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PRESENTATION

Founded in 1966, the **CENTER FOR OPERATIONS RESEARCH AND ECONOMETRICS (CORE)** is an interdisciplinary and interfaculty research center of the Université catholique de Louvain. At the initiative of the University, CORE became an "interdisciplinary research institute" of UCL by signing official collaboration agreements with the Department of Economics, the Department of Mathematical Engineering, the Department of Administration and Management, and the Institute of Statistics. These agreements reinforce the role of CORE to develop and promote knowledge and research in its fields of expertise, at the service of the University community.

This year CORE commemorated its 40th anniversary by organizing a scientific festival over the course of the entire year. The focus of the celebrations was the week of May 29 - June 2, of the CORE 2nd Summer School on "Heterogeneity in Social Organizations", which featured the lectures by three invited distinguished speakers: Steven DURLAUF (University of Wisconsin), Matthew JACKSON (Stanford University) and John ROEMER (Yale University), and 36 young scholars from Belgium, France, Germany, Great Britain, Israel, Italy, Portugal, Russia, Spain, Sweden, Ukraine, and USA, as well as 86 participants. Following the Summer School, CORE held the one-day celebration "CORE 40th Anniversary: Past, Present, Future" attended by 141 former and current CORE visitors, students, faculty and staff. This event included presentations by former CORE Research Directors, Paul CHAMPSAUR (Autorité de régulation des communications électroniques et des postes, Paris), George NEMHAUSER (Georgia Institute of Technology, Atlanta), Jean-François RICHARD (University of Pittsburgh), and, former visitor, Jean-Charles ROCHET (Université de Toulouse), and former Ph.D. student, Antonio DE LECEA (Directorate-General for Economic and Financial Affairs, European Commission). The evening session offered the roundtable "Research and Higher Education in Economics" led by CORE founder, Jacques DRÈZE, and features the presentations by Jacques CRÉMER (Director of the Industrial Economic Institute (IDEI) in Toulouse), the former Catalan Minister and the President of the European Economic Association, Andreu MAS-COLELL, (Universitat Pompeu Fabra, Barcelona) and the former President of the European Economic Association, Mathias DEWATRIPONT (Université Libre de Bruxelles). The other events of the CORE 40th celebration include the conferences on

- Equilibrium modelling of electricity
- Intergenerational equity in climate negotiations, overlapping generations models and social welfare
- Optimization in engineering
- Mixed integer and integer programming – The way forward
- Challenges of multilingual societies
- Cities and globalization
- Stability in competition : Hotelling's legacy and its future challenges of multilingual societies
- The CORE Lecture Series on "Mixed integer linear programming" by Robert WEISMANTEL, Universität Magdeburg, Germany, and
- Macrodynamics, technological change and the environment

While celebrating its success and achievements, CORE continues to be committed to its development and growth. We are pleased to reaffirm this commitment by adding promising young scholars to its staff. During this academic year, we welcome new UCL professors as

permanent CORE members: Christian HAFNER, an expert in econometrics and statistical methods, and Hylke VANDENBUSSCHE, who specializes in international trade, trade policy and tax competition.

In accordance with CORE's main objectives, the description of the activities in 2005-2006 is divided into three main categories.

RESEARCH

The first category contains the research output in the CORE central research areas: economics and game theory, econometrics and operations research. Hundred seventeen discussion papers have appeared and are described below by research disciplines. Interactive research in these disciplines, unified by mathematical modeling and reasoning, has generated new theoretical results and offered applications in the fields of mathematical engineering, economics and management, the main targets of CORE activities. In industrial economics and public policy, CORE members have considered a broad variety of topics including basic oligopoly theory, mergers, optimal taxation, regional tax policy, design of health schemes, industry dynamics, research and development, and regulation. Game theoretic and political economy issues have been investigated, including the effects of informational asymmetry and of the heterogeneity among individuals. In game theory, there were advances in stability of Nash equilibrium and learning dynamics, stochastic games, bargaining theory, and various foundational aspects. The developments in general equilibrium models have considered informational and market incompleteness, as well as institutional aspects in the dynamic setting. The utilization of overlapping generations growth models yielded a series of contributions concerning macroeconomic policy. In econometrics, new models and inference procedures for financial volatility have been studied. Several contributions have been obtained in the field of optimization: in the field of (mixed) integer programming, problems related to production and logistics have been studied, while in the case of convex programming, research has been focussed on efficient schemes to solve certain classes of large-scale problems. The CORE members were in the forefront of a major expansion of research activity in the field of economic geography, involving many issues of both theoretical and empirical interest, such as the strategic location of firms, agglomeration, regional economic cycles, and regional trade and specialization. This part of the CORE research agenda plays an important role in the ARC project "Economic analysis of heterogeneity in social organizations" which is supported by the Research Council of the Université catholique de Louvain and financed by the Belgian French-speaking Community. The project's focus is on theoretical and empirical facets of individual and group heterogeneity in various economic, political and social settings and it naturally builds upon two previous ARC projects carried out at CORE "Geography, regional economics and fiscal federalism" and "Models with asymmetric information: theory and applications".

SCIENTIFIC EXCHANGES AND EXTERNAL LINKS

An essential part of CORE activities centers on developing inter-university and international scientific exchanges and collaborations. Since its foundation, CORE has always benefited from the CORE membership of academics and researchers of other neighboring universities. This important collaboration is actively maintained and reinforced. These exchanges are also promoted by the fellowship and visiting professorship programs offering support for periods of two to twelve months to foreign visitors, an office for short and regular visits to professors from UCL and other nearby universities, and by the short-term visitors coming either to present their work at one of the four weekly research seminars, or to participate in CORE workshops or conferences, or simply to work with a co-author. The list of all visitors, either long or short term, and of all research seminars organized in 2005-2006 can be found in this report. These activities are supported by CORE's participation in many cooperative programs and research contracts that are financed either by the University, the Belgian Federal Government, the Belgian French-speaking Community, by the European Commission or Industry. In particular, CORE serves as the coordinator of an inter-university program (PAI) involving four universities (Université catholique de Louvain, Katholieke Universiteit Leuven, Facultés Universitaires Notre-Dame de la Paix, Namur and Gent Universiteit) which is supported by the Belgian Federal Government (this and all other contracts are listed below in this report). An important part of the CORE international activities has been driven by an increasing degree of collaboration with institutions and scholars in Central and Eastern Europe. CORE was instrumental in providing its support for the bilateral exchange agreement between the Université catholique de Louvain and the Higher School of Economics in Moscow, one of the leading Russian economic centers. CORE facilitated the visits by scholars from Warsaw School of Economics, Central European University (Budapest) and New Economic School (Moscow), whereas the CORE members visited those and other institutions in the Central and Eastern Europe. While this exchange is highly beneficial for those institutions, CORE can enhance its own research agenda by receiving an access to a largely untapped pool of talent and expertise.

EDUCATION

An important facet of CORE activities is educational. It is CORE's fundamental responsibility to transfer its knowledge to the younger generation, and to provide scientific training to young researchers in its areas of specialization by means of seminars, workshops, conferences and participation to education programs and networks. CORE will serve as the host institution for the Early Stage five-year Training Marie Curie project "Public Policy, Market Organization and Transition Economies" to be carried out in cooperation with the Central European University in Budapest and the Center for Economic Research and Graduate Studies at Charles University in Prague, and is supported by the European Commission. The aim of the project is to prepare students for careers in teaching, research and government services. The program is designed to ensure that the students from various regions, especially from the new member states of the European Union, acquire rigorous and state of the art knowledge of core areas of economic theory and research methodology and to offer the students research opportunities

under close supervision. This extension of CORE educational activities is naturally linked to its previously established ties with the Warsaw School of Economics. CORE devotes a large part of its resources and efforts to its educational mission and the Doctoral Courses in "Discrete Systems and Optimization" organized by the Ecole Polytechnique de Lausanne, the Institut Polytechnique de Grenoble, CORE, Université catholique de Louvain and the Computer Science Department of Universität zu Köln is a remarkable example of the activities listed in the report. Some fifty students are completing their doctoral studies under the supervision of CORE members, and benefit from CORE's facilities. Nine Ph.D. theses have been defended under the supervision of a CORE member. CORE doctoral students acquire a good position on various job markets. In this respect, an important role is played by the European Doctoral Program in Quantitative Economics, a doctoral network involving several European universities: the Rheinische Friedrich-Wilhelms-Universität Bonn, the Ecole des Hautes Etudes en Sciences Sociales (Paris), the London School of Economics, the Universitat Pompeu Fabra (Barcelona), the European University Institute in Florence and an association with the University of Tel Aviv. The Marie Curie program, EDNET, has provided funding for 21 Ph.D. students to visit CORE for a period of up to one year, to take advanced courses and conduct research with CORE members.

We are all aware that the support of Université catholique de Louvain is indispensable in helping to maintain such a stimulating and exceptional research environment and I am grateful for the university contribution. The last, but definitely not the least, comment comes to reinforce that obvious. All the activities listed in this report would not be possible without the dedicated work of all CORE's permanent staff, both academic and administrative. They are all warmly thanked for their continuing efforts. I want to extend my personal gratitude to the administrative staff of CORE for their exceptional loyalty to the challenges of this institution. At the end of my two-year stay as the Research Director, I must say that I tremendously enjoyed working with the CORE administrative staff and benefiting from their unmatched competence and dedication. I wish to thank all CORE family for those two years.



Shlomo Weber

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PERSONNEL

- MANAGEMENT
- THE FACULTY
- ADMINISTRATIVE STAFF
- DOCTORAL STUDENTS
- VISITING FACULTY MEMBERS AND RESEARCH FELLOWS
- ASSOCIATE FELLOWS AND RESEARCH ASSOCIATES
- SHORT TERM VISITORS
- FELLOWS AND VISITING FACULTY MEMBERS FOR 2006-2007
- OTHER ITEMS

▪ MANAGEMENT

Officers for the period covered by this report:

President	Jacques THISSE
Research Director	Shlomo WEBER
Co-directors	Jean HINDRIKS Laurence WOLSEY
Administrative Director	Sheila WEYERS

▪ THE FACULTY

During the academic year 2005-2006, the permanent staff of CORE consisted of **FACULTY MEMBERS** of the Université catholique de Louvain (UCL), Katholieke Universiteit Leuven (KUL), the Université Libre de Bruxelles (ULB), the Facultés Universitaires Saint-Louis, Bruxelles (FUSL), the Université de Liège (ULG), the Facultés Universitaires Notre-Dame de la Paix, Namur (FUNDP) and the Université de Lille III (France).



ANTON BARTEN

Professor emeritus, Katholieke Universiteit Leuven and Université catholique de Louvain.

Ph.D. (economische wetenschappen), Nederlandse Economische School, Rotterdam, 1996.

Visiting professor, University of California, Berkeley, 1962-1963; University of Wisconsin, Madison, 1963; University of Pennsylvania, Philadelphia, 1964; University of Chicago, 1969-1970.

Econometrics and macroeconomic models.

Fellow of the Econometric Society; member of the International Statistical Institute; corresponding member of the Royal Netherlands Academy of Sciences; foreign member of the Royal Belgian Academy of Sciences.

LUC BAUWENS

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, Département des sciences économiques).

Docteur en sciences économiques, Université catholique de Louvain, 1983.

World Bank, 1983-1984; senior researcher at Facultés Catholiques de Mons, 1984-1987; senior lecturer at Ecole des Hautes Etudes en Sciences Sociales (EHESS), Marseille, 1987-1991.

Econometrics and statistics.

Leonard J. Savage Thesis Award, 1984.

Associate editor, *Computational Statistics, Empirical Economics, Journal of Applied Econometrics, Journal of Financial Econometrics, Risk Letters*.



PAUL BELLEFLAMME

Associate professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, IAG-Louvain School of Management).

Docteur en sciences économiques, Facultés Universitaires Notre-Dame de la Paix, Namur, 1997.

Facultés Universitaires Notre-Dame de la Paix, 1997-1999; University of London, 1999-2002.

Associate editor, *Information Economics and Policy*, Member of the editorial board, *Regards Economiques*.

Microeconomics (industrial organization, game theory).

Research affiliate, Center for Economic Studies and Ifo Institute for Economic Research (CESifo).



RAOUF BOUCEKKINE

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, Département des sciences économiques).

Docteur en sciences économiques, Université Paris I, 1993.

Assistant professor, Universidad Carlos III de Madrid, 1993-1997.

Associate professor, Universidad Carlos III de Madrid, 1997-1998.



Visiting professor, Université Louis Pasteur de Strasbourg, 2000-2003; Katholieke Universiteit Leuven, 2001 to 2005; HEC-Paris, 2003 to present.

Mathematical and computational methods in economics, growth theory and development, economic and mathematical demography.

Associate editor, *Journal of Public Economic Theory* and *Investigaciones*.



THIERRY BRÉCHET

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, IAG-Louvain School of Management).

Docteur en sciences économiques, Université Paris I, Panthéon-Sorbonne.

Holder of the Chair Lhoist Berghmans in Environmental Economics and Management.

Applied general equilibrium modeling and environmental economics.



LAURENCE BROZE

Professor, Université de Lille III; Vice-president in charge of research 2000-2006.

Director of GREMARS, Lille III, 1995-2001.

Docteur en sciences mathématiques, Université Libre de Bruxelles, 1986.

Research fellow, Université Libre de Bruxelles, 1985-1989; associate professor, Université de Lille III Charles-de-Gaulle, 1989-1995.

Member of the editorial board, *Annales d'économie et de statistique* and *Recherches économiques de Louvain*.

CLAUDE D'ASPREMONT

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, Département des sciences économiques) and Facultés universitaires Saint-Louis, Bruxelles.
Ph.D. (decision sciences), Graduate School of Business, Stanford University, 1973.

Part-time professor, Facultés Universitaires Saint-Louis, Bruxelles.

Visiting professor, Université d'Aix Marseille III, 1984-1996; Université Louis Pasteur, Strasbourg, 1988-1999; Ecole Polytechnique, Paris, 1995; visiting scholar, Graduate School of Business, Stanford, Summer 1987 and Spring 1995.

Mathematical economics, social choice theory, industrial organization.

Chairman of the economics department, Université catholique de Louvain, 1991-1994; research director, CORE, 1995-1998; fellow of the Econometric Society, 1984; Francqui Prize 1995; Doctor Honoris Causa, Université Louis Pasteur, Strasbourg, 2002.

Associate editor, *Games and Economic Behavior*, *Journal of Mathematical Economics*, *Social Choice and Welfare*, *Journal of Public Economic Theory* and *Revue de philosophie économique*; past associate editor, *European Economic Review* and *Journal of Economics/Zeitschrift für Nationalökonomie*.



PIERRE DEHEZ

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, Département des sciences économiques).

Docteur en sciences économiques, Université catholique de Louvain, 1980 (European Doctoral Program).

Professor, European University Institute, Florence (1983-1990) and Erasmus University Rotterdam (1991-1992); visiting professor, University of Illinois; Facultés Universitaires Notre-Dame de la Paix (Namur); Université de Cergy-Pontoise, Université Louis Pasteur (Strasbourg).

Microeconomics, general equilibrium theory.

Chairman, Department of Economics, Université catholique de Louvain, 1994-2000; European University Institute, 1985-1987 and 1989; Prorector in charge of the sector of human and social sciences, Université catholique de Louvain, 2001-2004.





DAVID DE LA CROIX

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, Département des sciences économiques).

Docteur en sciences économiques, Université catholique de Louvain, 1992.

Research fellow, University of Maastricht, 1992; visiting professor, University of California at Los Angeles, 2000-2001.

Francqui Chair, Gent Universiteit, 2004. Chercheur qualifié honoraire, Fonds National de la Recherche Scientifique (FNRS).

Growth theory, human capital and demography, overlapping generations.

Associate editor of the *Journal of Economic Dynamics and Control*, member of the Editorial Board, *Clometrica*, *Louvain Economic Review*.



MATHIAS DEWATRIPONT

Professor, Université Libre de Bruxelles; research director of the Centre for Economic Policy Research (CEPR), London, 1998-.

Ph.D. (economics), Harvard University, 1986.

Part-time visiting professor, Massachusetts Institute of Technology, 1998-.

Economic theory and applications.

Fellow of the Econometric Society; Francqui Prize, 1998; Jahnsson

Medal 2003; President of the European Economic Association, 2005.



JACQUES DRÈZE

Professor emeritus, Université catholique de Louvain.

Ph.D. (economics), Columbia University, 1958.

Visiting professor, Carnegie Institute of Technology, 1957-1958;

Northwestern University, 1962; University of Chicago, 1963-1968;

holder of the Chaire Francqui, Université Libre de Bruxelles, 1970-

1971 and Katholieke Universiteit Leuven, 1982-1983; Andrew D.

White professor at large, Cornell University, 1971-1977.

Economic theory and econometrics.

President of the Econometric Society, 1970; president of the European Economic Association, 1985-1986; president of the International Economic Association 1996-1999; fellow of the Econometric Society.

LOUIS EECKHOUDT

Professor emeritus, Facultés Universitaires Catholiques de Mons.

Ph.D. (economics), Michigan State University, 1970.

Decisions under risk and health economics.

Associate editor of the *Geneva Papers on Risk and Insurance – Theory*.



JEAN J. GABSZEWICZ

Professor emeritus, Université catholique de Louvain.

Docteur en droit, Université catholique de Louvain, 1961; Docteur

en sciences économiques, Université catholique de Louvain, 1968.

Visiting professor, Polish Academy of Sciences, 1972; University of

Tel-Aviv, 1973; Université de Paris IX (Dauphine), 1973; Université

d'Aix-Marseille, 1973; Université de Paris XII, 1979; Université

d'Aix-en-Provence, 1981; Université de Lyon, 1981; Université de

Strasbourg, 1982; Université de Dijon, 1983; Institut Universitaire Européen, Florence, 1984;

Université de Paris I, 1999-2000, Université de Paris II, 1999-2001.

Economic theory.

Fellow of the Econometric Society; administrator of CEPREMAP (Paris); member of the Council of the European Economic Association, 1986-1989; Doctorat Honoris Causa, Université d'Aix Marseille II, 2003.

Associate editor *Journal of Economics* and *Ricerche Economica*; past associate editor *Journal of Economic Theory* and *European Economic Review*.





VICTOR GINSBURGH

Professor emeritus, Université Libre de Bruxelles.
Docteur en sciences économiques, Université Libre de Bruxelles, 1972, co-director of ECARES.
Researcher, Yale University, 1975; visiting professor, Université catholique de Louvain, 1973, 1978 and 1985; University of Virginia, 1979; Université Paris I (Panthéon-Sorbonne), 1986-1987 and 1991-1992; Université Paris II (Panthéon-Assas), 1986-2004; Université

d'Aix-Marseille, 1986-1989; holder of the Chaire Francqui, Université de Liège, 1992-1993; University of Chicago, 1996.

Economic theory and cultural economics.

President of the International Association of Cultural Economics, 2002-2004. Co-editor, *Journal of Wine Economics*; associate editor, *Recherches économiques de Louvain*, *Journal of Cultural Economics*; past associate editor, *Annales d'économie et de statistique* and *European Economic Review*.



PIERRE GIOT

Associate professor of finance, Facultés Universitaires Notre-Dame de la Paix, Namur.

Ingénieur civil en électronique, Université catholique de Louvain, 1993. Ph.D. in Economics (financial econometrics), Université catholique de Louvain, 1999.

Assistant professor at the Department of Quantitative Economics, Universiteit Maastricht, 2000-2001; visiting professor at Université

catholique de Louvain, 2000-present and at Université Paris I (Panthéon-Sorbonne), 2002.

Financial econometrics, modeling volatility and risk, market microstructure, venture capital economics.



FRANÇOIS GLINEUR

Associate professor, Université catholique de Louvain (Faculté des sciences appliquées, Département d'ingénierie mathématique).

Docteur en sciences appliquées, Faculté polytechnique de Mons, 2001.

Optimization (algorithms and modeling, in particular convex optimization, conic optimization, duality and interior-point methods).

ISABEL GRILO

Associate professor, Université de Lille III. Principal Administrator, European Commission (Enterprise Directorate-General), 2000-present.

Docteur en sciences économiques, Université catholique de Louvain, 1994 (European Doctoral Program).

Visiting professor, Université catholique de Louvain, 1994-2001 (Institut d'Administration et de Gestion).

Economic theory, industrial organization.



CHRISTIAN HAFNER

Professor, Université catholique de Louvain (Institut de statistique).

Docteur en sciences économiques, Humboldt-Universität zu Berlin, 1996.

Postdoctoral fellow at CORE, 1996-1997; Research associate at Humboldt-Universität zu Berlin, 1997-1998; Chief analyst at Electrabel, Louvain-la-Neuve, 1999-2003; Assistant professor at Erasmus Universiteit Rotterdam, 2002-2005.

Econometrics and statistics.

Associate editor, *Computational Statistics*.



JEAN HINDRIKS

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, Département des sciences économiques).

Docteur en sciences économiques, Facultés Universitaires Notre-Dame de la Paix, Namur, 1996.

University of Essex, 1997-1998; University of Exeter, 1998-2000; Queen Mary College, University of London, 2000-2002.



Public economics and political economy.

Associate editor, *European Journal of Political Economy* and *Fiscal Studies*.



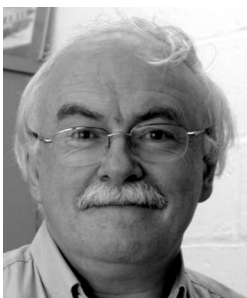
SÉBASTIEN LAURENT

Associate professor of Econometrics, Facultés Universitaires Notre-Dame de la Paix, Namur.

Ph.D. in Financial Econometrics, Universiteit Maastricht, 2002.

Visiting professor at Université catholique de Louvain, 2001-present.

Financial econometrics, modeling volatility and risk, computational econometrics.



ETIENNE LOUTE

Professor, Facultés Universitaires Saint-Louis, Bruxelles.

Docteur en sciences appliquées, Université catholique de Louvain, 1976.

Visiting professor, Brookhaven National Laboratory, 1977; IIASA (Vienne), 1979; Ecole des Hautes Etudes Commerciales (Montréal), 1981; Université de Genève, 1992; Université de Savoie, 1992-2004; National University of Vietnam, Ho Chi Minh City, Vietnam, 1998-2002.

Mathematical programming: algorithmic and implementation issues; management and engineering applications of mathematical programming.

Dean of the Faculté des sciences économiques et politiques, Facultés Universitaires Saint-Louis, Bruxelles, 1993-1996; member of SOGESCI (Société Belge pour l'Application des Méthodes Scientifiques de Gestion), INFORMS, SIAM and Mathematical Programming Society.



FRANÇOIS MANIQUET

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques).

Chercheur qualifié honoraire, Fonds National de la Recherche Scientifique (FNRS).

Docteur en sciences économiques, Facultés Universitaires Notre-Dame de la Paix, Namur, 1994.

Member of the School for Social Science, Institute for Advanced Study, Princeton, 2001-2002.
 Microeconomic theory (social choice theory, public economics and game theory).
 Editor, *Social Choice and Welfare*.

JEAN-FRANÇOIS MERTENS

Professor, Université catholique de Louvain (Faculté des Sciences, Département de mathématique).

Docteur en sciences, Université catholique de Louvain, 1970.

Visiting professor, Universität Heidelberg, 1970; Hebrew University of Jerusalem, 1970; University of California, Berkeley, 1971 and 1972-1975; Universität Bielefeld, 1972; Harvard Business School, 1981; leading professor of economics and of applied mathematics,

S.U.N.Y. at Stony Brook, 1989-1992; The Hebrew University of Jerusalem, 2001.

Fellow of the Econometric Society.

Past editor, *Journal of Mathematical Economics*; *International Journal of Game Theory and Economic Theory*.



MICHEL MOUCHART

Professor emeritus, Université catholique de Louvain.

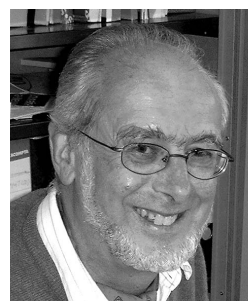
Docteur en sciences économiques, Université catholique de Louvain, 1972.

International professor CIENES, Santiago, Chili, 1966-1967; visiting professor, University of Chili, 1967-1968 and 1994-1996; University College, London, 1976; Université de Strasbourg, 1981; Indian Statistical Institute, 1982; Université d'Aix-Marseille, 1982; Università

di Bologna, 1984; Carnegie-Mellon University, 1985; Université des Sciences Sociales de Toulouse, 1991-1993; Université de Paris I (Panthéon-Sorbonne), 1993-1994.

Statistics and econometrics.

Member of the International Statistical Institute, Bernoulli Society, Société Belge de Statistique.





YURII NESTEROV

Professor, Université catholique de Louvain (Faculté des sciences appliquées, Département d'ingénierie mathématique).

Doctor in applied mathematics, Institute of Control Sciences, Moscow.

Research associate, Central Economic and Mathematical Institute of the Russian Academy of Science, Moscow, 1977-1992; visiting professor, Université de Genève, 1992-1993.

Convex and nonlinear optimization, approximate solution of combinatorial problems, polynomial optimization, static and dynamic transportation networks, numerical analysis, equilibrium in economic models.



DOMINIQUE PEETERS

Professor, Université catholique de Louvain (Faculté des Sciences, Département de géographie).

Docteur en sciences appliquées, Université catholique de Louvain, 1980.

Post-doctoral fellow, McMaster University, Hamilton, Ontario, 1982; visiting professor, Université du Québec, Montréal, 1986; Université de Bourgogne, 1991; Université de Tsukuba, 1996-1997.

Location theory, economic geography, regional science, mathematical programming, operations research.



PIERRE PESTIEAU

Professor, Université de Liège.

Ph.D. (economics), Yale University, 1971.

Assistant professor, Cornell University, 1971-1976.

Population economics and public economics.

Franqui Prize 1989.

Co-editor, *Journal of Public Economics*; associate editor, *Journal of Public Economic Theory*, *Journal of Population Economics*, *Finanz-Archiv* and *Economica*.

YVES POCHE

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, IAG Louvain School of Management); co-director of CORE, 1992-1998, director of CORE, 2000-2003.

Docteur en sciences appliquées (recherche opérationnelle), Université catholique de Louvain, 1987.

Operations research: mathematical programming, integer program-

ming and polyhedral combinatorics; production planning and sequencing, supply chain planning.

Administrator of the Belgian Operations Research Society (SOGESCI-BVWB), 1989-present, Administrator of the Belgian Operations Research Society (SOGESCI-BVWB), 2005-present.



LÉOPOLD SIMAR

Professor, Université catholique de Louvain (Institut de Statistique) and Facultés Universitaires Saint-Louis.

Docteur en sciences appliquées (mathématiques appliquées), Université catholique de Louvain, 1974.

Visiting professor, Cornell University, 1974; IDEI, Université des Sciences Sociales, Toulouse, 1991-2006; Institut für Statistik und Ökonometrie, Humbolt Universität, Berlin, 1993-2003; Department

of Economics, Texas University at Austin, 1995-2005; Department of Economics, Rice University, Texas, 1996, 1998; Australian National University, Canberra, 1999; Department of Economics, Universität of Mainz, 2002-2004; University of Pisa, 2003-2006; University of Bologna, 2006; ENSAI, Rennes, 1999-2001; ENSAE, Paris, 2001-2006; IFP, Rueil, 1991-2006.

Mathematical statistics, nonparametric statistics, resampling methods, production frontier.

Elected member of the ISI (International Statistical Institute); Dean, Faculté des sciences économiques, sociales et politiques, Facultés Universitaires Saint-Louis, Bruxelles, 1978-1990; Founder-Chairman, Institut de statistique, Université catholique de Louvain, 1992-2004; Past President of the Belgian Statistical Society, 1991-2001.

Associate editor of the *Journal of Productivity Analysis*.





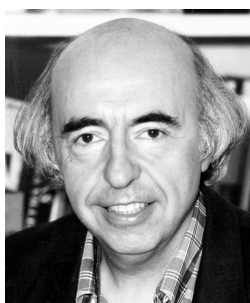
YVES SMEERS

Professor, Université catholique de Louvain (Faculté des sciences appliquées, Département d'ingénierie mathématique).
Master of Science (industrial administration) and Ph.D. (operations research), Carnegie-Mellon University, 1972.
Computational economics in network based industries.
European editor, *Energy Journal*; associate editor, *Energy Economics*.



FRANS SPINNEWYN

Professor, Katholieke Universiteit Leuven.
Ph.D. (economics), London School of Economics, 1975.
Chercheur qualifié, Nationaal Fonds voor Wetenschappelijk Onderzoek, 1977-1979; assistant, Katholieke Universiteit Leuven, 1979-1983; visiting professor, Cornell University, 1985.
Microeconomics.
B.A.C. prize, 1976.



JACQUES THISSE

Professor, Université catholique de Louvain (Faculté des sciences économiques, sociales et politiques, Département des sciences économiques).
Docteur en sciences économiques, Université de Liège, 1975.
Visiting professor, McMaster University, 1981; University of Pennsylvania, 1985; INSEAD, 1987; Virginia Polytechnic Institute, 1990; Université de Paris I (Panthéon-Sorbonne), 1991-1996.

