxford

Recommended:
- M. Verbeek (2004). *A Guide to Modern Econometrics* (2nd edition), Wiley
- J.M. Wooldridge (2000). *Introductory Econometrics, a Modern Approach*, South Western College Publishing

TI806/I ADVANCED ECONOMETRICS I

Lecturer: Dr. C.S. Bos (VU)

Course description: In this course we focus on the linear regression model. First we pay attention to the standard regression techniques, before showing how these can be adapted to fit models that deviate from initially made presumptions. Resulting non-linear least squares or generalized least squares are studied in detail, both in theory and in some practical exercises.

Literature: R. Davidson and J.G. MacKinnon (2004). *Econometric Theory and Methods*, OUP

TI706/II ADVANCED ECONOMETRICS II

Lecturer: Dr. K.J. van Garderen (UvA)

Course description: This course continues on from Advanced Econometrics I and considers estimation methods more general than Least Squares that are appropriate when the classical assumptions are violated. We consider Instrumental Variables (IV), Generalized Method of Moments (GMM), and Maximum Likelihood (ML) to deal with cases when regressors are correlated with disturbances for instance. We will investigate the properties of these estimators such as asymptotic distributions and finite sample behaviour. We further analyse a number of likelihood-based models commonly used in applied research for cases where the dependent variable is discrete or in some other way restricted.

Literature:
Compulsory: R. Davidson and J.G. MacKinnon (2004). *Econometric Theory and Methods*, OUP
Recommended: Additional reading from books and papers

TI806/III ADVANCED ECONOMETRICS III

Lecturer: Prof.dr. S.J. Koopman (VU)

Course description: Several major advances in time series, forecasting and software engineering have occurred in the past years. These advances have provided a major breakthrough in the modelling of time series using advanced up-to-date estimation methodologies. The first part of the course aims to provide a thorough understanding of linear time series models, unobserved components, state space, the Kalman filter, signal extraction and forecasting. It further discusses how these innovative modeling and forecasting methods can be implemented in real-life business, industry and government situations. The course also pays attention on how to interpret and report results. The second part of the course shows how the methodologies extend to nonlinear and non-Gaussian time series models. It requires additional methods based on simulation techniques. Further various applications of the techniques are discussed in the fields of micro- and macroeconomics and financial econometrics.

Literature:
Compulsory:
- Durbin, J. and Koopman, S.J. (2001). *Time Series Analysis by State Space Methods*, Oxford University Press

Recommended:
- Brockwell, P.J. and Davies, R.A. (1987). *Time Series: Theory and Methods*, New York: Springer-Verlag
- Harvey, A.C. (1989). *Forecasting, Structural Time Series Models and the Kalman*

filter, Cambridge University Press
- Shumway, R.H. and Stoffer, D.S. (2000). *Time Series Analysis and Its Applications*, New York: Springer-Verlag

TI807/I FINANCE I (Asset Pricing)

Lecturer: Professor A. Beber (UvA)

Course description: This course provides a comprehensive yet rigorous introduction to both the theory and related empirical evidence of modern asset pricing. We will cover a number of models and methodologies that have been recently developed in the literature to address intriguing empirical regularities. In particular, we will focus on research about optimal asset allocation.

Literature: John H. Cochrane (2005). *Asset Pricing (Revised Edition),* Princeton University Press

TI807/II FINANCE II (Derivatives)

Lecturer: Prof.dr. A.C.F. Vorst (VU)

Course description: In this course an introduction to pricing of derivative financial instruments like options, futures, forwards and swaps will be given. The pricing of derivative instruments is based on the no arbitrage assumption, which is not a very strong assumption and does not require an equilibrium, rational behaviour of all investors or other strong assumptions on which most investment theories are based. In this course we will mainly focus on equity and currency derivatives. We will not only discus pricing but also hedging, since this theory is so widely accepted because through hedging risks can be minimized, if necessary. We will combine the technical aspects of the theory with the practical aspects of trading.

Literature: Hull J.C. (2008). *Options Futures and Other Derivative*s, Prentice Hall, 7th edition

I807/III FINANCE III (Advanced Asset Pricing)

Lecturer: Dr. J.J.A.G. Driessen (UvA)

Course description: This course is an introduction to the fundamentals of asset pricing. We start off with the basic concepts of expected utility, state prices and pricing kernels. We then turn to portfolio choice, the pricing of securities, and the valuation of contingent claims. We end with an introduction to continuous time option pricing.

Literature:
Compulsory:
- Stephen F. LeRoy and Jan Werner (2001). *Principles of Financial Economics*, Cambridge University Press
- John H. Cochrane. *Asset Pricing,* Princeton University Press
  Note: you can use either the (2001) first edition or the (2005) revised edition
  Both books can be bought as a package via Amazon.com

Recommended:
- Chi-fu Huang and Robert H. Litzenberger (1988). *Foundations for Financial*

Economics, Elsevier Science Publishing Co., Inc.
This book is out of print; selected chapters will be made available in class.

TI807/IV FINANCE IV (International Finance)

Lecturer: Prof.dr. E.C. Perotti (UvA)

Course description: Financial economics concerns the creation, trading and enforcement of financial contracts and the assignment of control over corporate assets.
This course studies the determinants of the regulatory and governance system which frames corporate financing choices. While grounded in corporate finance theory, and illustrated with formal models, it is closely related to the broader literature on institutions and growth. We will review selectively theoretical and empirical results on the determinants of the structure of financial intermediation, and focus on the role of legal and political institutions in shaping cross country variation in financial structure and its evolution over time.
The main themes are the determinants of financial development, governance and financing patterns across countries. Specific themes will be access to finance, capital market structure and its regulation, and financial instability.