Fellow of the Econometric Society and of the Regional Science Association International.
Associate editor, *Journal of the European Economic Association*, *Japanese Economic Review*, *Journal of Industrial Economics*, *Journal of Economics and Management Strategy*, *Regional Science and Urban Economics* and *Journal of Economic Geography*.

HENRY TULKENS

Professor emeritus, Université catholique de Louvain.
Dr. jur., Katholieke Universiteit Leuven, 1960; Docteur en sciences économiques, Université catholique de Louvain, 1968.

Visiting professor, Université d'Aix-Marseille II, 1971; Université libre de Bruxelles, 1971-1972 and 1973-1974; Princeton University, 1973 and 1983; Stanford University, 1973 and 1979; Hebrew University of Jerusalem, 1976 and 1981; Université Laval, 1977; Université de Paris

XII, 1978; Université de Montréal, Montréal, 1985; Beijer Institute of Ecological Economics, Stockholm, 1992 and 1993; Fondazione ENI Enrico Mattei, Milan, 1993; Ecole Nationale de la Statistique et de l'Administration Economique, Paris, 1995; International Monetary Fund, Washington, 1997 and 2004; Université de Paris I (Panthéon-Sorbonne), 2003; University of the South Pacific, Suva, Fiji, 2004.

Economic theory and public finance.

Dean, Faculté des sciences économiques, sociales et politiques, Facultés Universitaires Saint-Louis, Bruxelles, 1970-1974; president, Institut des sciences économiques, Université catholique de Louvain, 1978-1981; vice-president, International Institute of Public Finance, 1994-2000; General secretary of the European Economic Association, 1998-2004.



SÉBASTIEN VAN BELLEGEM

Associate professor, Université catholique de Louvain (Institut de statistique).

Docteur en sciences statistiques, Université catholique de Louvain, 2003.

Statistics and econometrics (semi- and nonparametric statistics, microeconometrics, time series).



HYLKE VANDENBUSSCHE

Professor, Université catholique de Louvain (Chaire Jacquemin, Département des sciences économiques).

Ph.D. in Economics, University of Antwerp.

Lecturer in Industrial Economics, Judge Institute of Management of the University of Cambridge (United Kingdom), 1994-1996;



postdoctoral researcher, Belgian Fund for Scientific Research, 1996-1999; professor in Applied Economics, Katholieke Universiteit Leuven, 1999-2005; visiting professor, Dartmouth College (USA), 2000-2001 and 2003-2004.

Vereniging voor Economie Vlaanderen (VEV-Award), 1999; panel member of economic policy; scientific committee Midwest International Trade meetings, US and European Trade Study Group.



VINCENT VANNETELBOSCH

Chercheur qualifié du Fonds National de la Recherche Scientifique (FNRS) and associate professor, Université catholique de Louvain (Département des sciences économiques).

Docteur en sciences économiques, Université catholique de Louvain, 1996.

Extramural Fellow of METEOR, Universiteit Maastricht, 2003-present; associate fellow of CEREC, Facultés Universitaires Saint-Louis,

Bruxelles, 2005-present; director of the European Doctoral Program in Quantitative Economics, 2004-present.

Game theory and industrial organization.



TANGUY VAN YPERSELE

Professor, Université de la Méditerranée, Aix-en-Provence.

Docteur en sciences économiques, Université catholique de Louvain, 1997 (European Doctoral Program).

BAEF fellow and visiting scholar Harvard University, 1997-1998.

Assistant professor, Tilburg University, 1999; associate professor, Facultés Universitaires Notre-Dame de la Paix, Namur, 1999-2003.

Public economics, international economics, law and economics.

Fellow Belgian-American Educational Foundation.

XAVIER WAUTHY

Professor, Facultés Universitaires Saint-Louis, Bruxelles.
 Docteur en sciences économiques, Université catholique de Louvain, 1995.
 Research fellow, Maastricht Universiteit, 1996; chargé de recherches, Fonds National de la Recherche Scientifique (FNRS), 1997-1998; visiting professor, Université catholique de Louvain, 1999-.
 Industrial organization, microeconomic theory.
 Member of the editorial board, *Recherches économiques de Louvain*.



SHLOMO WEBER

Robert H. and Nancy Dedman Professor of Economics, Southern Methodist University, Dallas, USA.
 Ph.D. Hebrew University of Jerusalem, 1979.
 Humboldt Fellow, Universität Bonn, 1980-1981; Lecturer, University of Haifa, 1981-1984; Professor of Economics, York University, 1986-1992; visiting professor, Yale University 1984, Universität Bonn, 1986-1987, Université Libre de Bruxelles, 1987, GREQAM, 1994
 University of Venice 1995, Hitotsubashi Institute for Economic Research, 2000, UCL, 2000-2001 and CORE Research Director, 2004-2006, University Paris II, 2003, University of Toulouse, 2004.
 Humboldt Prize Holder, Technical University of Dresden.
 Game theory, political economy.



LAURENCE WOLSEY

Professor, Université catholique de Louvain (Faculté des sciences appliquées, Département d'ingénierie mathématique).
 Ph.D. (mathematics), Massachusetts Institute of Technology, 1969.
 Visiting researcher, Manchester Business School, 1969-1971; London School of Economics, 1978-1979; Cornell University, 1983; visiting professor, Ecole polytechnique de Lausanne, 1986-1987; Donders professor, Department of Computer Science, University of Utrecht, Spring 1998.
 Operational research and applied mathematics.



■ ADMINISTRATIVE STAFF

Laurent Buset ■ Mady DE DECKER ■ Micheline DELIZE ■ Emeline DUBOIS ■ Catherine GERMAIN ■ Laurence GILET ■ Alain GILLIS ■ Fabienne HENRY ■ Geneviève LECLERCQ ■ Guy LOUIS ■ Sylvix MAUROY ■ Sheila WEYERS

■ DOCTORAL STUDENTS

Oscar AMERIGHI ■ Efthymios ATHANASIOU ■ Michel BAES ■ Paolo BUSSI ■ Filippo CALCIANO ■ Eloisa CAMPIONI ■ Robert CHARES ■ Giuseppe DE FEO ■ Fabrice DEFEVER ■ Frederico DE STEFANO ■ Elina EGUIAZAROVA ■ Fernanda ESTEVAN ■ Falilou FALL ■ Emmanuele FORLANI ■ Gregory GADZINSKI ■ Fausto GALLI ■ Caterina GIANNETTI ■ Catarina GOULAO ■ Gilles GRANDJEAN ■ Jakub GROWIEC ■ Marisa HIDALGO ■ Jérôme LAHAYE ■ Frédéric LAURIN ■ Johan LEPERS ■ Peter MALKIN ■ Marco MARINUCCI ■ Ricardo MARTINEZ ■ Jean-François MAYSTADT ■ Mika MEITZ ■ Kjetil MIDTHUN ■ Antonio MINNITI ■ Jan-Magnus MOBERG ■ Simone MORICONI ■ Eissa NEMATOLLAHI ■ Giorgia OGGIONI ■ Luca PANACCIONE ■ Agustin PEREZ ■ Alain PHOLO BALA ■ Ruslan SADYKOV ■ Diego SALZMAN ■ Eugenia SANIN ■ Anastiiina SILVENNOINEN ■ Andrera SILVESTRINI ■ Huasheng SONG ■ Genaro SUCARRAT ■ Alfonso VALDESOGLO ROBLES ■ Giacomo VALLETTA ■ Cecilia VERGARI ■ Leopoldo VILCAPOMA ■ François WARICHET ■ Skerdilajda ZANAJ ■ Vera ZAPOROZHETS ■ Gregor ZOETTL

■ VISITING FACULTY MEMBERS AND RESEARCH FELLOWS

Kristian BEHRENS, Université de Bourgogne, Dijon, France
Philippe CHEVALIER, IAG Louvain School of Management, UCL, Belgium
Kaniska DAM, Universidad de Guanajuato, Mexico
Hervé LELEU, CNRS, Université de Lille, France
Alexandre MARINO, Université Paris-Dauphine, France
Roman MINGUEZ SALIDO, Universiad San Pablo, Madrid, Spain
Giordano MION, Università di Bologna, Italy
Juan de Dios MORENO TERNERO, Universidad de Málaga, Spain
Noemi NAVARRO, Université de Montréal, Canada
Saltuk OZERTURK, Southern Methodist University, Dalas (TX), USA
Elena PANOVA, Université de Toulouse, France
Pierre PICARD, University of Manchester, United Kingdom
Arie PREMINGER, Ben-Gurion University of the Negev, Jerusalem, Israel
Alexei SAVVATEEV, Central Economics and Mathematical Institute, Moscow, Russia
Laura SCRIMALI, Università di Catania, Italy
Aggey SEMENOV, Université de Toulouse, France
Takaaki TAKAHASHI, University of Tokyo, Japan

■ ASSOCIATE FELLOWS AND RESEARCH ASSOCIATES

Last year, CORE has created two categories of external visitors, **ASSOCIATE FELLOWS**, and **RESEARCH ASSOCIATES**. The purpose of this initiative was to strengthen and institutionalize the CORE links with scholars who have strong ties with CORE and its members. The ExCom felt that CORE needs an organizational structure to effectively deal with a large number of scholars who visit CORE with a various degree of frequency. The belief is that the introduction of different categories of external fellows would be beneficial for both CORE and the cohort of its visitors.

The category of **ASSOCIATE FELLOWS** is designed for scholars that commit to visit CORE on the regular basis (usually, once a week) and are assigned an office at CORE, whereas **RESEARCH ASSOCIATES** (due to geographical constraints) do not come with the same degree of frequency. In order to be appointed, an external fellow has to express a willingness to be nominated and to have a support of two CORE members. Both categories of external fellows are expected to be involved in the institution activities, such as joint projects with CORE members, participation in the seminar series, contribution and refereeing of CORE discussion papers, etc. The term for both types of appointments is for a two-year period, at the end of which ExCom could consider a possible extension.

ASSOCIATE FELLOWS

Gani ALDASHEV, Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium
 Jean-Marie BALAND, Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium
 Vincent BLONDEL, Département de mathématiques appliquées, UCL, Belgium
 Olivier BOCHET, Universiteit Maastricht, The Netherlands
 Bernard FORTZ, Université Libre de Bruxelles, Belgium
 Axel GAUTIER, Facultés Universitaires Saint-Louis, Bruxelles, Belgium
 Andreas HEINEN, Universidad Carlos III de Madrid, Spain
 Leonidas KOUTSOUGERAS, University of Manchester, United Kingdom
 Stéphane LAMBRECHT, Université des Sciences et Technologies, Lille, France
 Ana MAULEON, Facultés Universitaires Saint-Louis, Bruxelles, Belgium
 Erik SCHOKKAERT, Katholieke Universiteit Leuven, Belgium
 Dirk VANDEGAER, Universiteit Gent, Belgium
 David VEREDAS, Université Libre de Bruxelles, Belgium

RESEARCH ASSOCIATES

El Houssaine AGHEZZAF, Universiteit Gent, Belgium
 Per AGRELL, IAG-Louvain School of Management, UCL, Belgium
 Luisito BERTINELLI, Université de Luxembourg, Luxembourg
 Philippe CHEVALIER, IAG-Louvain School of Management, UCL, Belgium
 Bernard DE MEYER, Université de Paris I, France
 André DE PALMA, Université de Cergy-Pontoise, France
 Francesco DE SINOPOLI, Universidad Carlos III de Madrid, Spain

Jean-Jacques HERINGS, Universiteit Maastricht, The Netherlands
Pierre-André JOUVET, Université du Maine, Le Mans, France
Bernard LEJEUNE, Université de Liège, Belgium
Susana PERALTA, Universidade Nova de Lisboa, Portugal
Frank PLASTRIA, Vrije Universiteit Brussel, Belgium
Stef PROOST, Katholieke Universiteit Leuven, Belgium
Jeroen ROMBOUTS, HEC Montréal, Canada
Isabelle THOMAS, Département de géographie, UCL, Belgium

■ SHORT TERM VISITORS

In addition to the longer stays of the visiting faculty and research fellows, CORE benefited from the visits of a number of scholars whose stays ranged from a few days to a few weeks. Among them

Fuad ALESKEROV, Higher School of Economics, Moscow, Russia
Yves BALASKO, Ecole Nationale des Ponts et Chaussées, Paris, France
Francis BLOCH, Université de la Méditerranée, Marseille, France
Gaetano BLOISE, Università degli Studi Roma Tre, Italy
Anna BOGOMOLNAIA, Rice University, Houston (TX), USA
Noël BONNEUIL, Ecole des Hautes Etudes en Sciences Sociales, Paris, France
Andrei BREMZIN, New Economic School, Moscow, Russia
Jean CAVAILHES, Université de Dijon, France
Parkash CHANDER, National University of Singapore
Michele CONFORTI, Università di Padova, Italy
Roman CONGAR, Université de Rouen, France
Tito CORDELLA, International Monetary Fund Washington (DC), USA
Arianna DEGAN, Université du Québec, Montréal, Canada
Françoise FORGES, Université Paris-Dauphine, France
Masa FUJITA, Kyoto University, Japan
Paula GONZALES, Universidad Pablo de Olavide, Seville, Spain
Anatoly LOUDITSKI, Université de Grenoble, France
Pierre-André JOUVET, Université du Maine, Le Mans, France
Esteban KLOR, Hebrew University of Jerusalem, Israël
Wilfried KOCH, Université de Bourgogne, Dijon, France
Michel LE BRETON, Université de Toulouse I, France
Ben LOCKWOOD, University of Warwick, United Kingdom
Kul LUINTEL, University of Wales, Swansea, United Kingdom
Michael MAGILL, University of Southern California, Los Angeles (CA), USA
Valery MAKAROV, Moscow Central Economics and Mathematics Institute, Russia
Fred MURPHY, Temple University, Philadelphia (PA), USA
Jan MOBERG, Norwegian School of Economics, Bergen, Norway
Mareme NDOYE, Université de Dakar, Senegal
Ignacio ORTUNO ORTIN, Universitat de Valencia, Spain
Andres PEREA, Universiteit Maastricht, The Netherlands

Victor POLTEROVICH, Moscow Central Economics and Mathematics Institute, Russia
Florian POTRA, University of Maryland, Baltimore (MD), USA
Nicolas PORTEIRO, Universidad Pablo de Olavide, Seville, Spain
Martine QUINZII, University of California, Davis (CA), USA
Dany RALPH, University of Cambridge, United Kingdom
Jeroen ROMBOUTS, Université de Montréal, Canada
Alice SCHOONBROODT, University of Minnesota at Minneapolis (MN), USA
Yves SPRUMONT, Université de Montréal, Canada
Giuseppe STORTI, Università di Salerno, Italy
Tomasz SZAPIRA, Szkola Glowna Handlowa, Warsaw, Poland
Takatoshi TABUCHI, University of Tokyo, Japan
Jean-Philippe VIAL, Université de Genève, Suisse
Joao TEIXEIRA, Universidade de Coimbra, Portugal
Olivier TERCIEUX, Paris-Jourdan Sciences Economique, France
Dao-Zhi ZENG, Kgwawa University, Japan
Ekatarina ZHURAVSKAYA, Center for Economic and Financial Research, Moscow, Russia

■ FELLOWS AND VISITING FACULTY MEMBERS FOR 2006-2007

The following scholars will be in residence for all or part of the 2006-2007 academic year

Ayşe AKBALIK, Institut National Polytechnique de Grenoble, France
Nihat AKTAS, IAG-Louvain School of Management, UCL, Belgium
Kristian BEHRENS, Université de Bourgogne, Dijon, France
Eric de BODT, IAG-Louvain School of Management, UCL, Belgium
Johana GOERTZ, Ohio State University, USA
Lennart HOOGERHEIDE, Erasmus Universiteit Rotterdam, The Netherlands
Markus JOCHMAN, Universität Konstanz, Germany
Hervé LELEU, Université de Lille, France
Quentin LOUVEAUX, Universität Magdeburg, Germany
Roland LUTTENS, Universiteit Gent, Belgium
Yann MÉNIÈRE, Ecole des Mines de Paris, France
Giordano MION, Università di Bologna, Italy
Yu XIA, Institute of Statistical Mathematics, Tokyo, Japan

■ OTHER ITEMS

PRIZES AND AWARDS

Luc BAUWENS was awarded the "Chaire Francqui au titre belge" at the Facultés Universitaires Notre-Dame de la Paix, Namur. He gave a series of lectures on "Volatility and Risk Management".

Pierre DEHEZ was elected member of the Panel "Economics and Statistics", Valuzazione Triennale della Ricerca, Comitato di Indirizzo per la Valutazione della Ricerca, Roma, Italy, and member of the Committee for Economics and Business, Centre National de la Recherche Scientifique, Paris, France.

Juan D. MORENO TERNERO was awarded the Extraordinary Ph.D. Award in Quantitative Economics at Universidad de Alicante, Spain.

Pierre PESTIEAU was awarded the Prix Risques – Les Echos, 2006. This price is awarded annually by the daily newspaper "Echos" and by the Review "Risk" to reward the more innovating publication for the comprehension of the challenges related to the risk.

Alexei SAVATEEV has obtained the second prize "Best young mathematical economists in Russia (below 40)", from the Fund in honor of Professor B.L. Osvievich.

Sébastien VAN BELLEGEM has obtained the 2005 "Prix Marie-Jeanne Laurent-Duhamel" from the French Statistical Society for the best Ph.D. in statistics.

NEW FACULTY MEMBERS

CORE welcomed Christian HAFNER and Hylke VANDENBUSSCHE as new CORE members.

2

RESEARCH ACTIVITIES

- CORE DISCUSSION PAPERS
- RESEARCH PROJECTS UNDER CONTRACTS
- EUROPEAN SUPPORT FOR YOUNG RESEARCHERS

The first part of this section gives an overview of all contributions realized during the period covered by this report. The second subsection discusses ongoing research projects at CORE that are sponsored by outside agencies in the form of grants and contracts. The third subsection reviews European support to young researchers.

■ CORE DISCUSSION PAPERS

In the following pages, a brief account of the results published during the last academic year in the Discussion Paper Series will be presented in a more concise form, grouping them by fields of interest.

PUBLIC AND POLITICAL ECONOMICS

Jean-François RICHARD, Henry TULKENS and Magali VERDONCK (2005/48) test econometrically the existence of fiscal interactions between Belgian municipalities. Two types of taxes are considered, for which Belgian municipalities have the decision power as to rates: the "centimes additionnels" on the personal income tax and the "précompte immobilier" which is a property tax. A dynamic adjustment model is specified and estimated using panel data for 598 municipalities over 15 years. The empirical results obtained bear upon two main points: (i) Some interaction definitely has prevailed between the municipalities' fiscal choices made during the observation period, for both taxes; (ii) However, the adjustment reactions to the other municipalities' fiscal choices have occurred over time at the very low yearly pace of 6% and 10%, respectively, of the discrepancy between the actual rates and the preferred rates.

In (2005/49), Fernanda ESTEVAN and Jean-Marie BALAND investigate the role of young adult mortality on child labor and educational decisions and show that, in the absence of appropriate insurance mechanisms, the level of child labor is inefficient and that a cash transfer conditional on child's schooling can always restore efficiency regarding child labor.

Marc GERMAIN and Alphonse MAGNUS propose in (2005/64) a model of pollution control through choices between taxes and tradable permits, supposed to be decided at several time periods t_1, t_2, \dots, t_I . At each of these time periods, the choice depends on the solution of a dynamic programming problem involving the expectations of the polluting factor of production function $z(t)$ and the pollutant stock function $S(t)$. According to coefficients of these two functions in the dynamic problem, the authors show under a broad functional setting that permits are decided for a while, followed by decisions of taxes for all the remaining periods. The case of finite ($I < \infty$), as well as infinite ($I = \infty$) time horizons are considered.

Paolo COLLA, Marc GERMAIN and VAN STEENBERGHE notice in (2005/66) that tradable emission permits share many characteristics with financial assets. As on financial markets, speculators are likely to be active on large markets for emission permits such as those developing under the Kyoto Protocol. The authors show how the presence of speculators on a market for emission permits affects the price of these permits when firms face risk aversion. The agency in charge of the optimal environmental policy should account for the presence of speculators when determining the total amount of permits to issue.

Marc GERMAIN and Vincent VAN STEENBERGHE remark in (2005/76) that the literature on the impact of economic instruments on the level of innovation is usually based on the assumption that innovation reduces the slope of the marginal abatement cost curve. This assumption, which usually leads to the conclusion that taxes induce higher levels of innovation than tradable permits, is however never motivated. In this short article, they analyse the assumption by introducing innovation in the production function of a polluting firm and by showing how it affects the corresponding marginal abatement cost curve. They show that the slope of the marginal abatement cost curve does not necessarily decrease with the level of innovation. The authors conclude by noticing that, as a consequence, previous analyses lead to misleading policy recommendations.

Noticing that the ethic of "priority" is a compromise between the extremely compensatory ethic of "welfare equality" and the needs-blind ethic of "income equality", Juan MORENO-TERNERO and John ROEMER propose in (2005/77) an axiom of priority, and characterize resource-allocation rules that are impartial, prioritarian, and solidaristic. These comprise a class of rules, which equalize some index of resources and welfare across individuals. Consequently, they provide an ethical rationalization for the many applications in which such indices have been used (e.g., the "human development index", "index of primary goods", etc.).

The same authors complete in (2005/81) Harsanyi's model of the veil of ignorance by appending information permitting objective comparisons among persons. They show that the veil-of-ignorance conception of Harsanyi, so completed, and Dworkin's, when modeled formally, recommend wealth allocations in conflict with the prominently espoused view that priority should be given to the disabled in wealth allocation.

Kristian BEHRENS and Pierre PICARD develop in (2005/91) a model of capital tax competition in which imperfectly competitive firms choose both the number of plants they operate and their location. When compared to models with single-plant firms, the presence of multinationals reverses some standard results. First, instead of being subsidized, capital may actually be taxed in equilibrium, which shows that the presence of taxable "multinational rents" relaxes tax competition. Second, even when firms are subsidized, their subsidy-inclusive profits may be decreasing in subsidies, due to fiercer price competition by more multinationals. Third, multinationals may give rise to multiple equilibria in the tax game, one of which can be a employed "subsidy trap" characterized by many multinationals, high subsidy levels, and low welfare.

In (2005/93), Jean HINDRIKS, Susana PERALTA and Shlomo WEBER start from the observation that revenue sharing can be used to discourage low tax regions from competing for capital and firms with high tax regions. However, with heterogeneous regions, revenue sharing involves net transfers across regions and creates a "moral-hazard" problem - that is, regions may want to invest less in market fostering public goods when the benefits are shared across nations. The authors analyze these costs and benefits. When asymmetric regions compete in capital income taxes only, they show that revenue sharing can be desirable for the high tax region if it is pushed far enough, while tax harmonization is always harmful for the low tax region. When regions also compete through public investments, they find that tax competition distorts (downwards) public investments. While revenue sharing discourages public investments due to moral-hazard effect, it remains beneficial in most cases. Moreover, there are new

agglomeration forces resulting from public investments, because the inflow of capital raises the incentive for public investments, which in turn attracts more capital. This leads to the possibility of policy-induced agglomeration.

The paper (2006/3), written by Parkash CHANDER and Henry TULKENS seeks for logical foundations of this. It first deals with how the need for cooperation derives from the public good aspect of the externalities involved, as well as with where the source of cooperation lies in cooperative game theory. In either case, the quest for efficiency is claimed to be at the root of cooperation. Next, cooperation is considered from the point of view of stability. After recalling the two competing concepts of stability used in the IEA literature, new insights on the nature of the gamma core in general are given as well as the Chander-Tulkens solution within the gamma core. Free riding is also evaluated in relation to the alternative forms of stability under scrutiny. Finally, it is asked whether with the often mentioned virtue of "self enforcement" any conceptual gain is achieved, different from what is meant by efficiency and stability. A skeptical answer is offered, as a reply to Barrett's (2003) attempt at giving the notion a specific content.

David CRAINICH, Hervé LELEU and Ana MAULEON notice that in a paper published by Ma (1994) it was argued that the prospective payment system in the hospital industry was superior to the cost based reimbursement system to achieve both cost reduction and quality improvement objectives. In the analysis, it was assumed that quality and costs decisions were made by a single agent. In (2006/5) the authors compare these two financing systems assuming that the main decisions taken within the hospital are shared between physicians (quality of treatment) and hospital managers (cost reduction). If Ma's conclusions hold in the US context (where the hospital managers bear the whole cost of treatment), they show that the ability of a prospective payment system to achieve both objectives is very depending of the type of interaction between the agents when physicians bear a part of the treatment cost, as is the case in many European countries.

Anna BOGOMOLNAIA, Michel LE BRETON, Alexei SAVVATEEV and Shlomo WEBER consider in (2006/7) an urban population represented by a continuum of individuals uniformly distributed over the real line that faces a problem of location and financing of multiple public facilities. Three notions of stability of emerging jurisdictions are examined: stability under unanimous consent, free mobility, and core, and a characterization of stable partitions under these notions of stability is provided.

The same authors examine in (2006/36) a model of multi-jurisdiction formation where individuals' characteristics are uniformly distributed over a finite interval. Every jurisdiction locates a public facility and distributes its cost equally among the residents. Two notions of stability are considered; Nash stability and its refinement local Nash stability, and the existence and characterization of stable partitions are examined. The main feature of this analysis is that, even under the uniform distribution, there are stable structures that exhibit a high degree of heterogeneity of jurisdiction sizes.

The design of pension schemes in a society where fertility is endogenous and parents differ in their ability to raise children is the subject of (2006/15), authored by Helmuth CREMER, Firouz GAHVARI and Pierre PESTIEAU. In a world with perfect information, a pay-as-you-go social security system is characterized by equal pensions for all but different contributions, which

may or may not increase with the number of children. Additionally, fertility must be subsidized at the margin to correct for the externality that accompanies fertility. In a world of asymmetric information, incentive-related distortions supplement the Pigouvian subsidy. These may either require an additional subsidy or an offsetting tax on fertility depending on whether the redistribution is towards people with more or less children. In the former case, pensions are decreasing in the number of children; in the latter case, they are increasing.

A series of three papers on social security by Helmuth CREMER, Jean-Marie LOZACHMEUR and Pierre PESTIEAU. (2006/16) studies the design of retirement and disability policies. It illustrates the often observed exit from the labor force of healthy workers through disability insurance schemes. Two types of individuals, disabled and leisure-prone ones, have the same disutility for labor and cannot be distinguished. However, they are not counted in the same way in social welfare. Benefits depend on retirement age and on the (reported) health status. The authors determine first- and second-best optimal benefit levels and retirement ages and focus on the distortions which may be induced in the individuals' retirement decision, in addition disabled workers are better taken care of. It is not optimal to test all applicants. Surprisingly, the (second-best) solution *may* imply later retirement for the disabled than for the leisure prone. In that case, the disabled are compensated by higher benefits.

In (2006/17), the authors remark that in many countries pension systems involve some form of earning tests, i.e., an individual's benefits are reduced if he has labor income, and examine whether or not such earning tests emerge when pension system and income tax are optimally designed. They use a simple model with individuals differing both in productivity and their health status. The working life of an individual has two "endings": an official retirement age at which he starts drawing pension benefits and an effective age of retirement at which professional activity is completely given up. Weekly work time is endogenous, but constant in the period before official retirement and again constant, after official retirement. Earning tests mean that earnings are subject to a higher tax after official retirement than before. The authors show under which conditions earning tests emerge both under a linear and a nonlinear tax scheme and, in particular, that earning tests will occur if heterogeneities in health or productivity are more significant after official retirement than before.

Finally, in (2006/19) the authors move from the fact that social insurance for the elderly is judged responsible for the widely observed trend towards early retirement. In a world of laissez-faire or in a first-best setting, there would be no such trend. However, when first-best instruments are not available, because health and productivity are not observable, the optimal social insurance policy may imply a distortion on the retirement decision. The main point they make is that while there is no doubt that retirement systems induce an excessive bias towards early in many countries, a complete elimination of this bias (i.e., a switch to an actuarially fair system) is not the right answer. This is so for two reasons. First, some distortions are second-best optimal. This is the normative argument. Second, and on the positive side, the elimination of the bias might be problematic from a political perspective. Depending on the political process, it may either not be feasible or alternatively it may tend to undermine the political support for the pension system itself.

Helmuth CREMER and Pierre PESTIEAU develop in (2006/18) a simple model of piracy to analyze its effects on prices and welfare and to study the optimal enforcement policy. A monopolist

produces an information good that is sold to two groups of consumers differing in their valuation of the good. The authors distinguish two settings: one in which the monopoly is regulated and one in which it maximizes profits and is not regulated, except that the public authority may be responsible for the control of piracy. They show that copying or piracy might be welfare enhancing because it is a way to provide the good to some individuals without undermining the firm's ability to finance the development cost via the pricing scheme applied to high valuation consumers. The level of piracy control differs according to the regulatory environment. Three levels of piracy control emerge. The highest is the one chosen by the private monopoly, the next level is the one chosen by the regulated monopoly and the lowest, that can be zero, is the level of control chosen by the public authority when the good is sold by a private monopoly.

Political information acquisition in large elections is the subject of (2006/20), written by Gani ALDASHEV, who considers the case where the probability of being pivotal is negligible. The model builds on the assumption that informed citizens enjoy discussing politics with other informed citizens. The resulting information acquisition game exhibits strategic complementarities. The author finds that information acquisition depends negatively on the social distance between citizens and next proposes an application of the model to the distributive politics game. Equilibrium policies are biased towards regions/groups with lower social distance between citizens. Finally, evidence for the basic model's main prediction based on the data from the 2000 U.S. National Elections Study is presented to show that citizens with a shorter residence span (thus having a less developed local social network) acquire significantly less political information than the otherwise similar long-term residents.

Given that the design of the income transfer program for the lower incomes is a hot issue in current public policy debate, Rolan Iwan LUTTENS and Erwin OOGHE ask in (2006/26) whether we should stick to a generous welfare state with a sizeable basic income, but high marginal tax rates for the lower incomes and thus little incentives to work, or whether we should "make work pay" by subsidizing the work of low earners, but possibly at the cost of a smaller safety net? The authors deem difficult to answer this question without making clear which individuals are (held) responsible for and which not. First, they present a new fair allocation, coined a Pareto Efficient and Shared resources Equivalent (PESE) allocation, which compensates for different productive skills, but not for different tastes for working and characterize a fair social ordering, which rationalizes the PESE allocation. Second, they illustrate the optimal second-best allocation in a discrete Stiglitz (1982, 1987) economy. The question whether we should have subsidies for the low earners or not crucially depends on whether the low-skilled have a strictly positive or zero skill. Third, the authors simulate fair taxes for a sample of Belgian singles. Simulation results suggest that "making work pay" policies can be optimal, according to the authors' fairness criterion, but only in the unreasonable case in which none of the unemployed are ever willing to work.

Hospital financing systems determine major decisions made by physicians and managers within hospitals; the paper (2006/29), by David CRAINICH, Hervé LELEU and Ana MAULEON examines the impact of the transition toward an activity-based reimbursement system that has emerged in most OECD countries. Two initial situations are considered, one for a private for-profit sector where both hospitals and physicians are paid on a fee-for-service basis and the other for a public sector under prospective budget and salaried physicians. For the private

sector, the model focuses on the type of interaction (simultaneous, sequential or joint decision-making games) that should emerge between agents after the introduction of the activity-based financing system. In the public sector, the elasticity of the demand to the level of inputs seems to play a more crucial role in the transition.

Paula GONZALES, Jean HINDRIKS, Ben LOCKWOOD and Nicolas PORTEIRO study in (2006/31) a model *à la* Rogoff (1990) where politicians distort fiscal policy to signal their competency, but where fiscal policy can be centralized or decentralized. The main focus is on how the equilibrium probability that fiscal policy is distorted in any region (the political budget cycle, PBC) differs across fiscal regimes. With centralization, there are generally two effects that change the incentive for pooling behavior and thus the probability of a PBC. One is the possibility of *selective distortion*: the incumbent can be re-elected with the support of just a majority of regions. The other is a *cost distribution* effect, which is present unless the random cost of producing the public goods is perfectly correlated across regions. Both of these effects work in the same direction, with the general result that overall, the PBC probability is larger under centralization (decentralization) when the rents to office are low (high). Voter welfare under the two regimes is also compared: voters tend to be better off when the PBC probability is lower, so voters may either gain or lose from centralization. Results are robust to a number of changes in the specification of the model.

Philippe DE DONDER and Jean HINDRIKS remark in (2006/32) that empirical testing of asymmetric information in the insurance market has uncovered a negative correlation between risk levels and insurance purchases, rather than the positive correlation predicted by the standard insurance theory. Hemenway (1990) proposes an explanation for this negative correlation, called "propitious selection". He argues that potential insurance buyers have different tastes for risk and that "individuals who are highly risk avoiding are more likely both to try to reduce the hazard and to purchase insurance" (p. 1064). Chiappori and Salanié (2000) also suggest that this line of argument, which they call "cherry picking", may explain the observed negative correlation. In this paper, the authors show that the propitious selection argument does not imply negative correlation between risk levels and insurance purchases, because it fails to take into account the supply side of the insurance market. To illustrate this claim, they provide a model where, although they assume that individuals differ in risk aversion and that the more risk averse individuals exert more precaution and buy more insurance, and end up with a positive correlation between risk and insurance purchases at equilibrium. The reason is that, in any separating equilibrium, the more risk averse individuals face insurance overprovision which, combined with moral hazard, increases their risk relative to the less risk averse individuals. To obtain the negative correlation between risk and insurance purchases, one further needs the extra condition of decreasing marginal willingness to pay for the less risk averse individuals. Finally, they find that propitious selection has profound policy implications for social insurance.

Philippe DE DONDER and Jean HINDRIKS also study in (2006/33) the political economy of social insurance with double heterogeneity of voters. Social insurance is financed through distortionary taxation and redistributes across income and risks. Individuals vote over the extent of social insurance, which they can complement on the private market. Private insurance suffers from adverse selection which results into insurance rationing. The authors model political competition *à la* Wittman, with two parties maximizing the utility of their

members. Party membership is endogenously determined. They show that although individuals differ in two dimensions, their preference for social insurance can be aggregated into a single dimensional type function. They then resort to numerical simulations to solve the political equilibrium outcome as a function of the distribution of income and risk. They obtain equilibrium policy differentiation with the Left party proposing more social insurance than the Right party. The Left party's equilibrium membership is made of low risk and high income individuals, with high risk and low income individuals forming the Right party's constituency. In equilibrium, each party is tying for winning. Unlike the median voter outcome, their equilibrium outcome depends on the whole income and risks distribution, and increasing income polarization leads both parties to propose *less* social insurance. The authors also compare the political equilibrium outcome with the Rawlsian and utilitarian outcomes.

Hylke VANDENBUSSCHE and Maurizio ZANARDI counter in (2006/38) the notion that the trade flows that are subject to antidumping (AD) laws are small and their distortions negligible, by quantifying the worldwide effect of AD laws on aggregate trade flows. The recent proliferation of AD laws across countries provides a natural experiment to estimate the trade effects of adopting versus using AD laws; differences in the intensity of use among countries with older AD laws allow to investigate reputation effects. For this purpose, the authors estimate worldwide trade flows using a gravity equation spanning 21 years of annual observations. Estimates confirm that AD effects are not small. Among other findings, new users have their aggregate imports depressed by 15.7 billion US \$ a year (or 6.7%) as a result of the AD measures they have imposed. For a traditional user like the United States, current AD measures depress annual imports by almost 20 billion US \$ on top of the cumulative negative effect of reputation. For some countries, the dampening effects of AD laws on trade flows are found to nearly offset the gains from trade liberalization.

The impact of environmental innovation on the marginal pollution abatement cost at the firm level is investigated by Thierry BRÉCHET and Pierre-André JOUVET in (2006/40). The authors show that the common assumption that innovation reduces the marginal abatement cost is wrong and draw some implications about the incentives to innovate under environmental regulation. In particular, they find that adopting an environmental friendly technology may lead to more pollution and less profit at the firm level.

Helmuth CREMER, Philippe DE DONDER, Dario MALDONADO and Pierre PESTIEAU study in (2006/47) the optimal linear pension scheme when society consists of rational and myopic individuals. Myopic individuals have, *ex ante*, a strong preference for the present even though, *ex post*, they would regret not to have saved enough. While rational and myopic persons share the same *ex post* intertemporal preferences, only the rational agents make their savings decisions according to these preferences. Individuals are also distinguished by their productivity. The social objective is "paternalistic": the utilitarian welfare function depends on *ex post* utilities. The authors examine how the presence of myopic individuals affects both the size of the pension system and the degree of redistribution it operates. The relationship between proportion of myopic individuals and characteristics of the pension system turns out to be much more complex than one would have conjectured. Neither the impact on the level of pensions nor the effect on their redistributive degree are unambiguous. Nevertheless, they show that under some plausible assumptions adding myopic individuals increases the level of pension benefits and leads to a shift from a flat or even targeted scheme to a partially

contributory one. However, they also provide an example where the degree of redistribution is not a monotonic function of the proportion of myopic individuals.

Can European economics become "the most dynamic and competitive in the world"? Using readily accessible data, the paper (2006/51), written by Jacques DRÈZE and Fernanda ESTEVAN documents the following aspects: (i) today, the US outperform Europe by a factor of the order of 3, with no clear trend; the Lisbon goal is not in sight; (ii) Europe is not homogeneous; the UK and the small countries in North-central Europe outperform significantly the Big 4 continental countries (France, Germany, Italy, Spain); the Big 4 should accept English as the lingua franca of economics, and implement major institutional reforms; (iii) some 30 leading economics departments (ten from each of these three areas) account for some 70-75% of Europe's research output; (iv) the concentration of research in leading departments is substantial but not exclusive; it is comparable in Europe and the US, but leading US departments have incomparably more resources and benefit from access to an integrated labour market; (v) few PhD programs are of efficient size, especially in Europe, calling for further concentration; (vi) second-best funding of higher education calls for block grants to efficient programs; in Europe, these should be organised at EU level. "I conclude with a modest proposal (15 million euros per year) consisting of block grants to leading departments and to young academic researchers. My optimistic verdict is that substantial progress towards the Lisbon goal is at hand, but requires significant departures from current practices " (Jacques Drèze).

In (2006/54), Pierre PESTIEAU, Gregory PONTIERE and Motohiro SATO aim at investigating whether or not a utilitarian social planner should subsidize longevity-enhancing expenditures in an economy with a PAYG pension system. For that purpose, a simple two-period OLG model is developed, in which the length of the second period of life can be raised by private health spendings. Focussing on the steady-state, it is shown that the sign of the optimal subsidy on health expenditures tends to be negative when the replacement ratio is sufficiently large. Moreover, the optimal health subsidy is also shown to depend significantly on the longevity production process and on the production technology.

Finally, Carmen HERRERO and Ricardo MARTINEZ study in (2006/66) claim problems in which a certain amount of indivisible units (of a homogeneous good) has to be distributed among a group of agents, when this amount is not enough to fully satisfy agents' demands. The authors are interested in finding solutions satisfying robustness and fairness properties. To do that, they define the M-down methods, which are the unique robust (composition down and consistency) and fair (balancedness or conditional full compensation) rules. Besides, they also establish the relationships between these M-down methods and the constrained equal awards rule.

INDUSTRIAL ORGANIZATION

In (2005/50) Yves SMEERS moves from the fact that the integration of national electricity systems into a single internal European electricity market is not progressing well with the result that the level of competition in the sector remains unsatisfactory. This had led to proposals to apply ex ante remedies that directly bear on the structure of national incumbents. These measures involve quantitative recommendations such as virtual auctioning of capacity or

divestitures that increase the number of competing firms. The evaluation of these measures partly relies on computable oligopoly models of the restructured electricity sector. This paper analyses the recent literature of these models and concludes that they are not currently capable of providing the degree of legal and regulatory certainty that the importance of these ex ante remedies requires. The state of the art in these models is such that their results reflect more a set of non-testable assumptions than observed facts or unambiguous theory. The author recommends that more academic work is necessary before these models can be applied in a legal or regulatory context. The conclusion is that this work on the structure of national electricity market distracts from the fundamental objective to introduce competition in the power sector by integrating the national markets into a single electricity market.

Rabah AMIR and Malgorzata KNAUFF derive in (2005/51) an objective ranking of economics departments worldwide in terms of graduate education. The central idea is that the value of a department is the sum of the values of its PhD graduates, as reflected in the values of their current employing departments. The scores are thus derived as solutions to a linear system of simultaneous equations in the values. The sample includes the top fifty-four departments, the composition of which is determined endogenously using a criterion requiring a minimum of four placements in the departments comprising the sample. Two other related rankings are proposed, which place more emphasis on more recent faculty recruitments. The results point to a very high concentration in the economics PhD education market worldwide, confirming the dominance of the top U.S. departments, in particular of Harvard and M.I.T. Nevertheless, a modest de-concentration trend is under way. The rankings are in close agreement with the 1994 National Research Council survey ranking based on the perceived quality of PhD programs.

Cost sharing in a job scheduling problem is the subject of (2005/53) by Debasis MISHRA and Bharath RANGARAJAN. In the model, a set of jobs needs to be served by a server, which can serve only one job at a time. Jobs have processing times and incur waiting costs (linear in their waiting time). The jobs share their costs through compensation using monetary transfers. In the first part, the authors provide an axiomatic characterization of the Shapley value rule by introducing some fairness axioms that are new in the literature, while in the second part, they use linear programming duality to provide an alternate characterization of the Shapley value rule, using the idea of decomposition of transfers and the notion of *pairwise no-envy allocation*. Of the family of allocation rules that satisfy pairwise no-envy, the Shapley value rule is the one with the minimum sum of absolute values of transfers. They discuss no-envy rules and show that no-envy is not possible in general. If processing times of all jobs are equal, then it is possible to design no-envy rules, and they characterize all no-envy rules for this case.

Commenting on the general presumption that competition is a good thing, in (2005/54), Giuseppe DE FEO and Jean HINDRIKS show that competition in the insurance markets can be bad when there is adverse selection. Using the dual theory of choice under risk, the authors are able to fully characterize both the competitive and the monopoly market outcomes. When there are two types of risk, the monopoly dominates competition if and only if competition leads to market travelling. When there are a continuum of types of efficiency of competition is less trivial. In effect monopoly is shown to provide better insurance but at the cost of driving out some agents from the market. Performing simulation for different distributions of risk, they find that monopoly in general performs (much) better than competition in terms of the

realization of the gains from trade across all traders in equilibrium. The reason is that the monopolist can exploit its market power to relax the incentive constraints.

In (2005/56) Anna RUBINCHIK-PESSACH and Shlomo WEBER analyze the balance of power and divergence of policies in a model of electoral competition: two incumbent parties choose their platforms in a unidimensional policy space while facing a credible threat of an entry by the third party. Relative electoral support is the predominant objective of each party, and the third party enters only if it can displace one of the incumbents. In an equilibrium the two incumbents choose to prevent the entry and achieve the balance of power, i.e., splitting the electorate equally. The incumbents' positions might diverge more as compared to a system in which the parties seek to solely maximize the voters' support. Therefore, rank preoccupation under the threat of entry might contribute to more polarized political platforms of the two leading parties.

A model of a vertically differentiated duopoly with two regions is instead analyzed by Emmanuele BACCHIEGA and Antonio MINNITI in (2005/71). These two locations differ for the market size or for the distribution of the willingness to pay for quality of their consumers. Firms sequentially choose to settle in one region and then simultaneously compete in prices, selling their products both on the local market and on the foreign one. The authors show that the decision whether to agglomerate or not crucially depends on the extent of regions' asymmetries, but, counter-intuitively, there are parametric configurations in which the model predicts that the leader (the first firm choosing location) settles either in the poorer or in the smaller region, leaving the other one to the follower. Welfare analysis completes the paper.

Holger GORG, Pierre PICARD and Eric STROBL examine in (2005/82) the relationship between contracting out and the wage elasticity of labor demand in outsourcing plants. A simple theoretical model suggests that firms engaged in contracting out have lower wage elasticities. Supportive evidence is provided by estimating plant level dynamic labor demand equations for Irish manufacturing.

PAUL BELLEFLAMME and Pierre PICARD study in (2005/83) the effects of (private, small-scale) piracy on the pricing behavior of producers of information goods within a unified model of vertical differentiation. Although information goods are assumed to be perfectly differentiated, demands are interdependent because the copying technology exhibits increasing returns to scale. The authors characterize the Bertrand-Nash equilibria in a duopoly. Comparing equilibrium prices to the prices set by a multiproduct monopolist, they show that competition drives prices up and may lead to price dispersion. Competition reduces total surplus in the short run but provides higher incentives to create in the long run.

JEAN GABSZEWICZ, Paolo GARELLA and Nathalie SONNAC consider in (2005/84) a model of daily newspapers' competition to test the validity of the so called "theory of the circulation spiral". According to it, the interaction between the newspapers and the advertising markets drives the newspaper with the smaller readership into a vicious circle, finally leading it to death. In a model with two newspapers, they show that, contrary to this conjecture, the dynamics envisaged by the proposers of the theory, does not always lead to the elimination of one of them.

In (2005/89) Saltuk OZERTURK analyzes how to provide information acquisition and truthful reporting incentives to a financial analyst who privately trades on own account. The analysis

exploits the observation that for a given report, the analyst's reward scheme essentially provides him with a portfolio endowment traded in the market. For every signal, the analyst makes the report that corresponds to the portfolio endowment with maximum market value, given security prices. The principal cannot make the analyst strictly prefer to report the true signal: the analyst is truthful only when indifferent between the two reports. The analyst's information acquisition incentive is driven only by private portfolio considerations: he acquires information only if he will be holding a large enough position in the stock he covers. The paper also presents a general "separation of the optimal report from private information" result and illustrates that performance based reward schemes can fail to induce any information revelation when the analyst privately trades.

(2005/86) written by Antonio TESORIERE, deals with endogenous firm asymmetry and cooperative R&D in linear duopoly with spillovers. In a linear model of cost reducing R&D/Cournot competition, firm asymmetry is shown to be sustainable as subgame perfect Nash equilibrium with R&D competition only if the productivity of research is sufficiently large relative to the benefits from imitation. The author finds that, in such a case, industry-wide cost reduction and firms asymmetry are increasing and decreasing functions of the spillover rate, respectively. In the absence of spillovers, a symmetric joint lab generates higher consumer surplus and social welfare than a pair of asymmetric competitors. If spillovers are not too small, asymmetric R&D competition is advantageous to consumers, but not to firms.

Simon ANDERSON and Jean GABSZEWICZ propose in (2005/88) an analysis of the media and advertising markets. Media industries are important drivers of popular culture: a large fraction of leisure time is devoted to radio, magazines, newspapers, the Internet, and television. Most advertising expenditures are incurred for these media. They are also mainly supported by advertising revenue. Early work stressed possible market failures in program duplication and catering to the Lowest Common Denominator, indicating lack of cultural diversity and quality. The business model for most media industries is underscored by advertisers' demand to reach prospective customers. This business model has important implications for performance in the market since viewer sovereignty is indirect. Viewers are attracted by programming, though they dislike the ads it carries, and advertisers want viewers as potential consumers. The two sides are coordinated by broadcasters (or "platforms") that choose ad levels and program types, and advertising finances the programming. Competition for viewers of the demographics most desired by advertisers implies that programming choices will be biased towards the tastes of those with such demographics. The ability to use subscription pricing may help improve performance by catering to the tastes of those otherwise under-represented, though higher full prices tend to favor broadcasters at the expense of viewers and advertisers. If advertising demand is weak, equilibrium program selection may be too extreme as broadcasters strive to avoid ruinous subscription price competition, but strong advertising demand may lead to strong competition for viewers and hence minimum differentiation. Markets (such as newspapers) with a high proportion of ad-lovers may be served only by monopoly due to a circulation spiral: advertisers want to place ads in the paper with most readers, but readers want to buy the paper with more ads.

Paul BELLEFLAMME and Cecilia VERGARI in (2006/14) examine in an oligopoly model with horizontally differentiated products how much a firm is willing to pay for a process innovation that it would be the only one to use. The authors show that different measures of competition

(number of firms, degree of product differentiation, Cournot vs Bertrand) affect incentives to innovate in non-monotonic, different, and potentially opposite ways.

In (2006/9) Saltuk OZERTURK analyzes the implications of executive hedge markets for firm value maximization in an optimal contracting framework. The main results are as follows: without any hedging ability, the manager underinvests in risk at the firm level to diversify his own compensation risk. If the manager can trade a security correlated with firm specific risk, the underinvestment in risk is reduced, optimal managerial share ownership and equilibrium effort increase. If the manager can hedge by simulating the sale of his shares, however, he can completely undo any incentive scheme. The model predicts that a higher degree of financial market development implies higher managerial share ownership and more efficient risk taking at the firm level.

Malgorzata KNAUFF investigates in (2006/37) the effects of market transparency on prices in the Bertrand duopoly model for both the cases of strategic complementarities and strategic substitutes. For the former class of games "conventional wisdom" concerning prices is confirmed, since they decrease. The consumers are always better off with higher transparency but changes in firm's profits are ambiguous. For the latter class of games, an increase in market transparency may lead to an increase in one of the prices, which implies ambiguity in consumers' utility and firms' profits.

(2006/43), written by Jean GABSZEWICZ and Skerdilajda ZANAJ, investigates how an incumbent monopolist can weaken potential rivals or deter entry in the output market by manipulating the access of these rivals in the input market. Two polar cases are considered. In the first one, the input market is assumed to be competitive with the input being supplied inelastically. The authors show that this situation opens the door to entry deterrence. Then they assume that the input is supplied by a single seller who chooses the input price. In this case, they show that entry deterrence can be reached only through merger with the seller of the input.

Tanguy ISAAC in (2006/48) studies information revelation in markets with pairwise meetings. Focusing on the one-sided case, the author performs a dynamic analysis of a constant entry flow model. The same question has been studied in an identical framework in Serrano and Yosha (1993) but they limit their analysis to the stationary steady states. Blouin and Serrano (2001) study information revelation in a one-time entry model and obtain results different from Serrano and Yosha (1993). It is shown that there is a dramatical loss when restricting the analysis of a constant flow entry model to stationary steady states, nevertheless, this loss might not explain completely the difference in the results presented in the two papers.

Kristian BEHRENS and Yasusada MURATA present in (2006/49) a general equilibrium model of monopolistic competition with variable demand elasticities and investigate the impact of free trade on welfare and efficiency. First, contrary to the constant elasticity case, in which all gains from trade are due to increasing product diversity, this model features gains from pro-competitive effects. Second, they prove that the market outcome is not efficient because too many firms operate at an inefficiently small scale. Last, they illustrate that free trade raises efficiency by reducing the gap between the equilibrium utility and the optimal utility.

Paul BELLEFLAMME and Francis BLOCH consider in (2006/59) that when firms can supply several separate markets, collusion can take two forms. Either firms establish production quotas on all the markets, or they share markets. Their paper compares production quotas and market

sharing agreements in a Cournot duopoly where firms incur a fixed cost for serving each market, to show that there exists a threshold value of the fixed cost such that collusion is easier to sustain with production quotas below the threshold and with market sharing agreements above the threshold. These results are obtained both under Nash reversion strategies and the globally optimal punishment strategies introduced by Abreu (1986).

Finally, postal markets are the subject of the paper (2006/65) written by Francis BLOCH and Axel GAUTIER. Postal markets have been open to competition for a long time. But, with a few exceptions, the competitors of the incumbent postal operator are active on the upstream segments of the market -- preparation, collection, outward sorting and transport of mail products. With the further steps planned in the liberalization process, there are new opportunities to extend competition to the downstream segments of the market - the delivery of mails. In the future, two business models will be possible for the new postal operators : (1) access where the firm performs the upstream operations and uses the incumbent's delivery network and (2) bypass, where the competing firm controls the entire supply chain and delivers mails with its own delivery network. These two options have different impacts on welfare and the profit of the incumbent operator. The choice between access and bypass depends on the entrant's delivery cost relative to the cost of buying access to the incumbent operator (the access price). In this paper, the authors derive optimal - welfare maximizing - stamp and access prices for the incumbent operator when these prices have an impact on the delivery method chosen by the entrant and show how prices should be re-balanced when the entry method is considered as endogenous, i.e., affected by the incumbent's prices.

MACROECONOMIC POLICIES

The formulation of the problem of justice among generations as the problem of finding an ordering of infinite utility streams is examined by Claude D'ASPROMONT in (2005/75) within the "social welfare functional" approach to social choice. This formulation usually presumes a double reduction, not only the classical "welfarist" reduction, according to which "utility" provides all the information required to construct a social evaluation rule, but also the aggregation of the individual utility levels at each generation into a single utility level. The author argues that this second type of reduction obliterates the relationship between the value judgments made in the social evaluation of the welfare of the presently living generation with that of future generations and does not emphasize the capacity for many social evaluation criteria (including pure utilitarianism and Leximin) to "proliferate" from the present generation to any larger set of generations. The results concerning the orderings generated by such proliferating rules are compared to characterisations already given in the literature.

Starting from the US Sky Trust claim that the "the sky belongs to us equally", Stéphane LAMBRECHT distinguishes in (2005/74) two sources through which overlapping generations may consent to the use of the environment whom they are the owners: the common consent of all generations reached behind the Rawlsian veil of ignorance and the specific consent of generations born at different time periods. It proposes two institutions: a fund mandated to implement the common consent by auctioning permits to firms and a voting procedure to implement the specific consent by choosing each generation's preferred level of

environmental maintenance. The analysis shows how the specific consent may be during each period, operative or inoperative and that there may be at most two switches between these two regimes on the transition path. Starting from the "business as usual" steady state, the introduction of these institutions always immediately increases the environmental quality, but the magnitude of this gain may be temporary and decrease if capital accumulation is strongly evicted by the policy. On the opposite, the author stresses a case in which the introduction of the policy has beneficial effects both on wealth and quality.

An extension of the recent literature on overlapping generations and pollution is provided in (2006/6) by Ingmar SCHUMACHER and Benteng ZOU by allowing each generation's utility to depend on past levels of pollution. To conform with the literature on habit in consumption they call this extension habit in pollution. Habit in pollution can visualize itself as either a concern for the flow of pollution only, or for the stock, or anything in between. The authors show that habit in pollution has not only significant consequences for the level of pollution and capital, but also for the evolution of utility over time. They observe that habit in pollution can lead to violations of two standard criteria of sustainability, which suggests that habit in pollution can be another source of intergenerational inequity.

Another contribution on the overlapping generation approach is provided by Thierry BRÉCHET and Stéphane LAMBRECHT, who in (2006/22) question the role of a joy-of-giving bequest motive of a privately-owned renewable resource for sustainability by modelling an overlapping generations economy in which individuals are endowed with a renewable resource. This resource can be exploited at no cost by the young households and provided to production or bequeathed to the next generation. Two main results are highlighted. First, the mere existence of a bequest motive does not guarantee a sustainable outcome. Second, when the resource is preserved in equilibrium, its level does not necessarily coincide with the efficient one. Whether the resource stock is too high or too low the capital stock should be lower than the golden rule level.

The same authors develop in (2006/35) an overlapping-generation model *à la* Diamond with a non-constant population growth in which households privately own a natural renewable resource and have a family-altruism resource bequest motive. The natural resource can be either extracted and sold to the producing firms as a production factor, or bequeathed to the offspring to increase his adult disposable income. With a numerical application, they analyze how family altruism interplays with population growth to shape the dynamics of the whole economy and also highlight the role of altruism in the case of a temporary negative demographic shock. The simulations they present show that a fall in the size of families increases the family natural resource stock but reduces resource extraction on the transition, through a reinforcement of family altruistic links. Hence, family altruism plays a key role in the recovery of the economy after the shock.

(2006/23), by Jakub GROWIEC moves on the idea of introducing fertility choice into an R&D-based semi-endogenous growth model, which makes it possible for the economy's long-run growth rate to be again fully endogenously determined. A *positive* growth rate along the balanced growth path requires a certain knife-edge assumption, though. In the usual framework, it would be the assumption that the intertemporal elasticity of substitution in consumption be exactly unity ($\text{IES}=1$). The author argues that such an assumption constitutes the ultimate source of long-run growth in these models; thus, he analyzes the alternatives. If

one relaxes the $IES=1$ assumption, and introduces a minimum "subsistence" fertility level to the model, there may (but may not) emerge an asymptotic balanced growth path with positive growth rates, to which the economy eventually converges as levels of variables diverge to infinity. This balanced growth path is either saddle-path stable or completely stable. The issue of the economy's invariance towards fertility-promoting policy within the semi-endogenous growth framework is also addressed, to conclude that such policy can bring long-run effects only in the knife-edge case of $IES=1$ type. Jones' policy invariance result is typically consistent with endogenous fertility.

In (2006/24), Raouf BOUCEKKINE, David DE LA CROIX and Omar LICANDRO highlight the salient characteristics and implications of the seminal contributions in the field of vintage capital growth theory (proposed entry for the new Palgrave dictionary of economics, 2nd edition).

Raouf BOUCEKKINE along with Fernando DEL RIO and Blanca MARTINEZ construct in (2006/27) a vintage capital model *à la* Whelan (2002) with both exogenous embodied and disembodied technical progress, and variable utilization of each vintage. The lifetime of capital goods is endogenous and it relies on the associated maintenance costs. Studying the properties of the balanced growth paths, the authors first show that the lifetime of capital is an increasing (resp. decreasing) function of the rate of disembodied (resp. embodied) technical progress and second that both the use-related depreciation rate and the scrapping rate increase when embodied technical progress accelerates. However, the latter drops when disembodied technical progress accelerates while the former remains unaffected. A key feature of the model is that the age-related depreciation rate does depend on the obsolescence rate in sharp contrast to the neoclassical model.