Literature:
Compulsory: A useful reference will be the survey by the instructor on "The Political Economy of Finance", forthcoming in JEL.
Recommended: An extensive reading list will be provided in the spring.

TI807/V FINANCE V (Contract Theory)

Lecturer: Professor B. Biais (Université de Toulouse I)

Course description: Contract theory is a very powerful tool to study a large array of business and economics issues. The goal of this course is to offer an introduction to important concepts of this theory (adverse selection, moral hazard, incentives, direct and indirect mechanisms, the revelation principle, etcetera) and to enable students to use them to analyse applied problems. While contract theory can be mathematically rather demanding, I will try whenever possible to stick with simple two-by-two models. Such models are often sufficient to present the concepts and the intuition. Although I will refer to many classical papers, I will usually not follow exactly the models presented in the papers. Rather, I will try to present the whole course in the context of a unified model (and set of notations). To do so, I will rely heavily on the excellent textbook by Laffont and Martimort (2002), which will be the basic reference for this course. Throughout the course, I will also endeavour to present the theory against the background of business and economics situations: regulation, price discrimination, corporate finance, insurance, etcetera. While I hope that at the end of the course students will have grasped the general concepts, I believe it is useful to build intuition by referring to specific contexts, rather than purely formal constructions.

Literature:
- Laffont and Martimort (2002), *The Theory of Incentives*, Princeton University Press
- Selected papers

TI807/VI FINANCE VI (Corporate Finance)

Lecturers: Professor B. Biais (Université de Toulouse I) and Dr. R. Calcagno (VU)

Course description: In this course we will present an overview of the main theoretical issues concerning the firms' financial choices and the firms' governance. Moving away from the Modigliani-Miller paradigm, the course focuses on agency problems affecting the choices of corporations at various levels, which represent the core of modern corporate finance theory.
The course will start reviewing theoretical models studying how investors can affect the behaviour of managers: managerial compensation and the investors' activism will be the central topics of this part. A more general view of the principles of corporate governance and a careful description of the notion of social responsibility will complete the first part of the course.
Then we explain how financial contracting can best align the interests of firm's insiders (i.e. decisors) with those of investors in the presence of informational asymmetries. We will study problems of credit rationing, the optimal maturity structure of debt, the determinants of borrowing capacity of firms and "pecking-order" theories. We then continue presenting theories based on the optimal allocation of control rights, both among security holders, and more generally the principles guiding the market for corporate control.

Literature: Jean Tirole (2006). *The Theory of Corporate Finance*, Princeton University Press

4.3 Field courses

Note that, in addition to the specific entrance requirements for each field course, all courses require that students have completed at least 48 ECTS of the core (see Sections 3.3 and 3.4).

TI811 ADVANCED TIME SERIES ECONOMETRICS

Lecturers: Prof.dr. H.P. Boswijk (UvA), Prof.dr. D.J. van Dijk (EUR) and Prof.dr. P.H.B.F. Franses (EUR)

Course description: The purpose of this course is to discuss modern techniques in time series econometrics, with applications in macroeconomics, finance and marketing. Topics covered include cointegration, volatility modelling, nonlinear regime-switching models, large-scale factor models, and recent developments in forecasting such as forecast combination and evaluation. The discussion of each topic consists of two parts. First, we treat theoretical aspects of the time series models and techniques involved. Second, the application of these models in different areas is illustrated by means of recent journal articles and working papers, and a number of practical homework assignments.

Literature:
- Boswijk, H.P. (2005). *Likelihood Inference in Gaussian Cointegrated VAR Models*. Lecture notes, Universiteit van Amsterdam
- Franses, P.H. and D. van Dijk (2000). *Nonlinear Time Series Models in Empirical Finance*. Cambridge: Cambridge University Press
- Hamilton, J.D. (1994). *Time Series Analysis*. Princeton: Princeton University Press (Chapter 22)

- Selected papers

Course entrance requirements:
Required: Statistics and Econometrics (TI704+TI705)
Recommended: Advanced Econometrics (TI706)

Assessment: Sit-in written exam (75%) and homework assignments (25%).

TI812 COMPUTATIONAL ECONOMETRICS

Lecturer: Prof.dr. R. Paap (EUR)

Course description: It is important for advanced econometric and applied economic researchers to have basic knowledge of simulation methods. The goal of this course is to provide a practical introduction into the use of advanced simulation methods. The course will start with a simple introduction into the basics of simulation methods, including standard sampling techniques and the constructing of a data generating process. In the remainder of the course we will deal with topics like, simulation of critical values of non-standard tests, the design of power studies, construction of the small sample distribution of an estimator using bootstrap, impulse/response analysis, the simulation of forecast densities and forecasts and simulated maximum likelihood and related techniques. Finally we consider Markov Chain MonteCarlo methods including the Gibbs sampler, the Metropolis-Hasting algorithm and data augmentation techniques.

Literature: Reader with selected papers and slides.

Course entrance requirements: Statistics and Econometrics (TI704+TI705)

Assessment: Take-home exam.

TI813 TOPICS IN ADVANCED MICROECONOMETRICS

Lecturer: Prof.dr. G. Ridder (USC)

Course description: In this course we will study advanced topics in micro-econometrics. The emphasis is not on technique but on concepts. Of course, technical issues cannot be completely avoided. Topics that will be covered are (not all will be covered each year) (i) discrete choice models and their application to modelling markets for heterogeneous products, (ii) dynamic programming models of individual behaviour, (iii) empirical models of auctions, (iv) estimation of treatment effects.

Literature: Lecture notes and selected papers.