The purpose of (2005/94) by Falilou FALL is to demonstrate that inherited human capital is a powerful vector of inequality formation and persistence, irrespective of its links to financial wealth endowment. This paper argues that the agents who inherit a low level of human capital bear a greater utility cost in their educational investment and that there are different profiles of returns on human capital within the economy. These two arguments are sufficient to generate an endogenous formation of workers' and entrepreneurs' groups and a continuum of steady states with inequality. Allowing for self-employment in the model generates the possibility of equality at equilibrium in addition to the inequality equilibrium with the emergence of a middle class.

David DE LA CROIX again with Alessandro SOMMACAL study in (2006/45) how mortality reductions and income growth interact, looking at their relationship prior to the Industrial Revolution, when income per capita was stagnant. The authors first present a model of individual medical spending giving a rationale for individual health expenditures even when medicine was not effective in postponing death and then explain the rise of effective medicine by a learning process function of expenditures in health. The rise in effective medicine can then be linked to the take-off of the eighteenth century through life expectancy increases, and fostered capital accumulation. The rise of effective medicine has also an impact on the relation between growth and inequality and on the intergenerational persistence of differences in income. These channels are operative through differential mortality induced by medicine effectiveness that turns out to determine a differential in the propensity to save among income groups.

In (2006/56) Jakub GROWIEC follows Jones (2005) in his approach to deriving the global production function from microfoundations. His framework is generalized by allowing for dependence between the Pareto distributions of labor- and capital-augmenting developments. Using the Clayton copula family to capture this dependence, the author derives a "Clayton-Pareto" class of production functions that nests both the Cobb-Douglas and the CES. Embedding the resultant production function in a neoclassical growth framework, he draws conclusions for the long-run direction of technical change. Jones's result of Cobb-Douglas global production functions and purely labor-augmenting technical change hinges on the assumption of *independence* of marginal Pareto distributions. In a more general case, the shape of local production functions matters for the shape of the global production function, and technical change augments both factors in the long run. Furthermore, the elasticity of substitution between capital and labor may exceed unity and thus yield endogenous growth.

Raouf BOUCEKKINE, Blanca MARTINEZ and Cagri SAGLAM analyze in (2006/58) an optimal growth model with one-hoss-shay vintage capital, where labor resources can be allocated freely either to production, technology adoption or capital maintenance. Technological progress is partly embodied. Adoption labor increases the level of embodied technical progress. The authors disentangle the amplification-propagation role of maintenance in business fluctuations: in the short run, the response of the model to transitory shocks on total factor productivity in the final good sector are definitely much sharper compared to the counterpart model without maintenance but with the same average depreciation rate. Moreover, the one-hoss-shay technology is shown to reinforce this amplification-propagation mechanism. They also find that accelerations in embodied technical progress should be responded by a gradual adoption effort, and capital maintenance should be the preferred instrument in the short run.

Jakub GROWIEC and Ingmar SCHUMACHER consider in (2006/63) an economy whose production function takes both renewable and non-renewable resources as inputs. The authors extend the current literature by allowing for exogenous technical change in the elasticity of substitution between these two types of resources. In addition, they study the consequences of biased technical change which alters the resources' relative productivities. They derive long-run asymptotic results, which are used to compare several cases. In the benchmark case of no technical change, results are close to those obtained by Dasgupta and Heal (1974). In the case of technical change in the elasticity of substitution, they observe that this kind of technical change helps obtain positive long-run production despite the depletion of non-renewable resources. In the biased technical change case, long-run production is only possible either if non-renewable resources are non-essential or if biased technical change is quick enough to compensate for the decreasing flow of non-renewable resources. The production function is embedded in an optimal growth model and study its dynamics. As a steady state (or a balanced growth path) is only attainable as time goes to infinity, the authors resort to numerical simulations to convey what is happening during the short and medium run.

Finally, David DELA CROIX, Thomas LINDH and Bo MALMBERG move from the evidence that aging of the population will affect the growth path of all countries and to assess the historical and future importance of this claim use in (2006/64) two popular approaches and evaluate their merits and disadvantages by confronting them to Swedish data. They first simulate an endogenous growth model with human capital linking demographic changes and income growth. Rising longevity increases the incentive to get education, which in turn has ever-

lasting effects on growth through a human capital externality and secondly consider a reduced-form statistical model based on the demographic dividend literature. Assuming that there is a common DGP guiding growth through the demographic transition, they use an estimate from postwar global data to backcast the Swedish historical GDP growth. Comparing the two approaches, encompassing tests show that each of them contains independent information on the Swedish growth path, suggesting that there is a benefit from combining them for long-term forecasting.

ECONOMETRICS

The paper (2005/58) by Luc BAUWENS, Dagfinn RIME and Genaro SUCARRAT sheds new light on the mixture of distribution hypothesis by means of a study of the weekly exchange rate volatility of the Norwegian krone. In line with other studies the authors show that the impact of information arrival on exchange rate volatility is positive and statistically significant, and that the hypothesis that an increase in the number of traders reduces exchange rate volatility is not supported. The novelties of this study consist in documenting that the positive impact of information arrival on volatility is relatively stable across three different exchange rate regimes, and in the fact that the impact is relatively similar for both weekly volatility and weekly realised volatility. It is not given that the former should be the case since exchange rate stabilization was actively pursued by the central bank in parts of the study period. They also report a case in which undesirable residual properties attained within traditional frameworks are easily removed by applying the log-transformation on volatilities.

Luc BAUWENS and Genaro SUCARRAT, in (2006/21), move from the point that the general-to-specific (GETS) approach to modelling is widely employed in the modelling of economic series, but less so in financial volatility modelling due to computational complexity when many explanatory variables are involved. This study proposes a simple way of avoiding this problem and undertakes an out-of-sample forecast evaluation of the methodology applied to the modelling of weekly exchange rate volatility. Its findings suggest that GETS specifications are especially valuable in conditional forecasting, since the specification that employs actual values on the uncertain information performs particularly well.

Temporal aggregation is the subject of (2005/59) by Andrea SILVESTRINI and David VEREDAS, who feature state-of-the-art econometric methodology of aggregating for univariate linear time series, namely ARIMA-GARCH models. The authors present a unified overview of temporal aggregation techniques for this broad class of processes and explain in detail, although intuitively, the technical machinery behind the results. An empirical application with Belgian public deficit data illustrates the main issues.

Arie PREMINGER and Shinichi SAKATA propose in (2005/73) a method of model selection suitable in S -estimation. The proposed method chooses a model to minimize a criterion named the penalized S -scale criterion (PSC), which is decreasing in the sample S -scale of fitted residuals and increasing in the number of parameters. The authors study the large sample behavior of the PSC in nonlinear regression with dependent, heterogeneous data, to establish sets of sufficient conditions for the PSC to consistently select the model with the best fitting performance in terms of the population S -scale, and the one with the minimum number of

parameters if there are multiple best performers. The analysis allows for partial unidentifiability, which is often a practically important possibility when selecting one among nonlinear regression models. Two examples are offered to demonstrate how large sample results could be applied in practice and Monte Carlo simulations are performed to verify that the PSC performs as large sample theory indicates, and assess the reliability of the PSC method in comparison with the familiar Akaike and Schwarz information criteria.

Luc BAUWENS and Jeroen ROMBOUTS estimate in (2005/85) the mixed conditional heteroskedasticity model of Haas, Mittnik, and Paoletta (2004). They construct a Gibbs sampler algorithm to compute posterior and predictive densities. The number of mixture components is selected by the marginal likelihood criterion. The model is applied to the SP500 daily returns.

Luc BAUWENS and Jeroen ROMBOUTS develop with Arie PREMINGER in (2006/11) univariate regime-switching GARCH (RS-GARCH) models wherein the conditional variance switches in time from one GARCH process to another. The switching is governed by a time-varying probability, specified as a function of past information. The authors provide sufficient conditions for stationarity and existence of moments. Because of path dependence, maximum likelihood estimation is infeasible. By enlarging the parameter space to include the state variables, Bayesian estimation using a Gibbs sampling algorithm is feasible. This model is applied using the NASDAQ daily return series.

Luc BAUWENS and Jeroen ROMBOUTS again, this time with Christian HAFNER, propose in (2006/12) a new multivariate volatility model where the conditional distribution of a vector time series is given by a mixture of multivariate normal distributions. Each of these distributions is allowed to have a time-varying covariance matrix. The process can be globally covariance-stationary even though some components are not covariance-stationary. They derive some theoretical properties of the model such as the unconditional covariance matrix and autocorrelations of squared returns. The complexity of the model requires a powerful estimation algorithm. In a simulation study they compare estimation by maximum likelihood with the EM algorithm and Bayesian estimation with a Gibbs sampler. Finally, the model is applied to daily U.S. stock returns.

Luc BAUWENS, with Walid BEN OMRANE and Erick RENGIFO design and implement in (2006/10) optimal foreign exchange portfolio allocations. An optimal allocation maximizes the expected return subject to a Value-at-Risk (VaR) constraint. Based on intradaily data, the optimization procedure is carried out at regular time intervals. For the estimation of the conditional variance from which the VaR is computed, the authors use univariate and multivariate GARCH models. The result for each model is given by the best intradaily investment recommendations in terms of the optimal weights of the currencies in the risky portfolio.

In (2006/25), Jean-Pierre FLORENS, Jan JOHANNES and Sébastien VAN BELLEGEM consider the semiparametric regression, $X'\beta + \phi(Z)$ where β and $\phi(\cdot)$ are unknown slope coefficient vector and function, and where the variables (X, Z) are endogeneous. The authors propose necessary and sufficient conditions for the identification of the parameters in the presence of instrumental variables. They also focus on the estimation of β . An incorrect parametrization of ψ generally leads to an inconsistent estimator of β , whereas consistent nonparametric estimators for β have a slow rate of convergence. An additional complication is that the solution of the equation necessitates the inversion of a compact operator, which can be

estimated nonparametrically. In general this inversion is not stable, thus the estimation β is ill-posed. In this paper, a \sqrt{n} -consistent estimator for β is derived under mild assumptions. One of these assumptions is given by the so-called *source condition*, which is explicated and interpreted in the paper. Finally the authors show that the estimator achieves the semiparametric efficiency bound, even if the model is heteroskedastic.

In (2006/42), Arie PREMINGER and Christian HAFNER consider a closed form estimator for a stochastic volatility model and derive its asymptotic properties. The authors confirm their theoretical results by a simulation study. In addition, they propose a set of simple, strongly consistent decision rules to compare the ability of the GARCH and the SV model to fit the characteristic features observed in high frequency financial data such as high kurtosis and slowly decaying autocorrelation function of the squared observations. These rules are based on a number of moment conditions that is allowed to increase with sample size. They show that this selection procedure leads to choosing the best and simple model with probability one as the sample size increases. The finite sample size behaviour of this procedure is analyzed via simulations. Finally, they provide an application to stocks in the Dow Jones industrial average index.

In (2006/50), Luc BAUWENS and Michel LUBRANO review Bayesian inference for dynamic latent variable models using the data augmentation principle. The authors detail the difficulties of simulating dynamic latent variables in a Gibbs sampler and propose an alternative specification of the dynamic disequilibrium model, which leads to a simple simulation procedure and renders Bayesian inference fully operational. Identification issues are discussed and a specification search is conducted using the posterior deviance criterion of Spiegelhalter, Best, Carlin and van der Linde (2002) for a disequilibrium model of the Polish credit market.

In (2006/67), Antonio COSMA and Fausto GALLI carry out a nonparametric analysis of financial durations, making use of an existing algorithm to describe nonparametrically the dynamics of the process in terms of its lagged realizations and of a latent variable, its conditional mean. The devices needed to effectively apply the algorithm to the dataset under analysis are presented. On simulated data, the nonparametric procedure yields better estimates than the ones delivered by an incorrectly specified parametric method. On a real dataset, the nonparametric analysis can convey information on the nature of the data generating process that may not be captured by the parametric specification. In this view, the nonparametric method proposed can be a valuable preliminary analysis able to suggest the choice of a "good" parametric specification, or a complement of a parametric estimation.

Finally, in (2006/68) Ari PREMINGER and Giuseppe STORTI develop a least squares estimation approach for the estimation of a GARCH (1,1) model. The asymptotic properties of the estimator are studied given mild regularity conditions, which require only that the error term has a conditional moment of some order. The authors establish the consistency, asymptotic normality and the law of iterated logarithm for estimates. The finite sample properties are assessed by means of an extensive simulation study.

OPTIMIZATION METHODS

Much progress has been made in recent years in solving certain classes of production planning problems using mixed integer programming. One of the major challenges is how to make this expertise available and easy to use to the non-specialist and to the practitioners. Yves POCHE, Mathieu VAN VYVE and Laurence WOLSEY in (2005/47) describe a modeling approach and tool LS-LIB, and report on computational results. LS-LIB is a library of primitives to declare procedures/subroutines/global constraints in a high-level modeling language that offers an interesting partial answer to this challenge. LS-LIB provides routines for problem reformulation, cut generation, and heuristics to find good feasible solutions quickly. The user must provide an initial formulation of his problem in the modeling language MOSEL. Then using his knowledge of the problem he must first classify each product or sku according to a simple three field scheme: [production type, capacity type, variant] proposed recently. Then it is a simple matter to use the global constraints of LS-LIB by adding a few lines to his initial MOSEL formulation to get a tightened formulation and/or call the appropriate cut separation routines. The heuristic procedures are called in a similar fashion. The authors illustrate the use of LS-LIB on an intractable two-level problem, and a hard multi-level problem.

Ruslan SADYKOV considers in (2005/57) the scheduling problem of minimizing the sum of the weights of the late jobs on a single machine ($1 | r_j | \sum w_j U_j$). A branch-and-check algorithm is proposed, where a relaxed integer programming formulation is solved by branch-and-bound and infeasible solutions are cut off using infeasibility cuts. Two ways to generate cuts are suggested. First it is shown how the algorithm by Carlier can be modified to produce tightened "no-good" cuts. It is then demonstrated how to create cuts by using constraint propagation. The branch-and-check algorithm proposed is implemented in the *Mosel* modeling and optimization language. Computational experiments show that this algorithm outperforms the exact approach of Péridy et al.

An exploration of one method for finding the convex hull of certain mixed integer sets is provided in (2005/62) by Michele CONFORTI and Laurence WOLSEY. The approach is to break up the original set into a small number of subsets, find a compact polyhedral description of the convex hull of each subset, and then take the convex hull of the union of these polyhedra. The resulting extended formulation is then compact, its projection is the convex hull of the original set, and optimization over the mixed integer set is reduced to solving a linear program over the extended formulation. The approach is demonstrated on three different sets: a continuous mixing set with an upper bound and a mixing set with two divisible capacities both arising in lot-sizing, and a single node flow model with divisible capacities that arises as a subproblem in network design.

A number of contributions on convex programming are presented by Yurii NESTEROV in a series of papers. In (2005/67) the author presents a new approach for constructing subgradient schemes for different types of nonsmooth problems with convex structure. The methods employed are primal-dual since they are always able to generate a feasible approximation to the optimum of an appropriately formulated dual problem. Besides other advantages, this useful feature provides the methods with a reliable stopping criterion. The proposed schemes differ from the classical approaches (divergent series methods, mirror descent methods) by the presence of two control sequences. The first sequence is

responsible for aggregating the support functions in the dual space, and the second one establishes a dynamically updated scale between the primal and dual spaces. This additional flexibility allows one to guarantee boundedness of the sequence of primal test points even in the case of an unbounded feasible set. The author presents variants of subgradient schemes for nonsmooth convex minimization, minimax problems, saddle point problems, variational inequalities, and stochastic optimization. In all situations these methods are proved to be optimal from the view point of worst-case black-box lower complexity bounds.

In (2005/68) the author proposes an accelerated version of the cubic regularization of Newton's method. The original version, used for minimizing a convex function with Lipschitz-continuous Hessian, guarantees a global rate of convergence of order $O(1/k^2)$, where k is the iteration counter. This modified version converges for the same problem class with $O(1/k^3)$, keeping the complexity of each iteration unchanged. The complexity of both schemes on different classes of convex problems is studied and, in particular, it is argued that for the second-order schemes, the class of non-degenerate problems is different from the standard class.

In many applications, it is possible to justify a reasonable bound for possible *variation* of subgradients of objective function rather than for their uniform *magnitude*. In (2005/79) NESTEROV develops a new class of efficient primal-dual subgradient schemes for such problem classes.

Moreover, in (2006/28) the author proposes a new interior-point method, which is based on an extension of the ideas of self-scaled optimization to the general cases. He suggests using the primal correction process to find a *scaling point*. This point is used to compute a strictly feasible primal-dual pair by simple projection, then an affine-scaling direction is defined and a prediction step performed. This is the only moment when the dual barrier is used. Thus, it is needed only to compute its value, which can even be done approximately. In the second part of the paper the author develops a $4n$ self-concordant barrier for the n dimensional p -cone, which can be used in numerical testing of the proposed technique.

In (2006/30) the author develops a technique for constructing self-concordant barriers for convex cones. Starting from a simple proof for a variant of a standard result on the transformation of a η -self-concordant barrier for a set into a self-concordant barrier for its conic hull with parameter $(3.08\sqrt{\eta}+3.57)^2$ he develops a convenient composition theorem for constructing barriers directly for convex cones. In particular, good barriers for several interesting cones obtained as a conic hull of the epigraph of a univariate function can now be constructed. This technique works for power functions, entropy, logarithm and exponent functions, etc. It provides a background for development of polynomial-time methods for separable optimization problems. Thus, the abilities in constructing barriers for convex sets and cones become now identical.

In (2006/34), the author proposes two new nonsymmetric primal-dual potential-reduction methods for conic problems. The methods are based on *primal-dual lifting*. This procedure allows one to construct a strictly feasible primal-dual pair related by an exact *scaling* relation even if the cones are not symmetric. It is important that all necessary elements of these methods can be obtained from the standard solvers for the *primal* Newton system. The first of the proposed schemes is based on the usual affine-scaling direction. For the second one, the

author applies a new *first-order* affine-scaling direction, which incorporates in a symmetric way the gradients of primal and dual barriers. For both methods he proves an $O(\sqrt{\eta} \ln 1/\varepsilon)$ complexity estimate, where η is the parameter of the barrier and ε is the required accuracy.

Finally, in (2006/39) he derives efficiency estimates of the regularized Newton's method as applied to constrained convex minimization problems and to variational inequalities, studying a one-step Newton's method and its multistep accelerated version, which converges on smooth convex problems as $O(1/k^3)$ where k is the iteration counter. The efficiency estimate of a second-order scheme for smooth variational inequalities is also derived and a global rate of convergence is established on the level $O(1/k)$.

In (2005/69), Yurii NESTEROV analyzes the computational performance of dual trigonometric generating functions on some integer programming problems, to show that if the number of equality constraints is fixed, then this technique allows one to solve the problems in time, which is polynomial in the dimension of the space of variables.

Shoshana ANILY, Michal TZUR and Laurence WOLSEY consider in (2005/70) a multi-item lot-sizing problem in which there are demands, and unit production and storage costs. In addition production of any mix of items is measured in batches of fixed size, and there is a fixed set-up cost per batch in each period. If one supposes that the unit production costs are constant over time, the storage costs are nonnegative, and for any two items the one that has a higher storage cost in one period has a higher storage cost in every period. The authors then show that there is a linear program with $O(mT^2)$ constraints and variables that solves the multi-item lot-sizing problem, thereby establishing that it is polynomially solvable, where m is the number of items and T the number of time periods. This generalizes an earlier result of Anily and Tzur who presented a $O(mT^{m+5})$ dynamic programming algorithm for essentially the same problem. Under additional conditions, a similar linear programming result is shown to hold in the presence of backlogging when the batch size is arbitrarily large.

The problem of correlation between the projections of two square matrices is considered in (2005/80) by Catherine FRAIKIN, Yurii NESTEROV and Paul VAN DOOREN. These matrices of dimensions $m \times m$ and $n \times n$ are projected on a subspace of lower-dimension k under isometry constraints. The correlation between these projections expressed as a trace function of the product of the projected matrices is maximized. The authors first connect this problem to notions such as the generalized numerical range, the field of values and the similarity matrix. They then show that these concepts are particular cases of the problem for choices of m , n and k . The formulation used applies to both real and complex matrices. The objective function, its fixed points, its optimal value for Hermitian and normal matrices and finally upper and lower bounds for the general case are characterized. An iterative algorithm based on the singular value decomposition is proposed to solve the optimization problem.

In (2005/87) Andrew MILLER, Debasis MISHRA and Dharmaraj VEERAMANI study a problem in a procurement setting in which an *Original Equipment Manufacturer* (OEM) wants to procure a set of items from a set of suppliers. Each supplier incurs a cost for supplying any subset/bundle of items, and each supplier's cost information is known only to him. The goal is to determine (i) an *efficient* allocation of suppliers to items and (ii) appropriate payments for suppliers. The authors formulate the problem of determining which supplier should supply what items as an integer program and develop a method, which is based on the *ellipsoid* method, that solves

the dual of the linear relaxation of the problem in polynomial time, to show that the linear relaxation has an integral optimal solution.

Michele CONFORTI, Marco DI SUMMA and Laurence WOLSEY consider in (2005/92) the mixing set with flows: $s + x_t \geq b_t, x_t \leq y_t$ for $1 \leq t \leq n$; $s \in \mathfrak{R}_+^1, x \in \mathfrak{R}_+^n, y \in Z_+^n$ that models the "flow version" of the basic mixing set introduced and studied by Günlük and Pochet, as well as the most simple stochastic lot-sizing problem with recourse, and more generally is a relaxation of certain mixed integer sets that arise in the study of production planning problems. The authors study the polyhedron obtained by convexifying the above set, and provide a system of inequalities that gives its external description and characterize its vertices and rays.

Marco DI SUMMA and Laurence WOLSEY present in (2006/44) various formulations based on mixing sets for the problem of lot-sizing on a tree with constant capacities, or stochastic lot-sizing with a scenario tree, and they present various reformulations based on mixing sets. They also show how earlier results for uncapacitated problems involving (Q,S_0) inequalities can be simplified and extended. Finally some limited computational results are presented.

Finally, Michel BAES extends in (2006/13) the powerful smoothing techniques of Nesterov to the framework of Euclidean Jordan algebras. This study allows him to design a new scheme for minimizing the largest eigenvalue of an affine function on a Euclidean Jordan algebra. The author proves that its complexity is in the order of $O(1/\varepsilon)$, where ε is the absolute tolerance on the value of the objective. Particularizing the result, he proposes a new algorithm to minimize a sum of Euclidean norms and performs its complete complexity analysis.

GAME-THEORETICAL MODELS

Ascending price auctions typically involve a single price path with buyers paying their final bid price. Using this traditional definition, no ascending price auction can achieve the Vickrey-Clarke-Groves (VCG) outcome for general private valuations in the combinatorial auction setting. Debasis MISHRA and David PARKES relax this definition in (2005/52) by allowing discounts to buyers from the final price of the auction (or alternatively, calculating the discounts dynamically during the auction) while still maintaining a single price path. Using a notion called *universal competitive equilibrium* prices, shown to be necessary and sufficient to achieve the VCG outcome using ascending price auctions, they define a broad class of ascending price combinatorial auctions in which truthful bidding by buyers is an ex post Nash equilibrium. Any auction in this class achieves the VCG outcome and ex post efficiency for general valuations. Two specific auctions in this class are defined by generalizing two known auctions in the literature.

Olivier BOCHET considers in (2005/60) exchange economies in which preferences are continuous, convex and strongly monotonic. It is well known that the Walrasian correspondence is not Nash implementable. Maskin monotonicity (1999) is violated for allocations at the boundary of the feasible set. The author derives an impossibility result showing that it is in fact not implementable in any solution concept and next, he constructs a sequential mechanism based on price-allocation announcements that fits the very description of Walrasian equilibrium. Imposing an additional domain restriction, it is shown that it fully implements the Walrasian correspondence in subgame perfect and strong subgame perfect

equilibrium, thus taking care of the boundary problem that was prominent in the Nash implementation literature.

In (2005/63), Olivier BOCHET constructs an elementary mechanism (Dutta, Sen and Vohra, 1995) that Nash implements the Constrained Walrasian correspondence, extends it to incomplete and non-exclusive information economies by enlarging the message space of agents and characterizes the set of Bayesian equilibrium outcomes of the mechanism, and thus characterizes an extension of the Constrained Walrasian correspondence when one switches from complete to incomplete information. First, measurability restrictions on allocations do not emerge from the strategic behavior of agents: there exist simple economies for which the set of Constrained Rational Expectations equilibrium allocations is not contained in the set of equilibrium outcomes of the mechanism. Next, by imposing measurability restrictions on allocations, the mechanism globally implements the Constrained Rational Expectations Equilibrium correspondence. This result shows game-theoretic connections between these two market equilibrium concepts. However, it is obtained at the price of strong restrictions on the behavior of agents.

In a third paper (2005/72), Olivier BOCHET considers the problem of exact Nash Implementation of social choice correspondences. Defining a lottery mechanism as a mechanism in which the planner can randomize on alternatives out of equilibrium while pure alternatives are always chosen in equilibrium, when preferences over alternatives are strict, the author shows that Maskin monotonicity (Maskin, 1999) is both necessary and sufficient for a social choice correspondence to be Nash implementable. He discusses how to relax the assumption of strict preferences, examines social choice correspondences with private components and, finally, applies this method to the issue of voluntary implementation (Jackson and Palfrey, 2001).

In (2005/78), Ines LINDNER notices that in general, analyses of voting power are performed through the notion of a simple voting game (SVG) in which every voter can choose between two options: "yes" or "no". Felsenthal and Machover (1997) introduced the concept of ternary voting games (TVGs) which recognizes abstention alongside. They derive appropriate generalizations of the Shapley-Shubik and Banzhaf indices in TVGs. Braham and Steffen (2002) argued that the decision-making structure of a TVG may not be justified. They propose a sequential structure in which voters first decide between participation and abstention and then between yes or no. The purpose of her paper is twofold. First, it compares the two approaches and shows how the probabilistic interpretation of power provides a unifying characterization of analogues of the Banzhaf (Bz) measure. Second, using the probabilistic approach the author proves a special case of *Penrose's Limit Theorem* (PLT), showing that PLT holds in TVGs for analogues of Bz measures, irrespective of the particular nature of abstention.

Jacques DRÈZE is the author of the article (2005/90) on nested identification of subjective probabilities. The theory of games against nature relies on complete preferences among all conceivable acts, i.e. among all potential assignments of consequences to states of nature (case 1). Yet most decision problems call for choosing an element from a limited set of acts. And in games of strategy, the set of strategies available to a player is given and not amenable to artificial extensions. In "Assessing Strategic Risk" (CORE DP 2005/20), Aumann and Drèze extended the basic result of decision theory (maximisation of subjectively expected utility) to situations where preferences are defined only for a given set of acts, and for lotteries among

these and sure consequences (case 2). In this paper, the author provides a similar extension for two other situations: those where only the *set of optimal elements* from a given set of acts is known (case 3); and those where only a *single optimal act* is known (case 4). To these four cases correspond four nested sets of admissible subjective probabilities over the states or the opponent's strategies, namely a singleton in case 1 and increasing sets in cases 2-4. The results for cases 3 and 4 also define the extent to which subjective probabilities must be specified in order to solve a given decision problem or play a given game.

In (2006/4) Sergio PARREIRAS and Anna RUBINCHIK-PESSACH study tournaments with many ex-ante asymmetric constants, whose valuations for the prize are independently distributed. The authors first characterize the equilibria in monotone strategies, second, provide sufficient conditions for the equilibrium uniqueness and, finally reconcile the experimental evidence documenting the "workaholic" behavior in contests with the related theory by introducing heterogeneity among participants. It is a "weak" participant that might become a "workaholic" in an equilibrium, that is, his effort density might *crease* at the highest valuation - weak, either because he is more risk averse or because his rivals consider that it is very unlikely that he has a high value for the prize. In contrast, effort densities are always decreasing in case of symmetry with identically distributed values for the prize and identical attitudes towards risk in case of CARA, as well as in contests with only two participants. Moreover, they show that for low valuations more risk averse agents are less likely to exert low effort than their "strong" rivals, while those with dominated distribution of the prize valuation are more likely to do so. An explicit solution for the uniform distribution case with contestant-specific support is provided as well.

Rabah AMIR, Filomena GARCIA and Malgorzata KNAUFF provide with (2006/8) an attempt to develop a unified approach to endogenous heterogeneity by constructing general class of two-player symmetric games that always possess only asymmetric pure-strategy Nash equilibria. These classes of games are characterized in some abstract sense by two general properties: payoff non-concavities and some form of strategic substitutability. The authors provide a detailed discussion of the relationship of this work with Matsuyama's symmetry breaking framework and with business strategy literature. This framework generalizes a number of models dealing with two-stage games, with long term investment decisions in the first stage and product market competition in the second stage. The main examples that motivate this study to illustrate the generality of the approach are presented.