Course entrance requirements:
Required: Statistics and Econometrics (TI704+TI705)
Recommended: Advanced Econometrics (TI706), Applied Microeconometrics (TI821)

Assessment: Sit-in written examination.

TI814 DYNAMIC PANEL DATA METHODS

Lecturer: Prof.dr. J.F. Kiviet (UvA)

Course description: This course will provide a thorough analytical and experimental analysis of the quality of inference when modelling dynamic panel data relationships. The course will be supplemented by exercises on the computer involving simulation illustrations. Topics covered will include:

1. Perils of unobserved heterogeneity; scope and limitations of panel analysis
2. Static panels: fixed effects, random effects, LS inference
3. Panel ARX(1) model: large sample and finite sample bias of LS variants
4. Dynamic panel data models: inference by GMM variants
5. Examining validity of moment restrictions and instrument weakness
6. Monte Carlo methodology for rating competing inference procedures
7. Heterogeneous panels and cross-section dependence

Literature: Lecture notes.

Course entrance requirements: Advanced Econometrics (TI706)

Assessment: Sit-in written examination and homework assignments.

EU815 MARKETING ECONOMETRICS (ECONOMETRIC INSTITUTE/PRINCETON UNIVERSITY PRESS LECTURES 2009)

Lecturers: Prof. P. Rossi (Chicago GSB), Prof.dr. H. K. van Dijk (EUR), Dr. D. Fok (EUR), Prof.dr. P.H.B.F. Franses (EUR), Prof.dr. R. Paap (EUR), Prof.dr. S. Stremersch (EUR)

Course description: Annual PhD lectures organized by the Econometric Institute at EUR, in cooperation with Princeton University Press.

See www.few.eur.nl/ei (> EI/PUP Lectures) for further course details.

TI821/I APPLIED MICROECONOMETRICS I (Modern Econometric Techniques)

Lecturers: Dr. B. van der Klaauw (VU)

Course description: This course focuses on drawing inference from cross-section data using techniques that are frequently used in applied econometric research. We consider limited dependent variable models, maximum likelihood estimation, instrument variable estimation, measurement errors in the exogenous variables, quantile regression, duration analysis, and treatment evaluation. The limited dependent variable models discussed during the course are binary choice models, Tobit models, sample selection models, and switching regression models. When discussing instrumental-variable estimation, we deal with weak instruments, Hausman-tests for endogeneity, and Sargan-test for overidentifying restrictions. The topic on treatment evaluation includes the discussion of the potential outcome model, the definition of different treatment effects such as average treatment effect, average treatment effects on the treated and local average treatment effects. Estimation of these treatment effects using social experiments, matching, natural experiments, and regression discontinuity designs is discussed. Finally, the course provides an introduction to duration analysis, covering the estimation and identification of models for single-spell data. During the course applications of the different methods are discussed, mainly in the fields of labor economics, health economics, and the economics of education.

Literature:
Compulsory: Cameron, A.C. and P. Trivedi (2005). *Microeconometrics: Methods and Application*s, Cambridge University Press
Recommended: Wooldridge, J.M. (2001). *Econometric Analysis of Cross section and panel data*, MIT Press
During the course additional literature will be made available.

Course entrance requirements: Statistics and Econometrics (TI704+TI705)

Assessment: Sit-in written exam (75%) and take-home assignment (25%).

TI821/II APPLIED MICROECONOMETRICS II (Longitudinal Data)

Lecturers: Prof.dr. M. Lindeboom and Prof.dr. G.J. van den Berg (VU)

Course description: This course focuses on exploiting panel and longitudinal structures in applied econometric research. During the course we consider random and fixed effects linear models, dynamic panel data model, GMM estimation, fixed-effect logit estimation, treatment evaluation using difference-in-difference estimation. We consider the specification and identification of duration models and maximum likelihood and stratified partial likelihood estimation. We discuss the evaluation of treatment effects in real time, both in the context of single-spell and multiple-spell duration models. During the course applications of the different methods are discussed mainly in the fields of labor economics, health economics and economics of education.

Literature:
Compulsory: Cameron, A.C. and P. Trivedi (2005). *Microeconometrics: Methods and Application*s, Cambridge University Press
Recommended: Wooldridge, J.M. (2001). *Econometric Analysis of Cross section and panel data*, MIT Press

Course entrance requirements:
Required: Statistics and Econometrics (TI704+TI705)
Recommended: Applied Microeconometrics I: Modern Econometric Techniques (TI821/I)

Assessment: Sit-in written exam (75%) and take-home assignments (25%).

TI822 LABOUR ECONOMICS

Lecturers: Dr. H.G. Bloemen (VU), Prof.dr. J. Hartog (UvA) and Dr. S. Hochguertel (VU)

Course description: This course covers empirical applications (with, where appropriate, theoretical foundations) of microeconomic models of labor supply, search, and migration. The first part (Hochguertel) covers various models of labor supply, ranging from individual to household, from static to intertemporal models. Interactions with tax and benefit systems will be emphasized.
The second part (Bloemen) deals with structural microeconomic applications of job search models. It covers the empirical implementation of the classical job search model, models with on-the-job search, matching-bargaining, and equilibrium search models. Attention will be paid to methods of estimation for these types of models. The outcomes of several empirical studies will be discussed.
The third part (Hartog) discusses the economic effects of migration for the host country and for the migrants themselves, based on international empirical evidence. In addition,

empirical studies relating to the Netherlands will be discussed.

Literature: Selected papers.

Course entrance requirements:
Required: Microeconomics I (TI701/I), Macroeconomics III (TI702/III), Statistics and Econometrics (TI704+TI705)
Recommended: Applied Microeconometrics (TI821)

Assessment: Sit-in written examination, oral examination or take-home assignments, depending on class size (75%), take-home assignments (25%).

TI823 ECONOMICS OF EDUCATION

Lecturers: Prof.dr. H. Oosterbeek (UvA) and Prof.dr. E.J.S. Plug (UvA)

Course description: This course covers recent developments in the economic analysis of education and training. This includes the demand for education, private and social returns to schooling, educational production, intergenerational mobility, and the determinants of and the returns to private sector training.

Literature: Selected papers.

Course entrance requirements:
Required: Applied Microeconometrics I (TI821/I)
Recommended: Labour Economics (TI822)

Assessment: Take-home exam.

TI824 HEALTH ECONOMICS

Lecturers: Prof.dr. E.K.A. van Doorslaer (EUR), Prof.dr. M. Lindeboom (VU) and Dr. N.P. Lundborg (VU)

Course description: This course is about the distribution of health, income and work across the life cycle. We address theoretical and empirical issues regarding the measurement of health and health inequality within and across countries and how this relates to (differences in) health care institutions. We next move to the determinants of later life health and discuss the mechanisms that relate socio-economic conditions during the life course to later life health and mortality. Finally we discuss theoretical and empirical models for addictive behaviours like smoking and drinking and look at the economics of obesity. In this course the emphasis is on empirical applications and in particular on the identification of causal pathways and the consequences for public policy.

Literature: Selected papers.

Course entrance requirements: Microeconomics (TI701), Applied Microeconometrics (TI821)

Assessment: Take-home assignment.

TI825 DEVELOPMENT ECONOMICS

Lecturers: Dr. C.T.M. Elbers (VU) and Prof.dr. J.W. Gunning (VU)

Course description: A central focus in development economics is the effectiveness of policies in alleviating poverty. In this course the nature and measurement of poverty and econometric techniques for estimating poverty ("poverty mapping") will be studied. The course covers theories explaining the persistence of poverty in terms of either endowments (e.g. poor education) or market imperfections (e.g. poverty traps or absence of insurance). Poverty interventions range from macro policies to stimulate growth to targeting on the basis of individual characteristics. Assessing the effectiveness of such interventions is currently a hot topic. A substantial part of the course is devoted to the evaluation of impact, both for macro and micro interventions.

Literature: Selected papers.

Course entrance requirements: Statistics and Econometrics I (TI704+TI705/I)

Assessment: Oral examination (75%) and homework assignments (25%).

TI831 ADVANCED DERIVATIVES

Lecturer: Prof.dr. A.C.F. Vorst (VU)

Course description: In this course the focus will be on credit derivatives pricing and hedging. The market for credit derivatives has grown enormously during the last 8 years. At the same time there has been a whole stream of academic papers on the subject of pricing of credit derivatives, especially on nth to default baskets, CDO tranches, CMCDS products and Credit Default Swaptions. However, it is felt that the definite model still needs to be developed, especially with respect to modelling correlation for both jumps to default as well as credit spread changes. We will discus the different approaches to correlation modelling.

Literature:
Compulsory: Philipp Schonbucher (2003). *Credit derivatives pricing models*, Wiley Finance
Recommended: selected papers

Course entrance requirements:
Required: Macroeconomics V (TI702/V), Statistics and Econometrics (TI704+TI705)
Recommended: Stochastic Processes for Finance (VU833)

Assessment: Sit-in written examination.

TI832 CORPORATE GOVERNANCE

Lecturer: Prof.dr. I. Dittmann (EUR)

Course description: Corporate governance analyzes two conflicts of interest and the ways to overcome them: The conflict between shareholders and managers, and the conflict between majority and minority shareholders. This course discusses recent theoretical and empirical papers in corporate governance. The course will cover the following three topics: (1) Executive compensation. This part is devoted to the structure and design of optimal compensation contracts, and to the question whether and how managers extract rents from their firms (managerial self-dealing). (2) Ownership, voting, and control. This part discusses the advantages (e.g. monitoring of management) and disadvantages (e.g. expropriation of minority shareholders) of block ownership. (3) Boards of directors. The board of directors can be seen as an institution that endogenously arises in order to overcome the conflicts between shareholders and management; here we will also discuss the effects and determinants of board size and board composition. A main purpose of the course is to identify potential thesis topics and to expose students to the research methods (and their potential shortcomings) used in theoretical and empirical corporate finance.

Literature:
The course is based on selected papers. Students are asked to prepare for the classes by reading a number of assigned papers before the lectures.

The following survey papers provide a good introduction into the field:

- Shleifer and Vishny (1997). *A Survey of Corporate Governance*, Journal of Finance 52, 737-783
- Becht, Bolton and Roell (2003). *Corporate Governance and Control*, in *Handbook of the Economics of Finance*, Vol. 1, Part 1, 1-109
- Murphy (1999). *Executive Compensation*, in *Handbook of Labor Economics*, Vol. 3, Part 2, 2485-2563
- Bebchuk and Fried (2003). *Executive Compensation as an Agency Problem*, Journal of Economic Perspectives, Vol. 17, 71-92

Course entrance requirements:
Required: Microeconomics II and V (TI701/II+V), Statistics and Econometrics (TI704+TI705)
Recommended: Corporate Finance (TI731)

Assessment: Take-home exam (75%) and homework assignments (25%).