A mistake in "Five legitimate definitions of correlated equilibrium in games with incomplete information" motivates Françoise FORGES to a re-examination, provided in (2006/41), of some extensions of the solution concept that Aumann introduced.

The paper (2006/62), by Carmen HERRERO, Jean MORENO-TERNERO and Giovanni PONTI reports an experimental study on three well-known solutions for problems of adjudicating conflicting claims: the constrained equal-awards, the proportional, and the constrained equal-losses rules. The authors first let subjects play three games designed such that the unique equilibrium allocation coincides with the recommendation of one of these three rules. In addition, they let subjects play an additional game, that has the property that all (and only) strategy profiles in which players coordinate on the same rule constitute a strict Nash equilibrium. While in the first three games subjects' play easily converges to the unique equilibrium rule, in the last game the proportional rule overwhelmingly prevails as a coordination device, especially when

the game is framed with an hypothetical bankruptcy situation. They also administered a questionnaire to a different group of students, asking them to act as impartial arbitrators to solve (among others) the same problems played in the lab. Also in this case, respondents were sensitive to the framing of the questions, but the proportional rule was selected by the vast majority of respondents.

NETWORKS

Jean GABSZEWICZ and Filomena GARCIA propose two papers on network industries. In the first (2005/95), the authors obtain explicitly the optimal path of prices for a monopolistic operating in a network industry during a finite number of periods. They describe this optimal path as a function of network intensity and horizon length and show that the prices are increasing in time and that, for very low network intensity, or very high horizon length, the monopolist will offer the good at zero price in the initial period.

The second paper (2005/87) analyses instead the optimal pricing choice of an incumbent firm that sells a good with network externalities and is threatened by the entry of a higher quality variant. In the framework of a vertical differentiation model, it finds a necessary and sufficient condition under which quality improvement occurs as a result of this competition.

In (2006/2) Noemi NAVARRO analyzes a market where there is a homogeneous good, which quality is chosen, and therefore known, by a single producer. Consumers do not know the quality of the good but they use their acquaintances in order to obtain information about it. Information transmission exhibits decay and consumers assign a common initial willingness-to-pay before information transmission takes place. The author defines an equilibrium concept for this type of situation and characterize the set of resulting equilibria for any possible social network. The main conclusion from this characterization is that, if there is a maximal level of quality (given by technological knowledge) that can be chosen, then, the producer may choose lower levels of quality as the population of consumers is getting more internally connected, due to free-riding on information by consumers when quality levels are low. This "adverse-selection" effect vanishes if consumers are expected to coordinate on the most favorable equilibria for the producer, if there is zero initial willingness-to-pay or if there are no technological constraints.

The paper (2006/53), by Ana MAULEON, Huasheng SONG and Vincent VANNETELBOSCH examines the formation of free trade agreements as a network formation game. The authors consider a three-country model in which international trade occurs between economies with imperfectly competitive product markets. Labor markets can be unionized and non-unionized in each country. They show that if all countries are of the same type (all of them are either unionized or non-unionized), the global free trade network is both the unique pairwise stable network and the unique efficient network. If some countries are unionized while others are non-unionized, other networks apart from the global free trade network are likely to be pairwise stable. However, the efficient network is always the global free trade network. Thus, a conflict between stability and efficiency may occur. Moreover, starting from the network in which no country has signed a free trade agreement, all sequences of networks due to

continuously profitable deviations do not lead (in most cases) to the global free trade network, even when global free trade is stable.

ECONOMIC GEOGRAPHY

In (2005/55), Kristian BEHRENS, Andrea LAMORGESE, Gianmarco OTTAVIANO and Takatoshi TABUCHI extend Krugman's (1980) two-country two-sector model to a setup with an arbitrary numbers of countries and sectors. The extended model predicts an adequately defined "home market effect" only after controlling for cross-country differential accessibility through a theory-based linear filter. The authors bring that prediction to data by running a battery of non-parametric sign- and rank-tests that are closely related to those used in factor proportions theory. When applied to production and trade data on a cross-section of OECD and non-OECD countries, they find support for the presence of "home market effects" in a broad number of industries.

Yasuhiro SATO and Jacques-François THISSE investigate in (2005/61) the impacts of capital mobility and tax competition in a setting with imperfect matching between firms and workers. The small country always gains and the large country always loses from tax competition, thus implying that tax competition leads to redistribution from the large to the small country. However, the large country always attains a higher utility than does the small country. These results imply that this model encapsulates both the "importance of being small" as well as the "importance of being large". It is also shown that tax harmonization leads to redistribution from the large to the small country.

An investigation of the spatial distribution and organization of an imperfectly competitive industry when firms may choose to operate more than a single production unit is provided by Kristian BEHRENS and Pierre PICARD in (2005/65). Focusing on a short-run setting with a fixed mass of firms, they fully characterize the spatial equilibria analytically and, comparing the equilibrium and the first-best, show that both organizational and spatial inefficiencies may arise. In particular, when fixed costs are low enough the market outcome may well lead to overinvestment and, therefore, to too many multinationals operating from a social point of view. Furthermore, once multinationals are taken into account, the market outcome may well lead to too little agglomeration.

Kristian BEHRENS and Yasuhiro SATO analyze in (2006/1) the impacts of labor market integration and migration on skill formation, wage structures, and per capita GDP of host and source countries. To do so, they propose a model in which heterogeneous agents invest in the acquisition of skills, and in which final good production exhibits increasing returns to scale in the range of available skills. Labor market integration, by allowing for migration in response to wage differentials, changes the wage structures and, therefore, the incentives to become skilled in both host and source countries. The authors show that this model can largely replicate the empirical evidence concerning international migration, the widening international income dispersion, the narrowing national income dispersion, and the divergence in the rates of skill formation in host and source countries.

Salvador BARRIOS, Luisito BERTINELLI and Eric STROBL investigate in (2006/46) the role that climatic change has played in the pattern of urbanization in sub-Saharan African countries

compared to the rest of the developing world. To this end they assemble a cross-country panel data set that allows them to estimate the determinants of urbanization. The results of the econometric analysis suggest that climatic change, as proxied by rainfall, has acted to change urbanization in sub-Saharan Africa but not elsewhere in the developing world. Moreover, this link has become stronger since decolonization, which is likely due to the often simultaneous lifting of legislation prohibiting the free internal movement of native Africans.

Luisito BERTINELLI and Eric STROBL, this time with Benteng ZOU, study in (2006/52) how the import of older and more polluting technologies alters the relationship between output and environmental quality in developing countries within a vintage capital framework. The results show that old technologies prolong the period until which pollution may eventually decrease and cause this turning point to be reached at a higher level of pollution. An empirical analysis using export data of vintage technologies from the US and Europe to developing countries supports the theoretical findings.

The paper (2006/55) by Pierre PICARD and Dao-Zhi Zeng investigates the joint impact of Chamberlinian monopolistic competition and Ricardian comparative advantages on the structure of trade and industries. The authors develop a trade model with several industries employing local factors and then investigate the structure of trade and industries as well as the possibilities of catastrophic changes and endogenous asymmetries in industry distribution. Three configurations are studied: multiple industries with local factor advantages at small trade costs, single industry with local factor advantage and two industries with comparative advantages for any trade costs. The last setting synthesizes the traditional results of Chamberlin and Ricardo.

The same authors propose in (2006/57) a framework where the relationship between growth and pollution is studied through a vintage capital model where new technologies are more environmental-friendly. The authors find that once the optimal scrapping age of technologies is reached, an economy may achieve two possible cases of sustainable development, one in which pollution falls and another in which it stabilizes, or a catastrophic outcome, where environmental quality reaches its lower bound. The outcome will depend on countries' investment path and their propensity to innovate in environmentally clean technologies, both of which are likely to differ across economies. Empirical results using long-time series for a number of developed and developing countries indeed confirm heterogeneous experiences in the pollution-output relationship.

Pierre PICARD and David WILDASIN start in (2006/60) from the fact that economic regions, such as urban agglomerations, face external demand and price shocks that produce income risk. Workers in large and diversified agglomerations may benefit from reduced wage volatility, while firms may outsource the production of intermediate goods and realize benefits from Chamberlinian externalities. Firms may also protect workers from wage risks through fixed wage contracts. This paper explores the relationships between firms' risks, workers' contracts, and the structure of production in cities.

As in models with heterogeneous firms trade integration has a positive impact on aggregate productivity through the selection of the best firms as import competition drives the least productive ones out of the market. To quantify the impact of firm selection on productivity, Massimo DEL GATTO, Giordano MION and Gianmarco OTTAVIANO (2006/61) calibrate and

simulate a multi-country multi-sector model with monopolistic competition and variable markups using firm-level data and aggregate trade figures on a panel of 11 EU countries. The authors find that EU trade has a sizeable impact on aggregate productivity. In 2000 the introduction of prohibitive trade barriers would have caused an average productivity loss of roughly 13 per cent, whereas a reduction of intra-EU trade costs by 5 per cent would have generated a productivity gain of roughly 2 per cent. Productivity losses and gains, however, vary a lot across countries and sectors depending on market accessibility and trade costs. Evidence that results are robust to alternative distance and productivity measures is also provided.

RESEARCH PROJECTS UNDER CONTRACTS

DOES CENTRALIZATION LEAD TO BETTER GOVERNANCE

The purpose of the proposed research is to investigate the interaction of political institutions and economic performance. A long tradition in fiscal federalism emphasizes the advantages of decentralization for good governance. The general idea is that governments are more accountable for their actions in smaller jurisdictions. Yet it is not obvious that decentralization promotes good governance. In fact, recent theory and evidence suggest that decentralization may actually induce efficiency losses. These losses can result from spillovers, externalities and soft budget constraint problems. Jean HINDRIKS coordinates this FSR project.

ECONOMIC ANALYSIS OF HETEROGENEITY IN SOCIAL ORGANIZATION

The co-existence under diversity has become one of the most important and challenging issues in multi-cultural societies. The diversity that could be rooted in cultural, religious, linguistic, economic, ideological or historical differences can provide an accelerator and spark to the enrichment and progress of our society. Recent research points out the strong linkage between the diversity of human capital and talents across major cities in the United States to the creativity and innovative technology-based industries located there. The positive impact of diversity of cultural and skill assets could be mitigated by the fact that diversity and polarization may pose a threat to the cohesiveness and preservation of existing political and economic structures. For example, the recent enlargement of the European Union created a powerful union of more than 450 million people and an economy of about nine trillion euros, which is close in size to that of the United States. On the other hand, the cultural, historical, religious, and geographical diversity within the bloc with twenty official languages is overwhelming. The economic disparities among the country members are striking. The gaps would widen even further when Bulgaria, Romania, Coratia, and possibly Turkey will join the Union. The crucial question is whether there exists a threshold on the degree of the intra-union heterogeneity that would preserve the sustainable cohesiveness of the Union and its ability to generate a consensus among its members.

Jean HINDRIKS and Shlomo WEBER coordinate this ARC project financed by the Communauté Française. Frederico DE STEFANO, Catarina GOULAO and Juan MORENO TERNERO have been working within the scope of this project.

EUROPEAN LABORATORY IN QUANTITATIVE ECONOMICS AND THEORY OF CHOICE

The Laboratory in Quantitative Economics and Theory of Choice is an Associated European Laboratory of the French CNRS (Centre National de la Recherche Scientifique), the Belgian FNRS (Fonds National de la Recherche Scientifique) and the Spanish Consejo Superior de Investigaciones Científicas (CSIC), which proposes a research programme based on a collaboration between the GREQAM of EHESS and the Universités d'Aix-Marseille II and III, the GREC grouping economists from three centers in Barcelona (Institut d'Anàlisi Econòmica, Universitat Autònoma de Barcelona and CODE at Universitat Pompeu Fabra) and CORE. The present convention ends in December 2007. The principal fields of research are: strategic foundations of industrial organization, uncertainty, bounded rationality and learning, political economy; coalition formation and networks, the development of econometric methods for tests and estimation, growth and redistribution. Giuseppe DE FE0 has been working within the scope of this project.

EQUILIBRIUM THEORY AND OPTIMIZATION FOR PUBLIC POLICY AND INDUSTRY REGULATION (CONTRACT IAP P5/21)

The Belgian Science Policy administration has renewed this important research contract for a new period of five years (Phase V) ending in December 2006. CORE is the "Attraction Pole" (Promotor: Claude D'ASPREMONT).

The Belgian partners are IRES, Université catholique de Louvain (Promotor: David DE LA CROIX), Centrum voor Economische Studien, Katholieke Universiteit Leuven (Promotor: Erik SCHOKKAERT), Groupe d'Economie Quantitative et Optimisation, Facultés Universitaires Notre-Dame de la Paix, Namur (Promotor: Sébastien LAURENT), Fakulteit Economie en Bedrijfskunde, Universiteit Gent (Promotor: Dirk VAN DE GAER). The Foreign partners are Groupement de Recherche en Economie Quantitative d'Aix-Marseille, Université d'Aix-Marseille II and III (Promotor: Francis BLOCH), the London School of Economics (Promotor: Frank COWELL), Institut d'Economie Industrielle, Université des Sciences Sociales de Toulouse (Promotor: Jacques CRÉMER), and the Norwegian School of Economics (Promotor: Fred SCHROYEN).

The objective of the project is to simultaneously develop analytical tools for economic equilibrium analysis and use these tools in the fields of public policy and regulation. The strategic and mechanism design approaches to equilibrium theory in economics, as well as the normative dimension of the analysis and the possible use of optimisation methods have to be developed. Various aspects of public decision, both at the micro and the macro level, and the regulation of both social and industrial organisations are examined. Econometric models should support the theoretical analysis.

In continuity with the previous *IAP* project, the general equilibrium perspective has been kept, but with further developments of game-theoretical features. This includes the integration of

strategic behavior (incentive constraints and market power effects) in general equilibrium and in macro-dynamics, and its consequences from a policy point of view. The strategic role of R&D and innovation has been emphasized. The regulation of various markets from an incentive point of view (such as markets for labor, insurance, financial or cultural goods and services) has been considered.

In game theory, several developments have been obtained in repeated games with imperfect monitoring, as well as in cooperative games and coalition formation. A lot of effort has also been devoted to the construction of different dynamic general equilibrium models with various features (including technological progress and imperfect competition) and to related empirical studies. In optimization there has been considerable work on non-linear programming using interior-point or mixed interior/exterior-point methods, or other kinds of methods using some structural properties of the objective function, such as separability. Unconstrained convex minimization is also studied, and further work has been done to solve mixed integer programs.

From a policy perspective, optimal redistribution through taxation, and the redistributive effect of privatizing a free access resource has been examined and a political economy viewpoint adopted. Various measures of welfare have been proposed and intergenerational equity considerations introduced in the study of social security and education. In economic geography and urban concentration, several empirical investigations in EU countries have been made and different welfare approaches to evaluate agglomeration vs. dispersion of economic activity have been explored.

On market and industry regulation, various models involving different sorts of networks (mainly transport and electricity transmission) have been constructed. On the labor market many issues have been examined, such as workers bargaining power, the impact of taxation on employment and income tax competition. Also, some work was done in economics of culture (including the ranking of economics departments in Europe and the study of language disenfranchisement) and on implementation of environmental policies. In econometrics, this year's contribution is mostly concentrated on financial econometrics, but there are some new developments in health insurance and health economics.

Timos ATHANASIOU, Gilles GRANDJEAN, Frédéric LAURIN and Cecilia VERGARI have been working in the scope of this project.

CLIMNEG PROJECT ON CLIMATE, COALITIONS AND TECHNOLOGY

The subject of this new CLIMNEG project is the exploration of the potential for post-Kyoto climate regimes with respect to two keys issues: (i) how stable coalitions of countries could emerge to significantly mitigate climate change; (ii) what could be the contribution of technological progress for a sustainable climate ? How these two issues interplay are especially examined in the project.

This project is coordinated by CORE (promotor: Thierry BRÉCHET). It gathers the Europese Hogeschool Brussel (promotor: Johan EYCKMANS), the Institut d'Astronomie et de Géophysique George Lemaître of Université catholique de Louvain (promotor: Jean-Pascal VAN

YPERSELE), the Center for Economic Studies of the Katholieke Universiteit Leuven (promotor: Denise VAN REGEMOTER), and the Dulbea at the Université Libre de Bruxelles (promotor: Henri CAPRON).

PUBLIC POLICY, MARKET ORGANIZATION AND TRANSITION ECONOMIES

This project is lead by a consortium which includes the Center for Operations Research and Econometrics (CORE), Université catholique de Louvain, project co-ordinator (coordinator: Jean HINDRIKS), the Central European University (CEU), Budapest (promotor: Istvan TEPLAN), the Center for Economic Research and Graduate Studies of Charles University (CERGE), Prague (promotor: Ivan WILHELM) and the Economics Institute, Academy of Sciences of the Czech Republic (EI), Prague (promotor: Lubomir LIZAL).

The aim of this training project is to prepare students for careers in teaching, research or government services and to prepare researchers to the analysis of the fundamental economic questions facing market regulation and transition economies. The program is designed to ensure that students acquire rigorous state of the art knowledge of core areas of economic theory and research methodology and to offer them research opportunities under close supervision.

The project provides state-of-the-art training in the fields of public policy, industrial organization and transition economies.

PUBLIC GOODS, PUBLIC PROJECTS, EXTERNALITIES

Defining European policies in provision and financing public goods and services, environment defense is a core challenge for the building of a political Europe. Rather than a political answer, this program invites to advance the part of economic theory addressing these crucial questions. Topics include pure public goods and public projects, all kind of impure public goods, public goods as production inputs, externalities, environment. The outcome of the program is the creation and development of an effective research network mixing theorists, specialists of political economy and of history of economic analysis and practitioners of public economics.

The program aims to foster and develop research in the field of public economics where the participants can benefit from an international exchange of ideas and of experience between different European institutions and researchers. It is expected that the outcome of the program will be the creation and development of an effective research network. The participants to this program are the University of Graz (promotor: Richard STURN), the Max Planck Institute for Research on Collective Goods, Bonn (promotor: Martin HELLWIG), the Bogazici University (promotor: Unal ZENGINOBUZ), CERMSEM, Université Paris I (promotor: Monique FLORENZANO) and CORE, Université catholique de Louvain (promotor: Jean HINDRIKS).

ALGORITHMIC DISCRETE OPTIMIZATION NETWORK

This project is a European Network devoted to doctoral and postdoctoral training and research in Algorithmic Discrete Optimization.

Participants are research groups from a variety of universities: Otto-van-Guericke Universität Magdeburg; CORE, Université Catholique de Louvain; Université Joseph Fourier Grenoble; Ecole Polytechnique Fédérale de Lausanne; Eotvos University Budapest, Faculdade de Ciencias da Universidade de Lisboa, Technische Universität Wien, Universität zu Köln, Universität Klagenfurt; and research centers: Stichting Centrum voor Wiskunde en Informatica Amsterdam; Consiglio Nazionale delle Ricerche Rome; and Dash Associates, Leamington.

The main topics covered by the project include

- Linear and nonlinear integer programming, as well as links to semi-definite programming and convex optimization.
- New approaches to integer programming including primal approaches, and methods based on algebraic geometry, lattices and rational functions.
- Combinatorial optimization and polyhedral combinatorics
- Problems with uncertain data: robust solutions and treatment of uncertainty.

At CORE, Yurii NESTEROV and François GLINEUR have a particular interest in approaches based on convex optimization, and Yves POCHET and Laurence WOLSEY in both polyhedral and novel approaches to integer and mixed integer programming.

OPTIMAL SCHEDULING AND ON LINE CONTROL OF HYBRID BATCH-CONTINUOUS PRODUCTION PROCESSES

The objective of this project is to develop methods for the scheduling and control of mixed production lines, composed of both batch production stages and continuous production stages. The aim is to study the specific coordination questions arising in scheduling (operations research part of the project) and controlling (automatic part of the project) such mixed lines. Then these methods are applied to real life chemical production lines in order to maximize the short term productivity, taking into account the limited availability of some shared resources, and to guarantee the stability of the proposed schedule through some feedback mechanism.

François WARICHET has been working within the framework of this project coordinated by Georges BASTIN, Denis DOCHAIN and Yves POCHET.

ACI TECHNICAL PROGRESS AND GROWTH

This project deals with the contribution of technological progress to sustainable development considered under its economics, environmental and social dimensions. The methodological approach is macrodynamics. The objective is to use and to develop the most recent theoretical works in macrodynamics in the field of sustainable development and to foster international collaborations. The project gathers European research centers: EUREQua, GAINS, Université de la Maine and INRA, GREQAM Université de la Méditerranée, Aix-Marseille, Université de

Montpellier, Université de Paris I, THEMA, Université de Paris X and other research centers: CORE (UCL), IRES (UCL) and the University of Lausanne. This project is coordinated by Thierry BRÉCHET.

SPACE AND EXTENSION OF CITIES

The French Ministry delegated to research and new technologies initiated this ACI (Incitative Concerted Action) project. It deals with several aspects : migrations and mobility (in particular periurbanization of the households, spatial segregation), land use dynamics (in particular landscape amenities in the urban-rural fringe), globalization and location of firms (in particular polycentrism and migration of firms in relation to the interregional or international trade). The broad coverage of the ACI results from the integrating character of the project, which brings together theorists in economics (economic geography, urban economics, public economics) and geography (fractal geometry, self-organizing processes) and applied researchers in rural economics (periurban fringe, ruralization of firms, rural labor markets), in urban economics (segregation, spatial mismatch, local public economics), in regional economics (endogenous growth, transport) and urban geography (morphology of urban sprawl, morphogenesis, borders, mixed spaces, urban segregation). This regrouping takes place around the UMR CESAER of the INRA (Dijon) and CORE, with the participation of other researchers belonging to the Fédération Jourdan (INRA-LEA, CERAS, CEPREMAP) and to THEMA (CNRS, Besançon). The ACI offers a coherent framework and the related mean for developing more collaboration between research centers, disciplines and competences (as well as generations) to shed light on some of the major stakes of the contemporary urban space structure in France.

Kristian BEHRENS, Dominique PEETERS, Jacques-François THISSE and Isabelle THOMAS are involved in this project.

▪ EUROPEAN SUPPORT FOR YOUNG RESEARCHERS

Kristian BEHRENS benefitted from financial support of the European Commission under the Marie Curie Individual Driven Actions. The topic of his research is the asymmetries in the economic geography of the European Union.

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PUBLICATIONS

- PUBLISHED PAPERS (CORE REPRINTS)
- PUBLISHED PAPERS (NOT IN THE REPRINT SERIES)
- OTHER PAPERS
- BOOKS
- EDITORIAL ACTIVITIES
- DOCTORAL DISSERTATIONS

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 - Helmuth CREMER, Philippe DE DONDER, Dario MALDONADO and Pierre PESTIEAU. Designing an optimal linear pension scheme with forced saving and wages heterogeneity. Mimeo, 2005.
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 - Massimo DEL GATTO, Giordano MION and Gianmarco I.P. OTTAVIANO. Trade integration, firms selection and the costs of non-Europe. Mimeo, 2006.

- Mathias DEWATRIPONT, Victor GINSBURGH, Patrick LEGROS, Alecis WALCKIERS, Jean-Pierre DEVROEY, Marianne DUJARDIN, Françoise VANDOOREN, Pierre DUBOIS, Jérôme FONCEL, Marc IVALDI and Dominique HEUSSE. Study on the economic and the technical evolution of the scientific publication market in Europe. DG-Research, EC, http://ec.europa.eu/research/science-society/pdf/scientific-publication-study_en.pdf. January 2006.
- Jacques DRÈZE, Michel LE BRETON, Alexei SAVATEEV and Shlomo WEBER. The cost of stability. Mimeo, 2005.
- Jacques DRÈZE, Michel LE BRETON and Shlomo WEBER. Rawlsian pricing of access to public facilities: a unidimensional illustration. Mimeo, 2006.
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- Fernanda ESTEVAN. Mortality risks, education and child labor. Under revision for the Journal of Development Economics, 2006.
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- Jean-Pierre FLORENS, Jan JOHANNES and Sébastien VAN BELLEGEM. Instrumental regression in partially linear models. Mimeo, 2005.
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- Filomena GARCIA and Cecilia VERGARI. Compatibility choice in vertically differentiated technologies. Mimeo, 2006.
- Catarina GOULAO. Pooling and redistribution with moral hazard. Mimeo, 2006.
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- Raymond HEMMECKE and Peter MALKIN. Computing generating sets of lattice ideals. Submitted to the Journal of Symbolic Computation.
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- Michel LE BRETON and Vera ZHETS. On the equivalence of coalitional and individual strategy-proofness properties. IDEI Working Paper 408, 2006.
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- Giordano MION and Paolo NATICCHIONI. Urbanization externalities, market potential and spatial sorting of skills and firms. CEPR Discussion Paper 5172, 2005.
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- Dagfinn RIME and Genaro SUCARRAT. Exchange rate variability and heterogeneity. Mimeo, 2006.
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- Laura SCRIMALI. The financial equilibrium problem with implicit budget constraints. Mimeo, 2006.
- Genaro SUCARRAT. The first stage in Hendry's reduction theory revisited. Mimeo, 2006.
- Genaro SUCARRAT. Why should true models be unique? Mimeo, 2006.
- Henry TULKENS. The White House and the Kyoto protocol: Double standards on uncertainties and their consequences. TERI School of Advanced Studies Working Paper 1, Delhi, and Environmental Economics and Management Memorandum 47, Chaire Lhoist Berghmans, CORE, Louvain-la-Neuve, 2006.
- Skerdilajda ZANAJ. Vertical multimarket oligopolies. Mimeo, 2006.
- Skerdilajda ZANAJ. Employment effects of upstream entry deterrence. Mimeo, 2006.
- Skerdilajda ZANAJ. Incentives for environmental innovation in CO2 markets: competitive effects. Mimeo, 2006.
- Skerdilajda ZANAJ. Deregulation policies: an input-output approach. Mimeo, 2006.

▪ BOOKS

- Nigar HASHIMZADE, Jean HINDRIKS and Gareth D. MYLES. *Solutions Manual to Accompany Intermediate Public Economics*. Cambridge, MIT Press, 2006.
- Jean HINDRIKS and Gareth D. MYLES. *Intermediate Public Economics*. Cambridge, MIT Press, 2006.
- Robert FENGE and Pierre PESTIEAU. *Social Security and Retirement*. Cambridge, MIT Press, 2006.
- Jean J. GABSZEWICZ. *L'industrie des medias*. Paris, La Découverte, Collection "Repères", 2006.
- Douglas NELSON and Hylke VANDENBUSSCHE (eds.). *The WTO and Antidumping* (2 volumes). Cheltenham, Edward Elgar Publishers, 2006.
- Pierre PESTIEAU. *The Welfare State in the European Union: Economic and Social Perspectives*. Oxford, Oxford University Press, 2006.
- Yves POCHET and Laurence WOLSEY. *Production Planning by Mixed Integer Programming*. Amsterdam, Springer, 2006.
- A.M. RIGORODSKII, A.V. SAWATEEV and I.D. SHKREDOV. *Combinatorics: Lectures for the Department of Bioengineering and Biological Informatics of Moscow State University*. Moscow, The Max-Press, 2005.

▪ EDITORIAL ACTIVITIES

PER AGRELL

- member of the editorial board
International Journal of Production Economics

LUC BAUWENS

- associate editor
Computational Statistics
Journal of Financial Econometrics
Risk Letters
- member of the editorial board
Journal of Applied Econometrics
Empirical Economics
- guest editor
High Frequency Financial Econometrics (special issue of Empirical Economics 30 (4), 2005)

PAUL BELLEFLAMME

- associate editor
Information Economics and Policy
- member of the editorial board
Regards Economiques

RAOUF BOUCEKKINE

- associate editor
Journal of Public Economic Theory
Investigaciones Economicas
- member of the advisory board
Mathematical Population Studies
- guest editor of special issue
Mathematical Population Studies (special on vintage modeling in economics and demography, 2006)

CLAUDE D'ASPREMONT

- associate editor
Journal of Mathematical Economics
Journal of Economics/Zeitschrift für Nationalökonomie
Games and Economic Behavior
Social Choice and Welfare

Journal of Public Economic Theory
Revue de Philosophie Economique

DAVID DE LA CROIX

- associate editor
Journal of Economic Dynamics and Control

VICTOR GINSBURGH

- co-editor
Journal of Wine Economics
- associate editor
Journal of Cultural Economics
Recherches Economiques de Louvain

FRANÇOIS MANIQUET

- Associate editor
Social Choice and Welfare

YURII NESTEROV

- associate editor
Optimization Methods and Software
Optimization and Engineering

PIERRE PESTIEAU

- co-editor
Journal of Public Economics
- associate editor
CEifo Economics Studies
Economica
Finanz Archiv
Journal of Public Economic Theory
Public Finance

JACQUES THISSE

- associate editor
International Journal of Economic Theory
International Journal of Industrial Organization
Japanese Economic Review
Journal of Economics and Management Strategy

Journal of Economic Geography
Regional Science and Urban Economics

ISABELLE THOMAS

- member of the editorial board
Cybergeog (European Journal of Geography on the Internet)
L'Espace géographique

DAVID VEREDAS

- guest editor
High Frequency Financial Econometrics (special issue of Empirical Economics 30(4)), 2005

XAVIER WAUTHY

- member of the editorial board
Recherches Economiques de Louvain

SHLOMO WEBER

- editor
Journal of Game Theory (special issue on Game Theory and Political Economics)
- associate editor
Journal of Public Economic Theory

LAURENCE WOLSEY

- Associate editor
Mathematical Programming

▪ DOCTORAL DISSERTATIONS

Nine research associates at CORE successfully defended their Doctoral Dissertation:

- On September 1, 2005. Andrea ATTAR, *Aggregate implications of contracts design with applications to credit market imperfections*. Docteur en Sciences Economiques, Université catholique de Louvain under the supervision of Claude D'ASPREMONT.
- On September 9, 2005, Helena BELTRAN-LOPEZ, *Dynamics of liquidity in order book markets*, Docteur en Sciences Economiques, Université catholique de Louvain, under the supervision of Luc BAUWENS.
- On November 22, 2005, Luciano GRECO, *The optimal design of fiscal decentralization*. Docteur en Sciences Economiques, Université catholique de Louvain, under the supervision of Jean HINDRIKS and Enrico MINELLI.