VU833 STOCHASTIC PROCESSES FOR FINANCE (VU code 400352)

Lecturer: Dr. F. Camia (VU)

Course description: Financial institutions trade in risk and it is therefore essential to measure and control such risks. Financial instruments such as options, swaps, forwards, caps and floors, etc. play an important role in risk management, and to handle them one needs to be able to price them. This course gives an introduction to the mathematical tools and theory behind risk management.
A "stochastic process" is a collection of random variables, indexed by a set T. In financial applications the elements of T model time, and T is the set of natural numbers (discrete time), or an interval in the positive real line. "Martingales" are processes whose increments over an interval in the future have zero expectation given knowledge of the past history of the process. They play an important role in financial calculus, because the price of an option (on a stock or an interest rate) can be expressed as an expectation under a so-called martingale measure. In this course we develop this theory in discrete and continuous time, with an emphasis on the second. Most models for financial processes in continuous time are based on a special Gaussian process, called Brownian motion. We discuss some properties of this process and introduce "stochastic integrals" with Brownian motion as the integrator. Financial processes can next be modeled as solutions to "stochastic differential equations".
After developing these mathematical tools we turn to finance by applying the concepts

and results to the pricing of derivative instruments, by studying models for the "term structure of interest rates", and to risk measurement and management. Foremost, we develop the theory of no-arbitrage pricing of derivatives, which are basic tools for risk management.

Literature:

- Lecture notes
- Alison Etheridge. *Financial Calculus*
- Martin Baxter and Andrew Rennie. *Financial Calculus: an Introduction to Derivatives pricing*

Course entrance requirements: Mathematics I (TI703/I) and Statistics (TI704)

Assessment: Written examination.

TI841 ADVANCED DYNAMIC PROGRAMMING

Lecturer: Prof.dr. W.J. den Haan (UvA)

Course description: The first part focuses on dynamic programming and shows how to prove existence and uniqueness of equilibrium. The second part focuses on numerical solution techniques to solve dynamic stochastic general equilibrium models. Key numerical tools such as function approximation and numerical integration are discussed. Several simple numerical techniques such as linearization and parameterized expectations will be discussed. After this two more general framework are developed. Those are perturbation and projection methods. The techniques taught are useful in many branches of our profession. Matlab programming exercises are an essential part of this course.

Literature: Selected papers.

Course entrance requirements: None.

Assessment: Sit-in written examination (75%) and take-home assignments (25%).

TI842 PUBLIC FINANCE

Lecturer: Prof.dr. B. Jacobs (EUR), Prof.dr. R.A. de Mooij (EUR) and Dr. J. Pereira (EUR)

Course description: This course gives an in depth introduction into the theory of optimal taxation and the new dynamic public finance. It will discuss the Ramsey principles for optimal commodity taxation and Mirrlees' (1971) non-linear income tax. In addition, the main theorems in public finance will be covered: the Atkinson-Stiglitz theorem on the desirability of commodity/capital taxation and the Diamond-Mirrlees production efficiency theorem. The main principles will then be applied to various topics such as optimal income redistribution, environmental taxation and the double dividend, education policies and redistribution, capital income taxation, government debt and fiscal policy, corporate income taxation, the marginal cost of public funds and the optimal provision of public goods.

Literature: A website with downloadable reading materials will be made available when the course starts.

Course entrance requirements: Microeconomics (TI701), Macroeconomics (TI702)
Assessment: Sit-in written examination (75%) and homework assignments (25%).

TI843 TOPICS IN INTERNATIONAL ECONOMICS

Lecturer: Prof.dr. S.J.G. van Wijnbergen (UvA) and Dr. L. Pozzi (EUR)

Course description: The course will cover two specialized topics:
1. Debt crises and the economics of sovereign debt renegotiations;
2. Balance of payment crises.

Literature: Selected papers.

Course entrance requirements:
Required: Macroeconomics IV (TI702/IV)
Recommended: Corporate Finance (TI731)

Assessment: Oral or sit-in written exam, depending on student numbers.

UA844 TOPICS IN MACROECONOMICS

Lecturers: Professor L. Christiano (Northwestern University) and Prof.dr. W.J. den Haan (UvA)

Course description: Advanced course on state of the art techniques and application in modern macroeconomics.

Literature: to be announced

Course entrance requirements: Macroeconomics (TI702)

Assessment: Paper.

UA845 SOLVING AND ESTIMATING DSGE MODELS WITH DYNARE

Lecturers: Professor M. Juillard (Université de Paris VIII) and Prof.dr. W.J. den Haan (UvA)

Course description: Starting at the basics this course teaches the students how to use the Dynare software package to solve DSGE models with perturbation techniques and estimate them using Bayesian econometrics.

Literature: to be announced

Course entrance requirements: Macroeconomics (TI702)

Assessment: Paper.

TI851 SPATIAL AND TRANSPORT ECONOMICS

Lecturers: Dr. H.L.F. de Groot (VU) and Prof.dr. E.T. Verhoef (VU)

Course description: This course covers advanced topics in theoretical and empirical research on spatial and transport economics. Key issues in the “spatial block” (4 lectures) are location and potential reasons for clustering of economic activity, patterns of regional economic convergence and divergence, the role of geographic factors in explaining regional economic growth performance, the impact of (spatial) externalities of knowledge production, urban size and growth, housing issues, the working of regional labour markets and unemployment, etc. Topics to be addressed in the “transport block” (3 lectures) include transport demand (including discrete choice analysis and dynamic aspects in consumer decision making) and transport supply (including cost functions and the economics of highway congestion analysis); market failures and government response in network markets; and second-best analysis and regulation. The course seeks a balance between theory and empirics, between analytical methodologies and policy analysis, and aims to integrate applied microeconomics and spatial and transport science.