- On January 1, 2006, Filomena GARCIA, *Strategic complementarities and network effects*. Docteur en Sciences Economiques, Université catholique de Louvain, under the supervision of Jacques THISSE and Jean GABSZEWICZ.
- On January 10, 2006, Malgorzata KNAUFF, *Complementarity and endogenous heterogeneity in oligopolistic markets*. Docteur en Sciences Economiques, Université catholique de Louvain, under the supervision of Jacques THISSE and Rabah AMIR.
- On March 24, 2006, Huasheng SONG, *International R&D collaboration networks and free trade agreement*. Docteur en Sciences Economiques, Université catholique de Louvain, under the supervision of Vincent VANNETELBOSCH.
- On June 9, 2006, Magali VERDONCK, *Fiscal federalism: Essays on equalization, competition and cooperation*. Docteur en Sciences Economiques, Université catholique de Louvain, under the supervision of Henry TULKENS.
- On June 26, 2006, Ruslan SADYKOV, *Integer programming-based decomposition approaches for solving machine scheduling problem*. Docteur en Sciences Appliquées, Université catholique de Louvain, under the supervision of Yurii NESTEROV and Laurence WOLSEY.
- On August 30, 2006, Antonio Fernandes TEIXEIRA, *Location of economic activities and its determinants*. Docteur en Sciences Economiques, Université catholique de Louvain, under the supervision of Jacques-François THISSE.

4

SEMINARS & WORKSHOPS

- ECONOMETRIC THEORY SEMINAR
- ECONOMIC THEORY SEMINAR
- MATHEMATICAL PROGRAMMING SEMINAR
- SEMINAIRE ECONOMIQUE DE LOUVAIN
- ECORE, joint CORE-ECARES SEMINAR
- IAP-UAP ECONOMIC THEORY SEMINAR
- SPATIAL ECONOMIC SEMINAR
- SEMINAR ON HETEROGENEITY IN SOCIAL ORGANIZATION
- LES ATELIERS DE L'ENVIRONNEMENT
- CORE-ECARES-KUL ECONOMETRIC SEMINAR

The three regular weekly seminars in econometrics, economic theory and mathematical programming and were held from September through June. CORE also continued its participation in the sponsorship of the Séminaire Economique de Louvain. Some seminars were also organized within the framework of outside research contracts.

ECORE federates two centers of excellence: CORE, Université catholique de Louvain and ECARES, Université Libre de Bruxelles. The creation of such a scientific association integrates the research activities and the doctoral programs of both institutions. It promotes their position on the international scene in the fields of economics, finance, operations research, econometrics and statistics.

■ THE ECONOMETRIC THEORY SEMINAR

- September 21, 2005. Fulvio PEGORARO, Centre de Recherche en Economie et Statistique (CREST), Paris, France
Switching VARMA term structure models
- September 28, 2005. Sanghamitra Bandyopadhyay, London School of Economics, United Kingdom
Inequality measurement and goodness-of-fit
- October 5, 2005. Gregory Gadzinski, CORE, UCL, Belgium
Estimating structural inflation dynamics: a reduced form solution for a conundrum
- October 12, 2005. Markku Lanne, University of Jyväskylä, Finland
A multivariate generalized orthogonal factor GARCH model
(Joint with Statistics seminar)
- October 26, 2005. Andre Moneiro, Vrije Universiteit Amsterdam and Tinbergen Institute Amsterdam, The Netherlands
Nonparametric estimation for non-homogeneous semi-Markov processes based on panel data: the homogeneous proportional hazards case
- November 9, 2005. Burag SALTOGLU, Marmara University, Istanbul, Turkey
Comparing density forecast models
- November 16, 2005. Steve Lawford, Electrabel, Belgium
An affine jump diffusion model for electricity
- November 24, 2005. Manuel Arellano, Centro de Estudios Monetarios y Financieros, Madrid, Spain
Understanding bias in nonlinear panel models: some recent developments
(Joint with ECARES and Katholieke Universiteit Leuven)
- November 25, 2005. Oliver Linton, London School of Economics, United Kingdom
A quantilogram approach to evaluating directional predictability
(Joint with Statistics seminar)

- November 25, 2005. Domenico Giannone, ECARES, Université Libre de Bruxelles, Belgium
Nowcasting GDP and inflation: the real-time informational content of macroeconomic data releases
(Joint with Statistics seminar)
- November 30, 2005. Philippe POLOME, Unité d'Economie Rurale, UCL, Belgium
Is referendum the same as dichotomous choice contingent valuation ?
- December 7, 2005. Javier MENCIA, Universidad Publica de Navarra, Spain
Testing dependence between financial returns. An application to the hedge fund industry
- December 14, 2005. Kul LUIWTEL, University of Wales, Swansea, United Kingdom
Heterogeneous ideas production and endogenous growth: an empirical investigation
- February 8, 2006. Giampiero M. GALLO, Università di Firenze, Italy
Vector multiplicative error model: representation and inference
- February 15, 2006. Eric GIRARDIN, GREQAM, Université de la Méditerranée, Marseille, France
Regime switching in the transmission of Chinese growth to East Asia
- February 17, 2006. Jean-Michel ZAKOIAN, Université de Lille 3, France
Estimating and testing GARCH processes when the parameter is on a boundary
(Joint with Statistics seminar)
- February 17, 2006. Mika MEITZ, CORE and Stockholms Universitet, Sweden
Ergodicity, mixing, and existence of moments of a class of Markov models with applications to GARCH and ACD models
(Joint with Statistics seminar)
- February 22, 2006. Alexei ONATSKI, Columbia University, New York (NY), USA
Random matrix approach to high dimensional factor models
- March 1, 2006. Marc WEITZMAN, Harvard University, New York (NY), USA
Risk, uncertainty, and asset-pricing 'Antipuzzles'
(Joint with the Economic Theory seminar)
- March 3, 2006. Arie PREMINGER, CORE, UCL, Belgium
A model selection method for S-estimation
(Joint with Statistics seminar)
- March 8, 2006. Alvaro ESCRIBANO, Universidad Carlos III de Madrid, Spain
Assessing the impact of the investment climate on productivity using firm-level data: methodology and the cases of Guatemala, Honduras and Nicaragua
- March 15, 2006. Tommaso PROIETTI, Università di Roma, Italy
Band spectral estimation for signal extraction
(Joint with Statistics seminar)
- March 22, 2006. Annaastiina SILVENNOINEN, CORE and Stockholm School of Economics, Sweden
Multivariate autoregressive conditional heteroskedasticity with time-varying conditional correlations: the double smooth transition conditional correlation GARCH model

- March 29, 2006. Taku YAMAMOTO, Hitotsubashi University, Japan
A bias corrected estimation of dynamic panel models in small samples
- April 19, 2006. Amine TRIFI, Université Paris 1-Sorbonne, Paris, France
Issues on aggregation over time of conditional heteroscedastic volatility models, what kind of diffusion do we recover
- May 3, 2006. Joaquim J.S. RAMALHO, Universidade de Evora, Spain
Goodness of fit tests for moment condition models
- May 3, 2006. Mark STEEL, University of Warwick, United Kingdom
Bayesian nonparametric inference in time series
- May 10, 2006. Anne VANHEMS, Ecole Supérieure de Commerce de Toulouse, France
Nonparametric study of solutions of differential equations: application to the endogenous variable cases
- June 21, 2006. Alok BHARGAVA, University of Houston (TX), USA
Globalization, literacy levels and economic development

▪ THE ECONOMIC THEORY SEMINAR

- October 3, 2005. Yves BALASKO, Ecole Nationale des Ponts et Chaussées, Paris, France
Structure of the exchange process and out-of-equilibrium price dynamics
- October 17, 2005. Martin HELLWING, Max Planck Institute for Research on Collective Goods, Bonn, Germany
Optimal income taxation and public goods finance
- October 24, 2005. Laure TURNER, Ecole Nationale de la Statistique et de l'Administration Economique, Paris, France
Productivity differences across individuals in public research: an econometric study of French physicists' publications and citations (1986-1997)
- October 27, 2005. Giovanna IANNANTUONI, Universidad Carlos III de Madrid
Extreme voting under proportional representation: the multidimensional case
- November 7, 2005. Jean-Jacques HERINGS, Universiteit Maastricht, The Netherlands
On the completeness of complete markets
(Joint with the Séminaire Economique de Louvain)
- November 14, 2005. Marc FLEURBAEY, CERSES, Université Paris V, France
Do irrelevant commodities matter ?
- November 23, 2005. Victor POLTEROVICH, New Economic School, Moscow, Russia
Hiring strategies and the evolution of honesty
- December 5, 2005. Francis BLOCH, GREQAM, Université de la Méditerranée, Marseille, France
Informal insurance in social networks

- December 12, 2005. Diego PUGA, University of Toronto (Ontario), Canada
Wake up and smell the ginseng: the rise of incremental innovation in low-wage countries
- December 13, 2005. Christian GOLLIER, Université de Toulouse, France
Does ambiguity aversion reinforce risk aversion ? Applications to portfolio choices and asset prices
- January 30, 2006. Claudia MEZZETTI, University of Leicester, United Kingdom
The afternoon effect, information disclosure, and revenue ranking of sequential and simultaneous multi-unit auctions with risk-averse bidders
- February 20, 2006. Christian SCHULTZ, Kobenhavns Universiteit, Denmark
Information, polarization and accountability in democracy
- February 21, 2006. Fuad ALESKEROV, Russian Academy of Sciences, Moscow, Russia
Power indices taking into account agents' preferences
- February 27, 2006. Eliana LA FERRARA, Università di Boconni, Italy
A generalized index of fractionalization
- March 1, 2006. Marc WEITZMAN, Harvard University, New York (NY), USA
Risk, uncertainty, and asset-pricing 'Antipuzzles'
(Joint with the Econometric seminar)
- March 6, 2006. Esteban KLOR, Hebrew University of Jerusalem, Israël
On terrorism and electoral outcomes: theory and evidence from the Israeli-Palestinian conflict
- March 20, 2006. Joseph ZEIRA, The Hebrew University of Jerusalem, Israël
Machines as engines of growth
- March 27, 2006. Massimo MOTTA, European University Institute, Firenze, Italy
Exclusionary pricing and rebates in a network industry
- April 24, 2006. Luis CABRAL, New York University (NY), USA
A theory of asymmetric price adjustment
- April 25, 2006. Gianmarco OTTAVIANO, Università di Bologna, Italy
Outsourcing, incomplete contracts and innovation networks
- May 8, 2006. Peyton YOUNG. The Johns Hopkins University, Baltimore (MD), USA
Power indices taking into account agents' preferences
- May 22, 2006. Kristian BEHRENS, CORE, UCL, Belgium
Gains from trade and efficiency under monopolistic competition: variable elasticity and income distribution
- June 14, 2006. William THOMSON. University of Leicester, United Kingdom
Independence conditions for the adjudication of conflicting claims

▪ MATHEMATICAL PROGRAMMING SEMINAR

- October 4, 2005. Arnold NEUMAIER, Universität Wien, Austria
Semidefinite programming and computer-assisted proofs
- October 11, 2005. Peter MALKIN, CORE and INMA, UCL, Belgium
Computing generating sets of lattice ideals
- October 18, 2005. Eissa NEMATOLLAHI, McMaster University, Hamilton, Ontario, Canada and CORE
How good are interior point methods ? Klee-Minty cubes tighten iteration-complexity bounds
- October 25, 2005. François VANDERBECK, Université de Bordeaux I, France
Branching in branch-and-price: a generic scheme
- October 31, 2005. Mikhail SOLODOV, Instituto de Matematica Pura e Aplicada, Rio de Janeiro, Brazil
An infeasible bundle method for nonsmooth convex constrained optimization without a penalty function or a filter
- November 29, 2005. Mette BJORN DAL and Kurt JÖRNSTEN, Norwegian School of Economics and Business Administration, Bergen, Norway
Equilibrium prices supported by dual price functions in markets with non-convexities
- November 29, 2005. Coralia CARTIS, Oxford University Computing Laboratory, United Kingdom
Overcoming some disadvantages of a Mehrotra-type primal-dual corrector interior-point algorithm for linear programming
- December 6, 2005. Laura SCRIMALI, CORE and INMA, UCL, Belgium
Traffic network equilibrium problems and quasi-variational inequalities
- December 13, 2005. Laurence WOLSEY, CORE and INMA, UCL, Belgium
Extended formulations for extensions of mixing sets and mixing sets with flows
- December 20, 2005. François GLINEUR, CORE and INMA, UCL, Belgium
How good are affine scaling algorithms ?
- January 3, 2006. Allen MUSHI, University of Dar es Salaam, Tanzania and University of Lancaster, United Kingdom
Course timetabling problem: the case of the University of Dar es Salaam
- January 31, 2006. Hamish WATERER, The University of Auckland, Australia
Solving the classroom assignment problem using integer programming
- February 21, 2006. Kamei FUKUDA, Ecole Polytechnique Fédérale de Lausanne, and Eidgenössische Technische Hochschule, Zürich, Switzerland
Minkowski addition of convex polytopes: its combinatorics, complexity and algorithms

- March 28, 2006. Juan-José SALAZAR, Universidad de La Laguna, Tenerife, Spain and Université Libre de Bruxelles, Belgium
Solving a multi-commodity pickup-and-delivery travelling salesman problem
- May 9, 2006. Nadjib BRAHIMI, Ecole des Mines de Nantes, France
Lagrangian relaxation for multi-item lot sizing with production time windows
- May 16, 2006. Florian Potra, University of Maryland, Baltimore (MD), USA
Interior point methods for mathematical programming
- May 23, 2006. Yu XIA, Institute of Statistical Mathematics, Tokyo, Japan
Semi-supervised clustering via optimization approaches
- June 13, 2006. Jean-Philippe VIAL, Université de Genève, Switzerland
Stochastic programming with step decision rules
- June 28, 2006. Maziar SALAHI, McMaster University, Hamilton (Ontario), Canada and Guilan University, Iran
Postponing the choice of barrier parameter in Mehrotra-type algorithms
- July 4, 2006. Bert PLUYMERS, Katholieke Universiteit Leuven, Belgium
Set invariance: numerical methods at the intersection of control, geometry and game theory

▪ THE SÉMINAIRE ECONOMIQUE DE LOUVAIN

- October 6, 2005. Falilou FALL, CORE, UCL, Belgium
Endogenous persistent inequality
- October 13, 2005. Thomas LINDH, Institute for Future Studies, Stockholm, Sweden
Productivity consequences at the plant level of workforce ageing-stagnation of a Horndal effect ?
- October 27, 2005. Hylke VANDENBUSSCHE, Chair Jacquemin, UCL, Belgium
Antidumping protection and productivity of domestic firms
- November 3, 2005. Alexis PARMENTIER, IRES, UCL, Belgium
The impacts of marginal tax rates in a matching model with endogenous labor supply
- November 7, 2005. Jean-Jacques HERINGS, Universiteit Maastricht, The Netherlands and CORE.
On the completeness of complete markets
(Joint with the Economic Theory seminar)
- November 17, 2005. Sami DAKHLIA, University of Alabama, Tuscaloosa (AL), USA
Rent-seeking with scarce talent: a model of preemptive hiring
- November 24, 2005. Philippe MARTIN, Université Paris I, France
Make trade not war ?

- December 1, 2005. Frédéric VERMEULEN, Universiteit Tilburg, The Netherlands
A collective retirement model: identification and estimation in the presence of externalities
- December 8, 2005. Alain TRANNOY, Ecole des Hautes Etudes en Sciences Sociales, Marseille, France
Optimal income tax when agents vote with their feet
- December 20, 2005. Ari VAN ASSCHE, Hautes Etudes Commerciales, Montréal, Canada
Firm heterogeneity, input specificity, and the optimal outsourcing
- January 19, 2006. David COLANDER, Middlebury College, Vermont, United Kingdom
The making of an economist revisited: What do U.S. economics graduate students think about economics and graduate school
- February 16, 2006. Laurence JACQUET, IRES, UCL, Belgium
Optimal income taxation with a maxi-min criterion: a synthesis
- February 23, 2006. Gabriel FELBERMARY, Eberhard-Karls-Universität Tübingen, Germany
Specialization on a technology stagnant sector need not be bad for growth
- March 2, 2006. Sébastien MÉNARD, Université du Mans, France
Unemployment insurance, punitive sanctions and monitoring
- March 7, 2006. Alice SCHOONBROODT, University of Minnesota, Minneapolis, MN, USA
From busts to booms in babies and goodies
- March 9, 2006. Giordano MION, CORE, UCL, Belgium
Trade integration, firms selection and the costs of non-Europe
- March 16, 2006. Franco DONZELLI, Università Bocconi, Milano, Italy
Marshall and Walras on equilibrium and disequilibrium
- March 30, 2006. Xavier JOUTARD, GREQAM, Université de la Méditerranée, Marseille, France
Contraintes horaires sur le marché du travail français: une caractérisation du sous-emploi et du sur-emploi féminin
- April 20, 2006. Michèle BELOT, University of Essex, United Kingdom
Friendship ties and geographical mobility, evidence from the BHPS
- May 11, 2006. Arnaud CHEVALIER, University of Kent, United Kingdom
Sheepskin or Prozac: the causal effect of education on mental health
- May 18, 2006. Kristian BEHRENS, CORE, UCL, Belgium
Gains from trade and efficiency under monopolistic competition: variable elasticity and income distribution
- June 1, 2006. Nicodème GAETAN, European Commission, Bruxelles, Belgium
Capital structure and international debt shifting in Europe
- June 21, 2006. Alok BHARGAVA, University of Houston, Texas (TX), USA
Globalization, literacy levels and economic development

- June 29, 2006. Guido COZZI, Università degli Studi di Macerata, Italy
Changing the research patenting regime: Schumpeterian explanation

▪ ECORE, JOINT CORE-ECARES SEMINAR

- October 10, 2005. David VEREDAS, ECARES, Université Libre de Bruxelles, Belgium
Aggregation
- November 28, 2005. Jean-François MERTENS, CORE, UCL, Belgium
Intergenerational fairness and the discounting of cost benefit analysis
- February 13, 2006. Julio DAVILA, ECARES, Université Libre de Bruxelles, Belgium and Centre d'Economie de la Sorbonne, Paris, France
Bargaining over public goods
- March 13, 2006. Vincent VANNETELBOSCH, CORE, UCL, Belgium
Stable networks
- April 24, 2006. Marco BECHT, ECARES, Université Libre de Bruxelles, Belgium.
Corporate mobility and the costs of regulation
- May 15, 2006. François MANIQUET, CORE, UCL, Belgium
Sharing the cost of a public good: an incentive-constrained

▪ THE IAP-UAP ECONOMIC THEORY SEMINAR

- November 21, 2005. Hylke VANDENBUSSCHE, IRES, UCL, Belgium
Is there regional tax competition? Firm level evidence for Belgium
(This seminar took place in Louvain-la-Neuve)
- November 21, 2005. Eckhard JANEBA, Universität Mannheim, Germany
International trade and consumption network externalities
(This seminar took place in Louvain-la-Neuve)
- February 6, 2006. Sanjeev GOYAL, University of Essex, United Kingdom
Networks games
(This seminar took place in Gent)
- February 6, 2006. Yves ZENOU, Research Institute of Industrial Economics, Stockholm, Sweden
Peer effects and social networks in education and crime
(This seminar took place in Gent)
- March 13, 2006. Jakob SVENSSON, Stockholms Universitet, Sweden
BRIBE or LOBBY? (it is a matter of development)
(This seminar took place in Namur)

- March 13, 2006. Micael CASTANHEIRA, ECARES, Université Libre de Bruxelles, Belgium
Districts, party discipline, and polarization
(This seminar took place in Namur)

▪ SPATIAL ECONOMICS SEMINAR

- February 7, 2006. Alain PHOLO BALA, CORE, UCL, Belgium
Rent-seeking elites, regional income transfers, and urban primacy in sub-Saharan Africa
- February 14, 2006. Pierre PICARD, CORE, UCL and University of Manchester, United Kingdom
Industrial location: a synthesis of Chamberlin and Ricardo
- March 7, 2006. Luisito BERTINELLI, Université du Luxembourg, Grand-Duché de Luxembourg and CORE
Climatic change and urbanization : the case of Sub-Saharan Africa
- March 21, 2006. Jens SUDEKUM, Universität Konstanz, Germany
Towards a unifying approach of the 'new economic geography'
- April 18, 2006. Pamina KOENIG, Université Paris I, France
Immigration and the export decision of French firms
- May 2, 2006. Laurent GOBILLON, Institut National d'Etudes Démographiques, Paris, France
The effect of location on finding a job in Greater Paris

▪ SEMINAR ON "HETEROGENEITY IN SOCIAL ORGANIZATION"

- October 3, 2005. Gani ALDASHEV, Delta, Paris, France and CORE, UCL, Belgium
Political information acquisition for social exchange
- October 17, 2005. Juan MORENO-TERNERO, CORE, UCL, Belgium
Impartiality, priority, and solidarity in the theory of justice
- October 24, 2005. Indraneel DASGUPTA, University of Nottingham, United Kingdom
Community and class antagonism
- November 14, 2005. Elias PAPAIOANNOU, European Central Bank, Frankfurt, Germany
Human capital, the structure of production, and growth
- December 5, 2005. Noemi NAVARRO, CORE, UCL, Belgium
Asymmetric information, word-of-mouth and social networks: from the market for lemons to efficiency
- January 23, 2006. Aggey SEMENOV, CORE, UCL, Belgium
Lobbying competition under ideological uncertainty: a common agency perspective

- January 30, 2006. Axel GAUTIER, Facultés Universitaires Saint-Louis, Bruxelles and CORE, UCL, Belgium
Efficient access pricing and endogenous market structure
- February 20, 2006. Arianna Degan, Université de Québec, Montréal, Canada
Do citizens vote sincerely (if they vote at all) ? Theory and evidence from U.S. national elections
- February 27, 2006. Ekaterina ZHURAVSKAYA, Center for Economic and Financial Research, Moscow, Russia
Lobbying in a federation
- March 6, 2006. Panu POUTVAARA, University of Helsinki, Finland
Political parties and network formation
- March 14, 2006. Elena PANOVA, CORE, UCL, Belgium
Congruence among the voters and contributions to political campaigns
- March 20, 2006. Saltuk OZERTURK, CORE, UCL, Belgium and Southern Methodist University, Dallas (TX), USA
Managerial hedge markets and corporate agency

▪ LES ATELIERS DE L'ENVIRONNEMENT

- February 23, 2006. Urs LUTERBACHER, Graduate Institute of International Studies, Geneva, Switzerland
Climate change, the Kyoto protocol and transatlantic relations
- March 9, 2006. Jean-Charles HOURCADE. Ecole des Hautes Etudes en Sciences Sociales, Paris, France
Trancher le noeud gordien climat-développement: options économiques et contraintes politiques
- April 26, 2006. Philippe TULKENS, TERI School of Advances Studies, New Delhi, India
The White House and the Kyoto protocol: double standards on uncertainties and their consequences
- May 4, 2006. Denny ELLERMAN, Massachusetts Institute of Technology, Cambridge, MA, USA
How are carbon allowances distributed ? The EU ETS experience

▪ CORE-ECARES-KUL ECONOMETRICS SEMINAR

- November 24, 2005. Manuel ARELLANO, Centro de Estudios Monetarios y Financieros, Madrid, Spain
Understanding bias in nonlinear panel models: some recent developments

5

DOCTORAL PROGRAM

The **EUROPEAN DOCTORAL PROGRAM IN QUANTITATIVE ECONOMICS** is a joint project of CORE, Université catholique de Louvain, Belgium, with the Universitat Pompeu Fabra, Barcelona, Spain, the Rheinische Friedrich-Wilhelms-Universität Bonn, Germany, the London School of Economics, United Kingdom, the Ecole des Hautes Etudes en Sciences Sociales, France, the European University Institute in Florence, Italy, and as an associate member, the University of Tel Aviv, Israël. Students in the program complete all the requirements for a doctorate in one of the participating universities. In addition, they spend at least one full academic year, typically their second year in the program, in one of the other universities.

The program started in 1977. Five students obtained their certificate during the academic year 2005-2006. Sixty-eight students are currently enrolled.

The annual jamboree was held at the European University Institute in Firenze on October 13-15, 2005 and attended by more than thirty-five doctoral students and several academics from the partner universities.

PROGRAMME

OCTOBER 14

- **LECTURE 1**

Massimo MOTTA, European University Institute, Firenze, Italy
Anti-competitive effects of exclusive contracts.

- **SESSION 1 – CHAIR : MASSIMO MOTTA, EUROPEAN UNIVERSITY INSTITUTE, FIRENZE, ITALY**

Mirabelle MUÜLS, London School of Economics, United Kingdom
Oranges and steel – a swing-state theory of trade protection in the electoral college.
DISCUSSANT : Michele RUTA, European University Institute, Firenze, Italy

Paolo VANIN, Universitat Pompeu Fabra, Barcelona, Spain
Local learning, trade policy and industrial structure dynamics
DISCUSSANT : Stephan FAHR, European University Institute, Firenze, Italy

- **SESSION 2 – CHAIR : SALVADOR ORTIGUEIRA, EUROPEAN UNIVERSITY INSTITUTE, FIRENZE, ITALY**

Marcus SONNTAG, Universitat Pompeu Fabra, Barcelona, Spain
Are entry wages rigid ?
DISCUSSANT : Fabio MARIANI, European University Institute, Firenze, Italy

Fernanda ESTEVAN, CORE, Université catholique de Louvain, Belgium
Mortality risks and child labor.
DISCUSSANT : Hosny ZOABI, European University Institute, Firenze, Italy

Eva BENZ, Rheinische Friedrich-Wilhelms-Universität Bonn, Germany
Modeling CO2 emission allowance prices.
DISCUSSANT : Saverio SIMONELLI, European University Institute, Firenze, Italy

- **SESSION 3 – CHAIR : KARL SCHLAG, EUROPEAN UNIVERSITY INSTITUTE, FIRENZE, ITALY**
 Filomena GARCIA, CORE, Université catholique de Louvain, Belgium
Endogenous heterogeneity in strategic models: symmetry-breaking via strategic substitutes and nonconcavities.
DISCUSSANT : Antonella IANNI, European University Institute, Firenze, Italy
 Sandra LUDWIG, Rheinische Friedrich-Wilhelms-Universität Bonn, Germany
 Do you think that others have a bias.
DISCUSSANT : Thierry VIGNOLO, European University Institute, Firenze, Italy
- **SESSION 4 – CHAIR : RICK VAN DER PLOEG, EUROPEAN UNIVERSITY INSTITUTE, FIRENZE, ITALY**
 Claudia HERMELING, Rheinische Friedrich-Wilhelms-Universität Bonn, Germany
Some out-of-steady-state results on the taxation of human capital.
DISCUSSANT : Arnaud LEFRANC, European University Institute, Firenze, Italy
 Anna BATYRA, Université catholique de Louvain, Belgium
Selective reductions in labour taxation: labour market adjustments and macroeconomic performance.
DISCUSSANT : Martin ZAGLER, European University Institute, Firenze, Italy
- **LECTURE 2**
 Thomas SARGENT, New York University, New York (NY), USA

OCTOBER 15

- **LECTURE 3**
 Andrea ICHINO, European University Institute, Firenze, Italy
Absenteeism, earnings and biological gender differences
- **SESSION 5 – CHAIR : ANINDYA BANERJEE, EUROPEAN UNIVERSITY INSTITUTE, FIRENZE, ITALY**
 Markus POSCHKE, European University Institute, Firenze, Italy
A model of industry evolution with technology adoption.
DISCUSSANT : Philip SAURE, European University Institute, Firenze, Italy
 Marc SCHIFFBAUER, Universitat Pompeu Fabra, Barcelona, Spain
Infrastructure and growth: smoothing the way for endogenous technological change
DISCUSSANT : Michael WICHERLEY, European University Institute, Firenze, Italy
 Alain GABLER, European University Institute, Firenze, Italy
Growth through selection under rational expectations?
DISCUSSANT : Paolo GIORDANI, European University Institute, Firenze, Italy
- **SESSION 6 – CHAIR : ANDREA ICHINO, EUROPEAN UNIVERSITY INSTITUTE, FIRENZE, ITALY**
 Ghazala AZMAT, London School of Economics, United Kingdom
The incidence of an earned income tax credit: evaluating the impact on wages in the UK

Guido SCHWERDT, European University Institute, Firenze, Italy

Labor turnover before plant closure: "Rats leaving sinking ship" vs. "captain throwing ballast overboard"?

Jean-Marc FOURNIER, Ecole Normale Supérieure, Paris, France

Where do Chinese migrants go to ?

6

MEETINGS HELD AT CORE OR CO-ORGANIZED BY CORE MEMBERS

- 8^{EME} RENCONTRE DE L'ENVIRONNEMENT
- INFRATRAN2 : EQUILIBRIUM MODELING OF ELECTRICITY MARKET
- INTERGENERATIONAL EQUITY IN CLIMATE NEGOTIATIONS,
OVERLAPPING GENERATIONS AND SOCIAL WELFARE
- ONE-DAY SYMPOSIUM ON "OPTIMIZATION AND ENGINEERING "
- SECOND SUMMER SCHOOL ON " ECONOMIC ANALYSIS OF
HETEROGENEITY IN SOCIAL ORGANIZATION"
- MIXED INTEGER AND INTEGER PROGRAMMING – THE WAY FORWARD
- ANNIVERSARY DAY "CORE 40TH ANNIVERSARY : PAST, PRESENT, FUTURE"
- CHALLENGES OF MULTI-LINGUAL SOCIETIES
- CITIES AND GLOBALIZATION
- STABILITY IN COMPETITION : HOTELLING'S LEGACY AND ITS FUTURE

▪ 8ÈME RENCONTRE DE L'ENVIRONNEMENT

organized by Thierry BRÉCHET, CORE, UCL, Belgium

PROGRAMME

OCTOBER 17

Pierre-André JOUVET, Université du Maine, Le Mans, France

Banking of pollution permits with risk and optimal risk sharing

Katrin MILLOCK, EUREQua, Université Paris I, France

Investments. An application to the chemical industry

Pierre M. PICARD, CORE, UCL, Belgium and University of Manchester, United Kingdom

Tradable noise permits

Agustin PEREZ-BARAHONA, CORE, UCL, Belgium

Capital accumulation and exhaustible energy resources: a special functions case

▪ INTRATRAN 2: EQUILIBRIUM MODELING OF ELECTRICITY MARKETS

organized by Yves SMEERS, CORE, UCL, Belgium

PROGRAMME

FEBRUARY 23

Yves SMEERS, CORE, UCL

General background of equilibrium formulations in restructured electricity models

Andreas SEMMIG, Energie Baden-Württemberg AG (EnBW), Karlsruhe, Germany

Discussion on "Network-constrained Cournot models of liberalized electricity markets: the devil is in the details" by K. Neuhoff, J. Barquin, M. Boots, A. Ehrenmann, B. Hobbs and F.A.M. Rijkers (2005)

Marcelo SAGUAN, Faculté Jean Monnet, Université Paris Sud 11, France

Discussion on "The more cooperation, the more competition ? A Cournot analysis of the benefits of electric market coupling" by B. Hobbs, F.A.M. Rijkers and M. Boots (2005)

Florian LEUTHOLD, Verbund Austrian Power Grid AG, Wien, Austria

Discussion on "Design of efficient generation markets " by R. Baldick, U. Helman, B. Hobbs and R.P. O'Neill (2005)

Franziska HOLZ, Deutsche Institut für Wirtschaftsforschung (DIW), Berlin, Germany

Discussion on "Electricity market models with conjectured resource price responses " by J.-S. Pang, B. Hobbs and C. Day (2004)

FEBRUARY 24

Yves SMEERS, CORE, UCL

Accommodating the large consumers

Martin KURZIDEM, Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland

Discussion on "Modeling strategic generator behavior with conjectured transmission price responses in a mixed transmission pricing system. I: formulation" by B. Hobbs, F.A.M. Rijkers (2004)

Ina RUMIANTSEVA and Hannes WEIGT, Technische Universität Dresden, Germany

Discussion on "Modeling strategic generator behavior with conjectured transmission price responses in a mixed transmission pricing system. II: application" by B. Hobbs and F.A.M. Rijkers and A.F. Wals (2004)

Giorgia OGGIONI, CORE, UCL and Università degli Studi di Bergamo, Italy

Discussion on "Leader-follower equilibria for electric power and NOx allowances markets" by Y. Chen, B.F. Hobbs, S. Leyffer and T.S. Munson (2005)

Jürgen APFELBECK, Electricité de France (EdF), Recherche et Développement, Paris, France

Discussion on "An oligopolistic electricity market model with tradable NOx permits" by Y. Chen and B.F. Hobbs (2005)

Hannes WEIGT and Ina RUMIANTSEVA, Technische Universität Dresden, Germany

Discussion on "An oligopolistic electricity market model with tradable NOx permits" by Y. Chen and B. Hobbs (2005)

Case studies: exercises

FEBRUARY 25

Case studies: exercises.

■ WORKSHOP ON "INTERGENERATIONAL EQUITY IN CLIMATE NEGOTIATIONS, OVERLAPPING GENERATIONS AND SOCIAL WELFARE"

organized by Thierry BRÉCHET and Claude D'ASPREMONT, CORE, UCL, Belgium

PROGRAMME

APRIL 27

■ SESSION I – CHAIR : HENRY TULKENS, CORE, UCL

Geir ASHEIM, Universitetet i Oslo, Norway

Sustainable recursive social welfare functions

DISCUSSANT : Luc LAUWERS, Katholieke Universiteit Leuven, Belgium

Marc FLEURBAEY, CNRS and Université Paris 5, France

Intergenerational fairness

DISCUSSANT : François MANIQUET, CORE, UCL

Luc LAUWERS, Katholieke Universiteit Leuven, Belgium

Ranking infinite utility streams, completeness at the cost of an ultrafilter

DISCUSSANT : Marc FLEURBAEY, CNRS and Université Paris 5, France

APRIL 28

▪ SESSION II – CHAIR : THIERRY BRÉCHET, CORE, UCL

Richard B. HOWART, Dartmouth College, Hanover (NH), USA

Rethinking the theory of discounting and revealed time preference

DISCUSSANT : Stéphane LAMBRECHT, Université de Lille I, France

Anna RUBINCHIK-PESSACH, University of Colorado, Boulder (CO), USA

Intergenerational equity and the discount rate for cost-benefit-analysis

DISCUSSANT : Grégory PONTIÈRE, Université de Liège, Belgium

Claude D'ASPREMONT, CORE, UCL

Welfare criteria and intergenerational equity

DISCUSSANT : Geir ASHEIM, Universitetet I Oslo, Norway

▪ SESSION III – CHAIR : CLAUDE D'ASPREMONT, CORE, UCL

Parkash CHANDER, National University of Singapore

Discounting and coalition formation

DISCUSSANT : Henry TULKENS, CORE, UCL

Johan EYCKMANS, Europese Hogeschool Brussel, Belgium

Almost ideal sharing scheme

DISCUSSANT : Vincent VANNETELBOSCH, CORE, UCL

▪ "OPTIMIZATION IN ENGINEERING"

PROGRAMME

MAY 24

Bram DEMEULENAERE, Katholieke Universiteit Leuven, Belgium

(Bio)-mechanical engineering applications of convex optimization

Jean-François COLLARD, MECA, UCL

Optimization of multibody systems

Franck PASTOR, Facultés Universitaires Saint-Louis, Bruxelles, Belgium

Solving lower/upper bound approaches of limit analysis by an interior-point method for convex programming

Serge GRATTON, European Centre for Research and Advanced Training in Scientific Computation, Toulouse, France

Optimization methods for variational data assimilation into ocean models

Rajan Filomeno COELHO, Université Libre de Bruxelles, Belgium

Optimization based on evolutionary algorithms for aeronautics

Frédéric BAIR, Université de Liège, Belgium

Simulation and optimization of a shipbuilding workshop

Maud BAY, Université de Liège, Belgium

Mixed integer models for naval structure optimization

El Houssaine AGHEZZAF, Universiteit Ghent, Belgium

Designing a new distribution strategy for a low-value goods producer: a practical solution of the inventory routing problem

Emilie WANUFELLE, Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium

Development of an algorithm for solving mixed integer and nonconvex problems arising in electrical supply networks

Jonathan DUPLICY, Université catholique de Louvain, Belgium

Optimizing future wireless communication systems

Carine GERKENS, Université de Liège, Belgium

Use of genetic algorithm for designing redundant sensor network

▪ SECOND SUMMER SCHOOL ON "ECONOMIC ANALYSIS OF HETEROGENEITY IN SOCIAL ORGANIZATIONS"

organized by Jean HINDRIKS, Jacques-François THISSE and Shlomo WEBER, CORE, UCL and sponsored by the Belgian Science Policy, the Communauté française de Belgique, the CORE Foundation and the Fonds National de la Recherche Scientifique

PROGRAMME

MAY 29

▪ PLENARY SESSION I – CHAIRS : SHLOMO WEBER AND VINCENT VANNETELBOSCH, CORE, UCL

Matthew O. JACKSON, California Institute of Technology, Pasadena (CA), USA
Social networks and economic interactions

Matthew O. JACKSON, California Institute of Technology, Pasadena (CA), USA
Network games

- **PARALLEL SESSION A1: ECONOMICS OF INFORMATION I – CHAIR : FRANCESCO DE SINOPOLI, UNIVERSIDAD CARLOS III DE MADRID, SPAIN**
Tymofy MYLOVANOV, Universität Bonn, Germany
Negative value of information in an informed principal problem with independent private values

Guillermo SABBIONI, University of Florida, Gainesville (FL), USA
Optimal multi-agent contract when cost correlation is uncertain

Saltuk OZERTURK, CORE, UCL and Southern Methodist University
Stock recommendation of an analyst who trades on own account

- **PARALLEL SESSION A2: SOCIAL NORMS AND INTERACTIONS – CHAIR : STEVEN DURLAUF, UNIVERSITY OF WISCONSIN, MADISON (WI), USA**
Dunia LOPEZ-PINTADO, Columbia University, New York (NY), USA
Social influence, binary decisions and collective dynamics

Pascal MOSSAY, Universidad de Alicante, Spain
Social interactions in open and closed spaces

Alexandra RUFINI, Université Nice Sophia-Antipolis, France
Social norms, coordination and collaboration in heterogeneous teams

- **PARALLEL SESSION B1: GAMES – CHAIR : MATTHEW JACKSON, CALIFORNIA INSTITUTE OF TECHNOLOGY, PASADENA (CA), USA**
Geoffroy DE CLIPPEL, Rice University, Houston (TX), USA
Marginal contributions and externalities in the value

Amrita DHILLON, University of Warwick, United Kingdom
Games of status and discriminatory contracts

Andrei BREMZEN, New Economic School, Moscow, Russia
Sequential auctions with entry deterrence

- **PARALLEL SESSION B2: PUBLIC POLICY I – CHAIR : JOHN ROEMER, YALE UNIVERSITY, NEW HAVEN (CT), USA**
Catarina GOULAO, CORE, UCL
Opting out of public insurance

Juan MORENO-TERNERO, CORE, UCL and Universidad de Malaga, Spain
The political economy of health care finance

Limor HATSOR, Tel Aviv University, Israël
The allocation of public education resources

MAY 30

- **PLENARY SESSION II – CHAIR : FRANÇOIS MANIQUET, CORE, UCL**
John E. ROEMER, Yale University, New Haven (CT), USA
Theories of party competition

John E. Roemer, Yale University, New Haven (CT), USA
The political economy of racism, xenophobia, and distribution

- **PLENARY SESSION III – CHAIR: JACQUES-FRANÇOIS THISSE, CORE, UCL**
 Steven N. DURLAUF, University of Wisconsin (MA), USA
Social interactions: basic ideas

MAY 31

- **PLENARY SESSION IV – CHAIRS : RAOUF BOUCEKKINE, IRES AND CORE, UCL AND JEAN HINDRIKS, CORE, UCL**
 Steven N. DURLAUF, University of Wisconsin (MA), USA
Social interactions: theory

 John E. ROEMER, Yale University, New Haven (CT), USA
 Will democracy engender equality in the long run ?
- **PARALLEL SESSION C1: ECONOMICS OF INFORMATION II – CHAIR : CLAUDE D'ASPROMONT, CORE, UCL**
 J. Carlos GONZALEZ-PIMIENTA, Universidad Carlos III de Madrid, Spain
On the equivalence between subgame perfection and sequentiality

 Aggey SEMENOV, CORE, UCL and National University of Singapore
Competition and collusion between interest groups in legislative politics

 Dana SISAK, Universität Mainz, Germany
Multi-prize contests as incentive mechanisms for the provision of public goods with heterogeneous agents
- **PARALLEL SESSION C2: POLITICAL ECONOMICS – CHAIR : JOHN ROEMER, YALE UNIVERSITY, NEW HAVEN (CT), USA**
 Benoît CRUTZEN, Erasmus Universiteit Rotterdam, The Netherlands
Districts, party discipline, and polarization?

 Jenny DE FREITAS, Universitat Autònoma de Barcelona, Spain
 Political support to the private system to finance political parties

 Socorro PUY, Universidad de Malaga, Spain
Political campaign and preferences over political issues
- **PARALLEL SESSION D1: DEVELOPMENT – CHAIR : STEVEN DURLAUF, UNIVERSITY OF WISCONSIN, MADISON (WI), USA**
 Gani ALDASHEV, Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium
NGO competition and the markets for development donations

 Kumar ANIKET, University of Edinburgh, United Kingdom
Does subsidizing the cost of capital really help the poorest ? An analysis of saving opportunities in group lending

Victor TANAKA, Lund University, Sweden

Electoral representation and development: distribution and efficiency in a supply-side analysis of the political equilibrium

▪ **PARALLEL SESSION D2: COLLECTIVE ACTION AND HETEROGENEITY – CHAIR : GIOVANNA IANNANTUONI, UNIVERSIDAD CARLOS III DE MADRID, SPAIN**

Vincent ANESI, GREMAQ, Université de Toulouse I, France

Moral hazard and free riding in collective action

Silvia SONGEREGGER, University of Bristol, United Kingdom

Cohesion and self-bias in societies

Katia MELNIK, GREQAM, Université de la Méditerranée

Population heterogeneity and the nonprofit sector in the US: global versus local spatial approaches

JUNE 1

▪ **PLENARY SESSION V – CHAIRS : MICHEL LE BRETON, UNIVERSITÉ DE TOULOUSE I, FRANCE AND HYLKE VANDENBUSSCHE, IRES AND CORE, UCL AND JEAN HINDRIKS, CORE, UCL**

Matthew O. JACKSON, California Institute of Technology, Pasadena (CA), USA

Diffusion of technology and behavior on networks with heterogeneous agents

Steven N. DURLAUF, University of Wisconsin (MA), USA

Social Interactions: econometrics.

▪ **PARALLEL SESSION E1: INDUSTRIAL ORGANIZATION – CHAIR : PAUL BELLEFLAMME, CORE, UCL**

Alex DICKSON, University of Manchester, United Kingdom

The strategic Marshallian cross and bilateral oligopoly

Filomena GARCIA, Universidade Tecnica de Lisboa

Technology adoption with forward looking agents

Kaniska DAM, CORE, UCL

Access pricing and endogenous market structure.

▪ **PARALLEL SESSION E2: PUBLIC POLICY II – CHAIR : PIERRE PICARD, CORE, UCL AND UNIVERSITY OF MANCHESTER, UNITED KINGDOM**

Felix BIERBRAUER, Max Planck Institute, Bonn, Germany

Optimal income taxation and public good provision in a two-class economy

Adolfo CRISTOBAL-CAMPOAMOR, Universidad Carlos III de Madrid, Spain

Skill-upgrading and the savings of immigrants

Simone MORICONI, Università Cattolica di Milano, Italy

International commodity taxation in an economy with unemployment

▪ **PARALLEL SESSION F1: COALITIONS AND NETWORKS - CHAIR: ANA MAULEON, FACULTÉS UNIVERSITAIRES SAINT-LOUIS, BRUXELLES AND CORE, UCL, BELGIUM**

Jean-François CAULIER, Facultés Universitaires Saint-Louis

Contractually stable networks

Alexei SAWATEEV, CORE, UCL

Cost of stability: 0.2 %

Huasheng SONG, Zhejiang University, China

International R&D collaboration and strategic trade policy

▪ **PARALLEL SESSION F2: SOCIAL CHOICE AND IMPLEMENTATION – CHAIR: JEAN-FRANÇOIS MERTENS, CORE, UCL**

Pablo AMOROS, Universidad de Malaga, Spain

Eliciting socially optimal rankings from unfair jurors

Bernardo MORENO, Universidad de Malaga, Spain

Ordering alternatives or agents ?

Antoine LOEPER, GREMAQ, Université de Toulouse I

Coordination externalities and the cost of centralization: What can we learn from the theory of implementation

▪ **"MIXED INTEGER AND INTEGER PROGRAMMING – THE WAY FORWARD"**

organized by Laurence WOLSEY, CORE, UCL

PROGRAMME

MAY 31

Gérard CORNUÉJOLS, Carnegie Mellon University, Pittsburgh (PA), USA and Laboratoire d'Informatique Fondamentale de Marseille, France

Projected Shvatal-Gomory cuts for mixed integer linear programs

Marco DI SUMMA, Università degli Studi di Padova, Italy

Mixing set relaxations for stochastic lot-sizing problems

Agostinho AGRA, Universidade de Aveiro, Portugal

Recent results on basic mixed-integer sets

Volker KAIBEL, Zuse-Institute Berlin, Germany

Orbitopes

Armin FÜGENSCHUH, Technische Universität Darmstadt, Germany

Mixed integer programming for metal design optimization

Robert WEISMANTEL, Otto-von-Guericke-Universität Magdeburg, Germany

From research in linear integer programming to challenges in mixed integer nonlinear programming

Jean-Philippe RICHARD, Purdue University, West Lafayette (IN), USA

New results on finite and infinite group problems

JUNE 1

Karen AARDAL, Centrum voor Wiskunde en Informatica, Amsterdam, The Netherlands

Using lattice structure to solve integer programs

Ruslan SADYKOV, CORE, UCL

New MIP formulations for the total weighted tardiness scheduling

Michele CONFORTI, Università degli Studi di Padova, Italy

Extended formulations of mixed integer programs

Edoardo AMALDI, Politecnico di Milano, Italy

On the maximum feasible subsystem problem and extensions

Markus CHIMANI, Universität Dortmund, Germany

Computing the crossing number of a graph by IP

Friedrich EISENBRAND, Universität Dortmund, Germany

Integer cones

Giacomo ZAMBELLI, Università degli Studi di Padova, Italy

On certain mixed-integer vertex covering problems on bipartite graphs

Claude LEMARÉCHAL, INRIA Rhône-Alpes, France

A convex-analysis perspective on (disjunctive) cuts

■ ANNIVERSARY DAY "CORE 40TH ANNIVERSARY: PAST, PRESENT, FUTURE"

PROGRAMME

JUNE 2

Jean-François RICHARD, University of Pittsburgh (PA), USA

Forty years of econometrics at CORE, where to go from here ?

George NEMHAUSER, Georgia Institute of Technology, Atlanta (GA), USA

CORE's contributions to operations research: past and future

Paul CHAMPSAUR, Autorité de Régulation des Communications Électroniques et des Postes, Paris, France and Jean-Charles ROCHET, Institut d'Économie Industrielle, Toulouse

How CORE has contributed to policy debates and to economic theory: some illustrations

Antonio DE LECEA, European Commission, Bruxelles, Belgium
CORE's influence beyond the academic community: special topics

Jacques DRÈZE, CORE, UCL

Research and higher education in economics: can we deliver the Lisbon objectives ?

Followed by a roundtable with Andreu MAS-COLELL, Universitat Pompeu Fabra, Spain, Mathias DEWATRIPONT, Université Libre de Bruxelles, and Jacques CRÉMER, Institut d'Économie Industrielle, Toulouse

■ "CHALLENGES OF MULTI-LINGUAL SOCIETIES"

organized by CORE, Université catholique de Louvain and ECARES, Université Libre de Bruxelles and sponsored by the Belgian Science Policy, the Communauté française de Belgique, CORE, ECARES and the Fonds National de la Recherche Scientifique.

PROGRAMME

JUNE 9

■ LINGUISTIC POLICIES IN INTERNATIONAL ORGANIZATIONS 1

Juhani LÖNNROTH, European Commission

The policy of multilingualism in the EU: Challenges and constraints

Sergio VIAGGIO, United Nations, Vienna, Austria

International organizations: politics versus actual communication needs

■ LINGUISTIC POLICIES IN INTERNATIONAL ORGANIZATIONS 2

Abram DE SWAAN, Universiteit Amsterdam, The Netherlands

The language predicament of the EU

Jan FIDRMUC, Brunel University, London, United Kingdom

On the choice of official languages in the EU

■ LANGUAGES AND ECONOMICS

Jacques CRÉMER, Université de Toulouse, France

Languages and the theory of the firm

Juan PRIETO, Universidad Oviedo, Spain

Returns to languages in the EU labor markets

JUNE 10

■ DIVERSITY, EFFICIENCY AND FAIRNESS

James FEARON, Stanford University (CA), USA

Two measures of linguistic distance, and one measure of genetic distance: some comparisons

Philippe VAN PARIJS, Université catholique de Louvain, Belgium and Harvard University, Cambridge (MA), USA

Linguistic diversity: what is it and does it matter ?

François GRIN, Université de Genève, Switzerland

Forms of multilingual communication: review of claims of efficiency and fairness

▪ **NATIONALISM AND THE TREATMENT OF MINORITIES**

David LAITIN, Stanford University (CA), USA

Linguistic nationalism as a consumption item

Klaus DESMET, Universidad Carlos III, Madrid, Spain

Peripheral diversity and redistribution

▪ **BILINGUAL EDUCATION**

Javier ORTEGA, Université de Toulouse, France

Unilingual versus bilingual education systems: a political economy analysis

Ian TUDOR, Université Libre de Bruxelles, Belgium

Trends in higher education language policy in Europe: the case of English as a language of instruction

▪ **"CITIES AND GLOBALIZATION"**

organized by Kristian BEHRENS and Jacques-François THISSE, CORE, UCL and Carl Caigné, INRA, Rennes, France

PROGRAMME

JUNE 13

Paul HOHENBERG, Rensselaer Polytechnic Institute, New York (NY), USA

Does globalization accelerate, inflect, or redirect trends in urbanization ?

Frédéric ROBERT-NICOUD, London School of Economics, United Kingdom

Off shoring of business services and deindustrialization: threat or opportunity and for whom?

Pierre-Cyrille HAUTCOEUR, Ecole des Hautes Etudes en Sciences Sociales, Paris, France

Integration of French financial markets in the 19th century

JUNE 14

Francis AUBERT and Carl GAIGNÉ, INRA, Rennes

Labour demand and industrial location: a historical perspective

Masahisa FUJITA, KYOTO University, Japan

Cities and rural development under globalization

Abey MULUTU, London School of Economics, United Kingdom

How did the location of industry respond to falling transport costs in Britain before world War I?

Luc Normand TELLIER, Université du Québec, Montréal

Is the spatial logic of world development changing ?

Guillaume DAUDIN, Observatoire Français des Conjonctures Economiques, Paris, France

A geography of domestic trade in late 18th century France

▪ "STABILITY IN COMPETITION: HOTELLING'S LEGACY AND ITS FUTURE"

organized by Claude D'ASPROMONT, Jean GABSZEWICZ and Jacques-François THISSE, CORE, UCL and sponsored by the Communauté française de Belgique, CORE, the Fonds National de la Recherche Scientifique and the Politique Scientifique Fédérale

PROGRAMME

JUNE 15

▪ SESSION 1 – CHAIR: JEAN J. GABSZEWICZ, CORE, UCL

Rodolphe DOS SANTOS FERREIRA, Université Louis Pasteur, Strasbourg, France and Jacques-François THISSE, CORE, UCL

Hotelling after eight decades ... and nine decades before

▪ SESSION 2 – CHAIR: JACQUES-FRANÇOIS THISSE, CORE, UCL

Konrad STAHL, Universität Mannheim, Germany

Global vs. local competition

Jacques THÉPOT, Université Louis Pasteur, Strasbourg, France

Hawks and Doves in Hotelling competition

▪ SESSION 3 – CHAIR: CLAUDE D'ASPROMONT, CORE, UCL

Mihkel TOMBAK; University of Toronto, Canada

Product positioning with asymmetric cost and endogenous leadership

Simon ANDERSON, University of Virginia, Charlottesville (VA), USA

Spatial competition without excessive differentiations

JUNE 16

▪ SESSION 4 – CHAIR: SHLOMO WEBER, CORE, UCL

Jean GABSZEWICZ, CORE, UCL

Hotelling and the media market

George NORMAN, TUFTS University, Medford (MA), USA

Product differentiation and film programming choice: do first-run movie theatres show the same film ?

▪ **SESSION 5 – CHAIR: SHLOMO WEBER, CORE, UCL**

Patrick VAN CAYSEELE, Katholieke Universiteit Leuven, Belgium

Banking competition and financial stability

Shlomo WEBER, CORE, UCL

On the stability of spatial jurisdiction structures

▪ **SESSION 6 – CHAIR: RODOLPHE DOS SANTOS FERREIRA, UNIVERSITÉ LOUIS PASTEUR, STRASBOURG, FRANCE**

Valeska GRONERT, Vanderbilt University, Nashville (TN), USA

Hotelling tax competition.

Susana PERALTA, Universidade Nova de Lisboa, Portugal

Fiscal competition, revenue sharing, and policy-induced agglomeration.

Sergio MEZA, University of Toronto, Canada

Does it pay to be first ? Sequential locational choice and foreclosure.

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INVITED SEMINARS

The following seminars were presented by CORE members during the academic year 2005-2006.