Literature:
Compulsory:

- Brakman, Garretsen and Van Marrewijk (2001). *An Introduction to Geographical Economics*, Cambridge University Press
- Small, K.A. and E.T. Verhoef (2006). *The Economics of Urban Transportation*, Routledge
- Selected papers

Course entrance requirements:
Required: Microeconomics I, III and IV (TI701/I+III+IV), Macroeconomics I (TI702/I) and IV (TI702/IV)

Assessment: Sit-in written exam.

TI852 ENVIRONMENTAL AND RESOURCE ECONOMICS

Lecturers: Prof.dr. C.A. Withagen (VU) and Prof.dr. F. Van der Ploeg (UvA/Oxford University)

Course description: Trade Liberalization and Environmental Quality: Environmentalists have expressed strong criticism against the globalization of international trade, claiming that it has adverse side-effects in the form of a degradation of the environment. We study the conditions under which trade increases pollution in small open economies. Topics addressed are: -Pollution Haven Models of International Trade Is trade driven by environmental policy differences necessarily bad for the environment? Do rich countries benefit at the expense of poor countries? -Factor Endowments, Policy Differences and Pollution We explore the trade-off between factor endowments and endogenous environmental policies as causes for trade. -Is Free Trade Good for the Environment? Empirics The previous two topics give rise to (i) the pollution haven hypothesis and (ii) the factor endowment hypothesis. Both are simultaneously tested for.
The resource curse: Why do countries rich in natural resources varying from gold, silver, copper, diamonds, oil, gas etc. often have such a disastrous economic performance with very dire social consequences. Indeed, that is the plight of many economies in Africa, witness for example Congo and Nigeria. Still, other economies such as Botswana and Norway seem to fare relatively well. The lectures provide empirical evidence and also give theoretical insights on why some resource-rich economies do well and others do badly. We need to go further than the usual harmful Dutch disease effects originating from an appreciation of the real exchange rate, a decline of the traded sector and a loss in learning by doing, and consider political economy of rent grabbing, corruption and

conflict. In addition, we will cover how exhaustible natural resources may be transformed in to reproducible physical r human capital by saving the Hotelling rents on natural resources. The heorical underpinning, or lack of it, will be discussed as well. he course consists of four lectures on the issue of trade versus nvironment and three lectures on the resource curse.

Literature:
Compulsory:

- Copeland, B. R. and Taylor, M.S. (2003). *Trade and the Environment: Theory and Evidence*, Princeton University press, Princeton
- Barbier, E.B. (2005). *Natural Resources and Economic Developmen*t, Cambridge University Press, Cambridge.
- Ploeg F. van der (2007). *Challenges and Opportunities of Resource-Rich Economies*, Survey
- Various papers

Course entrance requirements: None.

Assessment: Take-home assignment.

TI861 ADVANCED INDUSTRIAL ORGANIZATION

Lecturers: Professor Ch. Fershtman (EUR/Tel Aviv University) and Prof.dr. J. Hinloopen (UvA)

Course description: A number of topics are discussed that currently are center stage in Industrial Organization. Although last-minute changes are always possible, due to the ever developing field, topics included typically are: dynamic R&D processes, product bundling, leniency programs, and research joint ventures. The latest relevant papers are discussed and some recent research is presented as well.

Literature: Selected papers.

Course entrance requirements: Microeconomics (TI701)

Assessment: Take-home assignment.

TI862 PUBLIC ECONOMICS

Lecturer: Prof.dr. F.A.A.M. van Winden (UvA)

Course description:
Apart from my introduction and lectures at the first two meetings, participants are expected to actively contribute to the meetings through the presentation of literature. Each meeting will be divided into two parts. For every part, a participant will be requested to introduce (summarize and criticize, in English) the article or book chapter(s) assigned to that part. After the introduction (max. 20 minutes), a general discussion follows and a positioning and evaluation of the paper on my part. Every participant is expected to prepare at least two questions regarding the paper discussed.
Speakers and discussants will be selected at the first meeting.

Literature:
1. Introduction and The Economics of Taxation I

- Salanié (2003), Ch. 1: Tax Incidence.
- Salanié (2003), Ch. 2: Distortions and Welfare Losses.

2. The Economics of Taxation II
   - Salanié (2003), Ch. 3: Indirect Taxation.
   - Salanié (2003), Ch. 4: Direct Taxation.

3. Economics of Government Decision Making
   - Persson and Tabellini (2000), Chs. 2 and 3: Tools of Political Economics.
   - Persson and Tabellini (2000), Chs. 6: General Interest Politics.

4. Citizen-Candidates and Common Agency
   - T. Besley and S. Coate, An economic model of representative democracy, QJE, 1997, 85-114.
   - G. Grossman and E. Helpman, Electoral competition and special interest politics, RES, 1996, 265-286.

5. Transmission of Information
   - J. Potters and F. Van Winden, Lobbying and asymmetric information, PC, 1992, 269-292.
   - S. Lohmann, A signalling model of informative and manipulative political action, APSR, 1993, 319-333.

   or:
   - B. Visser and O.H. Swank, On committees of experts, QJE, forthcoming.

6. Checks and Balances
   - T. Persson, G. Roland and G. Tabellini, Separation of powers and political accountability, QJE, 1997, 1163-1202.
   - D. Acemoglu, Why not a political Coase theorem?, JCE, 2003, 620-652

7. Behavioural and Computational Models of Collective Action
   - J. Bendor, D. Diermeier, and M. Ting, A behavioral model of turnout, APSR, 2003, 261-280.
   - V. Sadiraj, J. Tuinstra, and F. van Winden, A computational electoral competition model with social clustering and endogenous interest groups as information brokers, PC, 169-187.

Background literature:
- A.B. Atkinson and J.E. Stiglitz (1980). *Lectures on Public Economics*, McGraw-Hill
- G.D. Myles (1995). *Public Economics*, CUP
- B. Salanié (2003). *The Economics of Taxation*, MIT
- T. Persson and G. Tabellini (2000). *Political Economics*, MIT
- Drazen A. (2000). *Political Economy in Macroeconomics*, Princeton
- G. Grossman and E. Helpman (2001). *Special Interest Politics*, MIT
- J.J. Laffont (2001). *Incentives and Political Economy*, OUP
- D.C. Mueller (2003). *Public Choice III*, CUP
- D. Austen-Smith and J. Banks (1999). *Positive Political Theory, Vol. I: Collective Preferences*, *Vol. II: Strategy and Structure*, Ann Arbor

Entrance requirements: Microeconomics (TI701).

Assessment: Take-home exam.

TI863 LAW AND ECONOMICS

Lecturers: Prof.dr. G. Dari-Mattiacci (UvA) and Professor D. Demougin (European Business School)

Course description: Law and economics is an expanding field of research applying economic theory to the study of legal institutions and law. In recent years this approach has been enriched to encompass empirical analysis (Empirical Legal Studies) and has expanded into neighboring fields such as Law and Finance and Political Economics. This course provides with foundations of economic analysis of law, gives an overview of the top-of-the-agenda research topics and focuses on two fundamental areas of research: tort law and contract law. Tort law is the body of law regulating accidents and their consequences, while contract law determines the legal framework within which parties conclude and perform, renegotiate or breach contracts. Tort and contracts (together with the enforcement of property rights) provide for the necessary legal background for economic activities, which is often taken as granted in economic analyses. This course offers the students a possibility to look closer at these issues and relates to recent issues in policymaking.

Literature:

- Polinsky and Shavell (2007). *Handbook of Law and Economics*, Elsevier (only chapters on torts and contracts, available online on SSRN.com)
- Selected articles

Course requirements:
Recommended: Microeconomics II (TI701/II)

Assessment: Take-home assignment.

TI864 ORGANIZATIONAL ECONOMICS

Lecturers: Prof.dr. O. Swank (EUR) and Prof.dr. B. Visser (EUR)

Course description: This course focuses on decision-making processes in organizations. Information, communication and debate play central roles in organizational decision-making. Moreover, as many important decisions are made by experts, people who are appointed because of their decision-making competences, reputational concerns also play an important role. This courses looks at recent contributions to the emerging literature on organizational decision-making. Key words: cheap talk, hard and soft information, advisor models, voting, delegation, herding, cascading, communication, reputational concerns.

Literature: Selected papers.

Course requirements: Microeconomics I and II (TI701/I+II)

Assessment: Take-home exam (75%) and homework assignments (25%).

TI865 ADVANCED GAME THEORY

Lecturers: Dr. J.R. van den Brink (VU) and Dr. H.E.D. Houba (VU))

Course description: Several frontier topics in game theory related to bargaining, coalition formation and network formation are discussed on the basis of a mix between classic and recent articles. In the first part, strategic bargaining models of bilateral negotiations and (in)complete information are discussed. The link with cooperative or axiomatic bargaining theory is established. Computational aspects will also be addressed. In the second part, the extension to multilateral negotiations with complete information, (im)perfect contracts and externalities is made to study endogenous coalition formation and the division of the gains from cooperation. Some links between strategic bargaining and cooperative solution concepts is established. Cooperative solution concepts are also applied to explain endogenous coalition formation. In the final part, a mix of methods from both cooperative and strategic game theory is applied to analyze networks. We consider allocation problems among players that are related by some given network, and use the results obtained to explain the formation of such networks.

Literature: Selected papers.

Course requirements:
Required: Microeconomics II and III (TI701/II+III)
Recommended: Microeconomics I and IV (TI701/I+IV), Mathematics (TI703)

Assessment: Oral examination and take-home assignment (75%) and homework assignments (25%).

TI866 MARKET DESIGN (TINBERGEN INSTITUTE LECTURES 2009)

Lecturer: Professor S. Athey (Harvard University)

Course description: This course will describe recent developments in theoretical and applied market design. Topics to be covered are:

1. Auction theory, theory of platform competition
2. Econometric analysis of auction data
3. Government auctions of natural resources
4. Online auction-based marketplaces (eBay, online advertising)

Methods include theory, empirical analysis, and description of real-world market institutions.

Course entrance requirements:
Required: Microeconomics (TI701), Mathematics (TI703), Statistics and Econometrics (TI704+TI705)
Recommended: Topics in Advanced Microeconometrics (TI813), Applied Microeconometrics (TI821), Advanced Industrial Organization (TI861), Contract Theory (TI807/V)

Assessment: Paper (grading coordinated by Dr. A.M. Onderstal).

TI871 RISK AND RATIONALITY

Lecturer: Prof.dr. P.P. Wakker (EUR)

Course description: Risk and uncertainty are important in many decisions, and play a central role in insurance, finance, health economics, and many other domains. Psychologists have discovered many irrationalities in human behavior, such as those underlying the equity premium puzzle (underinvestments in stocks). Kahneman and Tversky (1979) introduced prospect theory, which provides analytical tools for integrating empirical psychological findings with economic models. The theory provided a rational model of irrational behavior, something considered impossible up to that point. In experiments, the risk attitudes of the participants will be measured, and the best-fitting model will be determined for each. Financial advises will be given, based on theoretical foundations, such as: do not insure low-cost risks such as bike-theft; (b) invest pension-savings in stocks and not in bonds. In summary, this course shows how to incorporate irrational psychological behavior in economic models. At the end of the course, partcipants will be able to apply the modern models for risk and uncertainty to economic problems.

Literature:
Recommended:

- Tversky & Kahneman (1981). *Science* 211, 453-458
- Tversky & Wakker (1995). *Econometrica* 63, 1255-1280
- Wakker, Thaler, & Tversky (1997). *Journal of Risk and Uncertainty* 15, 7-28
- A syllabus will be provided

Course entrance requirements: Mathematics I (TI703/I) and Statistics (TI704)

Assessment: Oral examination and homework assignment (to be handed in before the oral exam).

TI872 EXPERIMENTAL ECONOMICS

Lecturer: Prof.dr. J. Sonnemans (UvA) and Dr. A. Ule (UvA)

Course description: Experimental Economics studies economic behavior in a controlled, laboratory environment. This course intends to teach the student how to design an experiment aimed at answering a self-developed research question. In addition, it gives an overview of recent trends in Experimental Economics. The course will focus around a set of recent experimental papers and on experimental designs developed by the students. Each student is expected to actively participate in classes by presenting and discussing papers selected by the instructor and to develop an experimental design of her/his own.

Literature: Selected papers

Course entrance requirements: Microeconomics V (TI701/V)

Assessment: Take-home assignment.

UA873 NON-LINEAR ECONOMIC DYNAMICS (UvA code 80017)

Lecturer: Prof.dr. C.H. Hommes (UvA) and Dr. M. Anufriev (UvA)

Course description: This course focuses on mathematical modelling of nonlinear dynamic phenomena and its application to economics and finance. After the course students are able to analyze nonlinear dynamic models, compute steady states, analyze their stability, compute bifurcation values, detect periodic and chaotic solutions by computer simulations and interpret the numerical results. Students are able to apply nonlinear dynamical system techniques to dynamic economic models and read and critically evaluate literature on economic dynamics, in particular on behavioural models with boundedly rational agents.

Contents:
Analysis of non-linear dynamical systems with applications in economics and financial markets. Key topics include:
- stability of steady states;
- period doubling, saddle-node and Hopf bifurcations;
- periodic solutions, deterministic chaos and strange attractors;
- bounded rationality, expectations and learning;
- evolutionary dynamics
- interacting agents, complex adaptive systems in economics

Literature: Hommes, C.H., Anufriev, M. *Syllabus Nonlinear Economic Dynamics* (appr. 200 pp., appr. € 12,-; available at the Sefa desk)

Course entrance requirements:
Recommended: Mathematics (TI703); Knowledge of local stability of systems of difference equations.

Assessment: Sit-in written exam (3 hours; 50%, at least 5.0 required) and two additional take-home assignments (partly numerical computer work 50%).

UA874 BOUNDED RATIONALITY (UvA code 85010)

Lecturers: Dr. M. Anufriev (UvA)

Course description: The leading paradigm in economic theory assumes that economic agents (households, firms) are perfectly rational in making their decisions. Experimental evidence and common sense indicate that this assumption of rationality is much too demanding.
Alternatively, one can consider models of "bounded" rationality. In this course we will review some experimental evidence of bounded rationality and study two types of theoretical models of bounded rationality:
i) Learning models, where agents use time series observations on, for example, prices or interest rates, to make predictions about future realizations of these prices or interest rates.
ii) Evolutionary models, where agents can choose between different types of behaviour, and an evolutionary competition between these different types of behaviour (based upon their performance) determines which type of behaviour 'survive' in the long run.

Literature: Selected papers

Course entrance requirements:
Required: Microeconomics I and II (TI701/I+II)
Recommended: Experimental Economics (TI872)

Assessment:
Three written summaries: 25%
Oral presentation: 25%
Active participation: 25%
Final paper: 25%

TI881 RECENT HISTORY OF ECONOMICS

Lecturer: Prof.dr. J.B. Davis (UvA)

Course description: This course redevelops and extends our understanding of the historical approach to economics by examining the work of living economists and current theories from a specifically historical point of view. One effect of this change in focus is to treat current work as being in a process of development, as opposed to seeing it as the final outcome of a series of more or less failed efforts in the past. Another effect is to understand current work 'laterally' or in the context of its overall development (including that in other disciplines), as opposed to seeing it as the development of a set of relatively independent disciplinary research threads. A further effect of the change in focus is to emphasize the history of science perspective on the history of economics, that is, the social historical factors involved in the development of economics.
This course examines the transformation of economics since the 1980s when the then dominant neoclassical research programme first began to break-up, leading to the emergence of a collection of different competing research programmes associated with such new developments as game theory, bounded rationality, evolutionary economics, experimentalism, behavioural economics, computational economics, etc. The period since roughly 1980 exhibits a specific type of phase in the development of economics, which might be characterized as pluralistic and transitional between relatively dominant approaches. The twentieth century interwar period is recognized by many historians of economics to be the last such transitional phase, but these transitional phases have occurred throughout the history of economics.
That the transitional phase under investigation in this course is on-going creates the opportunity for a forward-looking rather than retrospective evaluation of the theme of transitional development in economics. Accordingly the course places special emphasis on the field of economics methodology in explaining and evaluating the different research programmes that are examined. Methodology concepts and reasoning will be applied and introduced in connection with the historical discussion.

Literature: Selected papers and lecture notes.

Course entrance requirements:
Required: Microeconomics II (TI701/II) and Macroeconomics II (TI702/II)
Recommended: Microeconomics I (TI701/I)

Assessment: One take-home essay assignment on a recent development in the literature approached in a specifically historical manner. Students are encouraged to integrate this essay with their other course work and planned thesis work. Individual consultation with the instructor regarding the topic and approach should precede the writing of the essay.

Appendix I. Teaching associates 2008/2009

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Professor S. Athey (Harvard University)

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