PER AGRELL

- *Evolutionary regulation: From CPI-X towards contestability*
Fondazione Eni Enrico Mattei Plenary Workshop, Desenzano, Italy (October 2005)
- *Concepts and ideas for a future pan-Nordic network regulation*
NEMESYS Final Workshop on Pan-Nordic Regulation Models, Helsinki, Finland (November 2005)

GANI ALDASHEV

- *Voter turnout and political rents: theory and evidence*
Université d'Aix-Marseille (October 2005)
- *NGO competition and markets for development donations*
ECARES, Université Libre de Bruxelles (February 2006)
Solvay Business School, Université Libre de Bruxelles (March 2006)

OSCAR AMERIGHI

- *Transfer pricing and enforcement policy in oligopolistic markets*
Università di Bologna, Italy (January 2006)

LUC BAUWENS

- *Multivariate GARCH models: a survey*
Universität Konstanz (May 2006)

KRISTIAN BEHRENS

- *Tax competition, location, and horizontal foreign market investment*
Institute for Economic Research, Kyoto University, Japan (October 2005)
University of Tokyo, Japan (October 2005)
Warrington College of Business, University of Florida, Gainesville (FL), USA (April 2006)
- *Gains from trade and efficiency under monopolistic competition: a variable elasticity case*
London School of Economics, United Kingdom (February 2006)
ARISH, Nihon University, Japan (February 2006)
IRES, UCL, Belgium (March 2006)

RAOUF BOUCEKKINE

- *Special functions for the study of economic dynamics*
Technical University of Vienna, Austria (November 2005)

- *The growth economics of epidemics*
Austrian Academy of Science, Vienna, Austria (November 2005)

CLAUDE D'ASPREMONT

- *Justice sociale*
GREQAM, Université d'Aix-Marseille III, France (April 2006)
- *Price-quantity competition with varying toughness*
European University Institute, Firenze, Italy (June 2006)

DAVID DE LA CROIX

- *Education politics and democracy*
Kobenhavns Universitet, Denmark (September 2005)
University de Toulouse, France (September 2005)
Universidade de Lisboa, Portugal (May 2006)
World Bank, Washington DC, USA (June 2006)
- *From the industrial revolution to the future of an aging society*
CESIFO, Mannheim, Germany (February 2006)
European Central Bank, Frankfurt, Germany (June 2006)
- *Population policy through tradable procreation entitlements*
Nihon University, Tokyo, Japan (June 2006)

FRANÇOIS GLINEUR

- *Solving systems of polynomial equations and minimization of multivariate polynomials: two recent approaches*
Large networks ARC seminar and CESAME seminar, UCL (May 2006)

FRANÇOIS MANIQUET

- *Endogenous affirmative action, gender bias leads to gender quotas*
Paris-Jourdan Sciences Economiques, France (April 2005)
- *Sharing the cost of a public good: an incentive-constrained axiomatic approach*
Université Paris I, France (February 2006)

ANA MAULEON

- *Networks of manufacturers and retailers*
Facultés Universitaires Saint-Louis, Bruxelles, Belgium (October 2005)
Universidad del Pais Vasco, Bilbao, Spain (March 2006)

GIORDANO MION

- *Trade integration, firms selection and the costs of non-Europe*
Paris-Jourdan Sciences Economiques, France (June 2006)
- *Productivity and firm selection: intra-national vs. inter-national trade*
Paris-Jourdan Sciences Economiques, France (June 2006)

JUAN D. MORENO TERNERO

- *Progressivity, inequality reduction and merging-proofness in taxation*
Centre d'Economie de la Sorbonne, Université Paris I, France (October 2005)
Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium (February 2006)
- *On the adjudication of conflicting claims: an experimental study*
Universidad de Malaga, Spain (November 2005)
- *Impartiality, solidarity and priority in the theory of justice*
Universiteit Maastricht, The Netherlands (March 2006)

YURII NESTEROV

- *Barrier subgradient method*
Eidgenössische Technische Hochschule Zürich, Austria (February 2006)
- *Global performance of the Newton method*
Oxford University, United Kingdom (June 2006)
- *Accelerating the Newton method*
Institute of Control Sciences, Moscow (July 2006)

SALTUK OZERTURK

- *Executive hedge markets and corporate agency*
Koç University, Istanbul, Turkey (March 2006)
Université Libre de Bruxelles, Belgium (March 2006)
- *Stock recommendation of an analyst who trades on own account*
Sabanci University University, Istanbul, Turkey (March 2006)
- *Hedge markets and corporate agency*
Erasmus Universiteit, Rotterdam, The Netherlands (March 2006)

DOMINIQUE PEETERS

- *Residential equilibria in a green urban area*
Grand Rozoy, Analyse Spatiale et Phénomènes Economiques (GDR ASPE), Ivry-sur-Seine
(December 2005)
- *Early literacy achievements, population density and the transition to modern growth*
Séminaire d'Economie Spatiale et Urbaine du GDR ASPE, Paris (January 2006)

- *Quelle mobilité pour les urgences ?*
DEMO, UCL, Belgium (March 2006)

AUGUSTIN PEREZ-BARAHONA

- *Capital accumulation and exhaustible energy resources: a special function case*
Centre d'Economie de la Sorbonne, Université Paris I, France (February 2006)
Universidad del Pais Vasco, Bilbao, Spain (April 2006)

PIERRE PESTIEAU

- *Longevity and social security*
Paris-Jourdan Sciences Economiques, France (February 2006)
- *The right to social security: Bismarck versus Beveridge*
Paris-Jourdan Sciences Economiques, France (February 2006)
- *Longevity and PAYG pensions*
Université de Montpellier, France (May 2006)
Universiteit Tilburg, The Netherlands (July 2006)
- *Longevity, health care and pensions*
Universiteit Maastricht (June 2006)

PIERRE PICARD

- *Currency areas and international assistance*
University of Edinburgh, Scotland (November 2005)
- *Labor market pooling and increasing returns to scale in cities*
Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium (March 2006)
Universidad de Alicante, Spain (April 2006)
- *Airports and tradeable noise permits*
Université de Lille, France (May 2006)

LAURA SCRIMALI

- *Quasi-variational inequalities applied to traffic network equilibrium problems*
CESAME, UCL, Belgium (October 2005)

AGGEY SEMENOV

- *Competition or collusion between interest groups in legislative politics*
Université de Toulouse, France (April 2006)
- *Ideological uncertainty and lobbying competition*
National University of Singapore (2006)
Université de Montréal (2006)
Universiteit Maastricht (2006)

GENARO SUCARRAT

- *The first stage in Hendry's reduction theory revisited*
Universitetet Oslo, Norway (September 2005)
Statistics Norway, Oslo, Norway (September 2005)
- *General to specific modelling of exchange rate volatility: a forecast evaluation*
Norwegian School of Economics and Business Administration, Bergen (November 2005)
Centro de estudios monetarios y financieros, Madrid (February 2006)
Universidad Carlos III de Madrid, Spain (May 2006)

JOE THARAKAN

- *Endogenous model of competition in general equilibrium*
University of Nottingham, United Kingdom (November 2005)

ISABELLE THOMAS

- *Variation du prix de la terre en Belgique: un essai d'explication géographique*
Grand Rozoy, Analyse Spatiale et Phénomènes Economiques (GDR ASPE), Ivry-sur-Seine (December 2005)
- *L'état du logement en Belgique: disparités spatiales*
Fédération Construction Wallonne, Court-Saint-Etienne, Belgium (May 2006)

SÉBASTIEN VAN BELLEGEM

- *Instrumental regression in partially linear models*
Université Paul Sabatier, Toulouse, France (January 2006)
Katholieke Universiteit Leuven, Belgium (February 2006)
- *Local adaptive estimation for nonstationary time series*
Stockholm School of Economics, Sweden (May 2006)

HYLKE VANDENBUSSCHE

- *The global chilling effects of antidumping proliferation*
CenTer, Universiteit Tilburg, The Netherlands (May 2006)

VINCENT VANNETELBOSCH

- *Market integration and strike activity*
Facultés Universitaires Saint-Louis, Bruxelles, Belgium (December 2005)
- *Networks of manufacturers and retailers*
Universita degli Studi di Milano, Italy (May 2006)

XAVIER WAUTHY

- *Entry under capacity limitation and vertical differentiation: the return of Judo Economics*
Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium (April 2006)

SHLOMO WEBER

- *Linguistic disenfranchisement in multilingual societies*
Higher School of Economics, Moscow, Russia (October 2005)
University of Warsaw, Poland (November 2005)
University of Haifa, Israël (January 2006)
Hebrew University, Jerusalem, Israël (January 2006)
University of Manchester, United Kingdom (March 2006)
Kiev School of Economics, Kiev, Ukraine (March 2006)
Universita degli Studi di Tor Vergata, Roma, Italy (May 2006)
Universidade Nova Lisboa, Portugal (May 2006)
National University of Singapore (August 2006)

LAURENCE WOLSEY

- *The MIP approach to hard production planning problems*
University of Florida, Gainesville (FL), USA (February 2003)

SKERDILAJDA ZANAJ

- *Vertical foreclosure: denying the access to potential rivals*
Universidade Porto, Portugal (May 2006)
- *Competitive effects of vertical integration*
Certosa di Pontignano, Siena (July 2006)

VERA ZAPOROZHETS

- *Legislative lobbying under political uncertainty*
Katholieke Universiteit Leuven, Belgium (May 2006)

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ACADEMIC VISITS

Academic visits by CORE members to other institutions

JULY 2005

Kristian BEHRENS, University of Tokyo, Japan

Sébastien VAN BELLEGHEM, University of Illinois, Urbana-Champaign, Urbana (IL), USA

AUGUST 2005

Sébastien VAN BELLEGHEM, University of Illinois, Urbana-Champaign, Urbana (IL), USA

SEPTEMBER 2005

Jean GABSZEWICZ, Universidade do Porto

Genaro SUCARRAT, Universitetet Oslo, Norway ■ Norges Bank, Oslo, Norway

Sébastien VAN BELLEGHEM, Université de Toulouse I, France

OCTOBER 2005

Kristian BEHRENS, University of Tokyo, Japan ■ Kyoto University, Japan

Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France

Ruslan SADYKOV, Ecole Polytechnique, Paris, France

Aggey SEMENOV, Université de Toulouse, France

Jacques THISSE, Central European University, Budapest, Hungary

Sébastien VAN BELLEGHEM, Université de Toulouse I, France

NOVEMBER 2005

Luc BAUWENS, Università Ca Foscari, Venezia, Italy

Raouf BOUCEKKINE, Technical University of Vienna, Austria

Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France

Pierre PESTIEAU, Université du Maine, Le Mans, France

Alexei SAWATEEV, Universiteit van Tilburg, The Netherlands

Henry TULKENS, National University of Singapore

DECEMBER 2005

Raouf BOUCEKKINE, Technical University of Vienna, Austria

David DE LA CROIX, Institute for Future Studies, Stockholm, Sweden

Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France

Alexei SAWATEEV, Universiteit van Tilburg, The Netherlands

Aggey SEMENOV, Université de Toulouse, France

Genaro SUCARRAT, Norges Bank, Oslo, Norway

Henry TULKENS, National University of Singapore

JANUARY 2006

Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France
Laura SCRIMALI, Universita degli Studi di Catania, Italy
Shlomo WEBER, Central European University, Budapest, Hungary

FEBRUARY 2006

Kristian BEHRENS, Nihon University, Tokyo, Japan
Raouf BOUCEKKINE, HEC, Paris, France
Jean GABSZEWICZ, Université Paris-Dauphine, France
Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France
François MANIQUET, Laboratoire d'Econométrie de l'Ecole Polytechnique, Paris, France

MARCH 2006

Raouf BOUCEKKINE, Centre pour la Recherche Economique et ses applications (CEPREMAP), Paris, France
David DE LA CROIX, University of California, Los Angeles, USA
Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France
Peter MALKIN, Otto-von-Guericke Universität Magdeburg, Germany
Ana MAULEON, Universidad del Pais Vasco, Bilbao, Spain
Yves SMEERS, Institut Français du Pétrole, Paris, France ■ Université de Genève, Switzerland
Henry TULKENS, National University of Singapore
Vincent VANNETELBOSCH, Universidad del Pais Vasco, Bilbao, Spain

APRIL 2006

Kristian BEHRENS, University of Florida, Gainesville (FL), USA
Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France
Pierre PESTIEAU, Cornell University, Ithaca (NY), USA
Pierre PICARD, Universidad Alicante, Spain
Aggey SEMENOV, Université de Toulouse, France
Jacques THISSE, Zhejiang University, Hangzhou, China
Henry TULKENS, National University of Singapore
Sébastien VAN BELLEGEM, Universität Heidelberg, Germany

MAY 2006

Fernanda ESTEVAN, Harvard University, Cambridge (MA), USA
Catarina GOULAO, Institut d'Economie Industrielle, Toulouse, France
Pierre PESTIEAU, Universidad del Rosario, Colombia
Vincent VANNETELBOSCH, Universita degli Studi di Milano, Italy

JUNE 2006

Giordano MION, Paris Jourdan Sciences Economiques, France
Xavier WAUTHY, Universitat de Girona, Spain

JULY 2006

Giordano MION, Paris Jourdan Sciences Economiques, France
Xavier WAUTHY, Universitat de Girona, Spain

AUGUST 2006

Xavier WAUTHY, Universitat de Girona, Spain

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CONFERENCES

CORE members attended the following conferences and most presented a paper.

JULY 2005

- CESifo Venice Summer Institute Workshop on "Recent Developments in International Trade: Globalization and the Multinational Enterprise", Venice International University, San Servolo, Italy
Oscar AMERIGHI
- Spanish Public Finance Association, Murcia, Spain
Pierre PESTIEAU
- Society for Advancement of Economic Theory Meetings, Vigo, Spain
Shlomo WEBER
- Economic Education Research Consortium Workshop, Kiev, Ukraine
Shlomo WEBER

AUGUST 2005

- Research Unit of Economic Structures and Growth (RUESG) Workshop in Financial Econometrics, University of Helsinki, Finland
Luc BAUWENS
- 20th Annual Congress of the European Economic Association, Amsterdam, The Netherlands
Pierre PICARD
- Fourth International Conference on Complementarity Problems, Stanford University, Stanford (CA), USA
Yves SMEERS
- 7th IAEE European Energy Conference, Bergen, Norway
Yves SMEERS
- 3rd OxMetrics User Conference, London, United Kingdom
Genaro SUCARRAT
- 45th Congress of the European Regional Science Association (ERSA 2005), Amsterdam, The Netherlands
Isabelle THOMAS

SEPTEMBER 2005

- Workshop in Development Economics, Department of Economics, UCL, Belgium
Gani ALDASHEV ■ Raouf BOUCEKKINE ■ David DE LA CROIX ■ Jean HINDRIKS
- Workshop on Vintage Modelling in Economics and Demography, European University Institute, Florence, Italy
Raouf BOUCEKKINE

- International Finance Conference, Copenhagen, Denmark
Pierre GIOT ■ Genaro SUCARRAT
- 32nd Annual Conference of the European Association for Research in Industrial Economics (EARIE), Porto, Portugal
Ana MAULEON ■ Vincent VANNETELBOSCH ■ Xavier WAUTHY
- 12th Seminar on Individual Decisions and Social Choice, Osnabrück, Germany
Juan D. MORENO TERNERO
- XXXVII Annual Conference of the Italian Operations Research Society, Università di Bologna, Italy
Giorgia OGGIONI
- 14th European Colloquium on Theoretical and Quantitative Geography (ECTQG'05), Tomar, Portugal
Dominique PEETERS ■ Isabelle THOMAS
- CEPR-RTN FINRET Final Meeting, London, United Kingdom
Pierre PESTIEAU
- Association for Studies in Public Economics, Saint-Petersburg, Russia
Alexei SAVATEEV
- SESSA Brussels : "Implementing the Internal Market of Electricity: Proposals and Timetables", Brussels, Belgium
Yves SMEERS
- Manuel Arellano Workshop, Leuven, Belgium
Genaro SUCARRAT
- European Trade Study Group Conference, Dublin, Ireland
Joseph THARAKAN and Hylke VANDENBUSSCHE
- Fourth Workshop of the IAP Research Network, Katholieke Universiteit Leuven, Belgium
Sébastien VAN BELLEGEM
- Conference on Political Economy, University of Pennsylvania (PA), USA
Shlomo WEBER

OCTOBER 2005

- Workshop on Financial Econometrics, Dutch Statistical Society, Amsterdam
Luc BAUWENS
- Jamboree of the European Doctoral Program, Florence, Italy
Efthymios ATHANASIOU ■ Luc BAUWENS ■ Paul BELLEFLAMME ■ Raouf BOUCEKINE ■ Claude D'ASPROMONT ■ Pierre DEHEZ ■ David DE LA CROIX ■ Fernanda ESTEVAN ■ François MANIQUET, Giacomo VALETTA ■ Hylke VANDENBUSSCHE ■ Vincent VANNETELBOSCH
- Latin American and Caribbean Economic Association, Paris, France
Fernanda ESTEVAN

- National Bank of Belgium Financial Forum, Brussels
Pierre GIOT
- 3rd INFRATRAN- Autumn School on Applied Infrastructure Research and Policy Training,
Technische Universität Berlin, Germany
Giorgia OGGIONI ■ Yves SMEERS
- RTN Meeting "Pension and Saving"
Pierre PESTIEAU
- "Le sort de la Wallonie. Fait-on tout ce qu'il faut ?", ADIC Charleroi, Belgium
Pierre PESTIEAU
- OCDE Comité ELSA "Vieillesse et Politique de l'Emploi", Brussels, Belgium
Pierre PESTIEAU
- Economic Policy Panel, London, United Kingdom
Pierre PESTIEAU
- International Workshop on Optimization Frameworks for Industrial Applications: "Confront &
Share Methods: Efficiencies and Limits", Electricité de France, Paris, France
Yves SMEERS

NOVEMBER 2005

- Workshop on "Regional Agglomeration, Growth and Multilevel Governance: the EU in a
Comparative Perspective", Universiteit Gent
Oscar AMERIGHI ■ Kristian BEHRENS
- INFORMS Annual Conference, San Francisco (CA), USA
Philippe CHEVALIER ■ Yurii NESTEROV
- HECER Workshop on Fiscal Federalism, Helsinki, Finland
Jean HINDRIKS ■ Pierre PESTIEAU
- North American Meeting of the Regional Science Association International, Las Vegas (NV),
USA
Pierre PICARD
- Deuxième Journée des Géographes Belges "Mobiliteit, Maatschappij en Milieu in Kaart
Gebracht", Gent, Belgium
Isabelle THOMAS
- Deutsche Bundesbank Conference on "Heavy Tails and Stable Paretian Distributions in
Finance and Macroeconomics", Frankfurt, Germany
David VEREDAS
- Economic Education Research Consortium Workshop, Moscow, Russia
Shlomo WEBER

DECEMBER 2005

- Annual Conference of the European Network for Development Economics, Paris, France
Gani ALDASHEV
- 16 th EC² Meeting, "Econometrics of Financial and Insurance Risks", Istanbul, Turkey
Luc BAUWENS ■ Genaro SUCARRAT
- 10th Symposium on Finance, Banking and Insurance, Karlsruhe, Germany
Pierre GIOT
- The Third Thiele Symposium on Stochastic Volatility, Copenhagen, Denmark
Jérôme LAHAYE
- Final seminar on "External costs of energy and their internalisation in Europe. Dialogue with industry, NGO and policy-makers", European Commission, Brussels, Belgium
Johan LEPERS
- Workshop on Social Decisions, Universidad de Malaga, Spain
Juan D. MORENO TERNERO (co-organizer)
- International Workshop on "The Role of Open Space and Green Amenities in the Residential Move from Cities", ACI "Espace et Extension des Villes", Dijon, France
Dominique PEETERS
- Entretiens de l'Assurance, Paris, France
Pierre PESTIEAU
- Spanish Public Finance Association, Murcia, Spain
Pierre PESTIEAU
- Seminar on "Le contexte énergétique et social européen", European Commission, Brussels, Belgium
Yves SMEERS
- IAP Conference on Higher Education, Multijurisdictionality and Globalization, Facultés Universitaires Catholiques de Mons, Belgium
Xavier WAUTHY

JANUARY 2006

- Doctoral Workshop in Economics, Département des Sciences Economiques, UCL, Belgium
Kristian BEHRENS ■ Claude D'ASPREMONT ■ Elina EGUIAZAROVA ■ Catarina Goulao ■ Jakub GROWIEC ■ Jean HINDRIKS ■ Frédéric LAURIN ■ François MANIQUET ■ Marco MARINUCCI ■ Antonio MINITTI ■ Simone MORICONI ■ Alain PHOLO BALA ■ Ingmar SCHUMACHER ■ Giacomo VALLETTA ■ Vincent VANNETELBOSCH ■ Cecilia VERGARI ■ Shlomo WEBER ■ Skerdilajda ZANAJ ■ ■ Gregor ZOETTL
- Journées mathématiques pour l'économie, Université de Lille I, France
Laurence BROZE

- Second Joint Meeting CES-HESG, London, United Kingdom
Hervé LELEU
- Aussois International Workshop on Combinatorial Optimization, Aussois, France
Peter MALKIN ■ Yves POCHE ■ Ruslan SADYKOV ■ François WARICHET ■ Laurence WOSLEY
- ORBEL 20, Gent Universiteit, Belgium
Peter MALKIN ■ François WARICHET ■ Laurence WOLSEY
- XI Coalition Theory Network Workshop, University of Warwick, Coventry, United Kingdom
Ana MAULEON ■ Vincent VANNETELBOSCH
- American Economic Association Annual Meeting, Boston, USA
Elena PANOVA ■ Pierre PESTIEAU ■ Hylke VANDENBUSSCHE
- Florence School of Regulation: "Institutional Setting for the IEM: The Role and Status of Power Exchanges", European University Institute, Florence, Italy
Yves SMEERS
- Forskermotet, Bergen, Norway
Genaro SUCARRAT
- ENTER Jamboree, Stockholm, Sweden
David VEREDAS
- Global Development Network Conference on Global Economy, St. Petersburg, Russia
Shlomo WEBER

FEBRUARY 2006

- 14th International Working Conference on Production Economics, Innsbruck, Austria
Per AGRELL
- Workshop on "Health Economics: Health Insurance and Equality of Access", Katholieke Universiteit Leuven, Belgium
Giuseppe DE FEO ■ Dirk VAN DE GAER
- Fifth Annual Supply Chain Conference, University of Florida, Gainesville (FL), USA
Laurence WOLSEY

MARCH 2006

- International Workshop on Financial Market Quality, Paris, France
Pierre GIOT
- Journées de 3^{ème} cycle FNRS en Programmation Mathématique, Han-sur-Lesse, Belgium
François GLINEUR ■ Yves POCHE ■ Laura SCRIMALI ■ François WARICHET
- 61st International Atlantic Economic Conference, Berlin, Germany
Hervé LELEU

- ADONET Mid-Term Meeting, Ecole Polytechnique Fédérale de Lausanne, Switzerland
Peter MALKIN ■ Laurence WOLSEY
- Conference on "Reducing Poverty and Inequality: How Can Africa be Included?", Center for the Study of African Economics, Oxford University, United Kingdom
Dirk VAN DE GAER

APRIL 2006

- International Scientific Conference "Incentive Regulation in the German Electricity and Gas Sectors. Efficiency and Reliability to Set the Yardstick", Bonn, Germany
Per AGREL
- EURO Working Group on Stochastic Modelling, Amsterdam, The Netherlands
Philippe CHEVALIER
- Seventeenth Annual Conference of POMS (Production & Operations Management Society), Boston, MA
Philippe CHEVALIER
- Advances in Collective Choice Workshop, Maastricht, The Netherlands
Juan D. MORENO TERNERO
- "Lattices and Polytopes", Zürich, Switzerland
Yurii NESTEROV
- Workshop MODUS "About the Emergence of Complex Forms and Multi-Scale Patterns" (GCRS4), Paris, France
Dominique PEETERS
- Keynote Lecture "Globalization, Sustainable Development and Regional Science", Eastern China University, Shanghai, China
Jacques THISSE
- Economic Policy Forum, Vienna, Austria
Pierre PESTIEAU
- 10th International Workshop on Project Management and Scheduling, Poznan, Poland
Ruslan SADYKOV
- Annual Conference on Public Sector Problems, Ekateribburg, Russia
Alexei SAWATEEV
- 8th Annual Conference in Higher School of Economics, Moscow, Russia
Alexei SAWATEEV ■ Shlomo WEBER

MAY 2006

- Doctoral Workshop in Economics, Département des Sciences Economiques, UCL, Belgium
Oscar AMEREIGHI ■ Kristian BEHRENS ■ Paul BELLEFLAMME ■ Giuseppe DE FEO ■ David DE LA CROIX ■ Athanasiou EFTHYMOS ■ Federico DE STEFANO ■ Fernanda ESTEVAN ■ Caterina GIANNETTI ■ Gilles GRANDJEAN ■ Jakub GROWIEC ■ François MANIQUET ■ Jean-François MAYSTADT ■ Luca PANACCIONE ■ Juan MORENO TERNERO ■ Giorgia OGGIONI ■ Pierre PICARD, Maria Eugenia SANIN ■ Ingmar SCHUMACHER ■ Alfonso VALDESOGO ROBLES ■ Leopoldo VILCAPOMA ■ Francesco VIOLANTE ■ Xavier WAUTHY ■ Shlomo WEBER
- International Conference on High Frequency Finance, Konstanz, Germany
Luc BAUWENS and Genaro SUCARRAT
- Summer School of the Italian Statistical Society, Salerno, Italy
Luc BAUWENS
- 1st Workshop on "Advances in Collective Choice", Maastricht, The Netherlands
Valletta GIACOMO
- CIREQ Workshop on Coalitions and Networks, Concordia University, Montreal, Canada
Ana MAULEON
- International Workshop on "Spatial Econometrics and Statistics", Libera Università Internazionale degli Studi Sociali Guido Carli, Roma, Italy
Giordano MION
- 40th Annual Meeting of the Canadian Economics Association, Montréal, Canada
Elena PANOVA
- Colloque sur "Femmes et Pensions", Ministère des Pensions, Bruxelles, Belgium
Pierre PESTIEAU
- RTN Network on "Saving and Pensions"
Pierre PESTIEAU
- Conference on "Economics of Poverty, Environment and Natural Resource Economics", Environmental Economics and Natural Resources Group, Wageningen Universiteit, The Netherlands
Dirk VAN DE GAER
- Conference on "Seasonality, Seasonal Adjustment and Their Implications for Short-term Analysis and Forecasting", Eurostat, Luxembourg
David VEREDAS
- MICFINMA Conference "International Conference on High Frequency Finance", Konstanz, Germany
David VEREDAS

JUNE 2006

- North American productivity workshop (NAPW2006), New York University, New York (NY), USA
Per AGREL
- 2006 Society of Computational Conference, Limassol, Cyprus
Raouf BOUCEKKINE
- QQASS (Qualitative and Quantitative Analysis in Social Sciences) Special Issues Conference on "Macro and Financial Economics/Econometrics", Brunel University, London
Luc BAUWENS
- Workshop "Croissance et Equilibre", Dijon, France
Kristian BEHRENS
- LEA Spring School , Aix-en-Provence, Marseille
Paul BELLEFLAMME ■ Alain PHOLO BALA
- Telecom Paris Conference on the "Economics of Information and Communication Technologies", Paris, France
Paul BELLEFLAMME
- INFORMS Annual Conference, Hong Kong
Philippe CHEVALIER
- 1ère Conférence Euro-Africaine en Finance et Economie, Tunis, Tunisie
Claude D'ASPREMONT ■ Jean GABSZEWICZ
- 9th International Workshop on "High Performance Optimization Techniques" (HOOPT2006), Delft, The Netherlands
François GLINEUR ■ Yurii NESTEROV
- SURED 2006 (Sustainable Resource Use and Economic Dynamics), Ascona, Switzerland
Jakub GROWIEC ■ Stéphane LAMBRECHT ■ Agustin PEREZ-BARAHONA ■ Ingmar SCHUMACHER
- International Schumpeter Society Conference on Innovation and Growth ("Schumpeter 2006"), Nice, France
Jakub GROWIEC
- 2006 Belgian Financial Research Forum, Namur, Belgium
Jérôme LAHAYE
- Rencontres de l'Environnement, Université Paris X, Nanterre, France
Stéphane LAMBRECHT
- European Society of Population Economics (ESPE) 2006, Verona, Italy
Stéphane LAMBRECHT
- Logic, Game Theory and Social Choice 4, Université de Caen, France
François MANIQUET

- Public Economic Theory Conference, Université de la Méditerranée, Marseille, France
François MANIQUET
- Workshop on Social Decisions: Equity and Power, Alicante, Spain
François MANIQUET ■ Juan D. MORENO TERNERO
- Terzo Seminario della Società Italiana di Economia e Politica Industriale,), Libera Università Internazionale degli Studi Sociali Guido Carli, Roma, Italy
Marco MARINUCCI
- INTAS Summer School on "Nonlinear Analysis with Applications in Economics", Energy and Transportations", Università di Bergamo, Italy
Giorgia OGGIONI
- Econometric Society, North American Summer Meetings, Minneapolis, USA
Saltuk OZERTURK
- 12th International Conference on the "Foundations and Applications of Utility, Risk and Decision Theory" (FUR XII), Libera Università Internazionale degli Studi Sociali Guido Carli, Roma, Italy
Luca PANACIONE
- 2nd Atlantic Workshop on "Energy and Environmental Economics", Toxa, Spain.
Agustin PEREZ-BARAHONA
- Feitschrift of E. Saka "Longevity and PAYG Pensions", Tel Aviv, Israël
Pierre PESTIEAU
- Journées Louis-André Gérard-Varet, Marseille, France
Pierre PESTIEAU
- EMF-23: World Natural Gas Markets and Trade, Berlin, Germany
Yves SMEERS
- 26th International Symposium on Forecasting, Santander, Spain
Genaro SUCARRAT and David VEREDAS
- Microstructure of Financial and Money Markets, Paris, France
David VEREDAS
- High Frequency Econometrics and the Analysis of FX Markets, Warwick, United Kingdom
David VEREDAS
- Workshop on "Innovation, R&D, and Adoption of New Technology", Universität Kiehl, Germany
David VEREDAS

JULY 2006

- 21st European Conference on Operational Research (EURO XXI), Reykjavik, Iceland
Philippe CHEVALIER and Laura SCRIMALI

- Italian Workshop of the Association of Competition Economics, Lucca, Italy
Federico DE STEFANO
- VIII International Meeting of the Society for Social Choice and Welfare, Istanbul, Turkey
Valletta GIACOMO and Catarina GOULAO
- Les Rencontres de l'Environnement. EUREQua, Université Paris I, France
Agustin PEREZ-BARAHONA
- CEPR ESF Exploratory Workshop on "Designing Partnerships between Government and the Private Sector", Bristol, United Kingdom
Pierre PICARD
- 44th Workshop on "Variational Analysis and Partial Differential Equations", Erice, Italy
Laura SCRIMALI
- Economic Education Research Consortium Workshop, Kiev, Ukraine
Shlomo WEBER

AUGUST 2006

- International Symposium on Mathematical Programming, Rio de Janeiro, Brazil
Yves POCHEZ ■ Yves SMEERS
- 61st European Meeting of the Econometric Society, Vienna, Austria
Aggey SEMENOV
- 33rd Annual Conference of the European Association for Research in Industrial Economics (EARIE), Amsterdam, The Netherlands
Jacques DRÈZE ■ Zanaj SKERDILAJDA

APPENDIX

This section gives the abstracts of the Discussion Papers that appeared in the period covered by this report. They are listed in numerical orders.

2005/47 YVES POCHE, MATHIEU VAN VYVE AND LAURENCE A. WOLSEY

LS-LIB: A LIBRARY OF REFORMULATIONS, CUT SEPARATION ALGORITHMS AND PRIMAL HEURISTICS IN A HIGH-LEVEL MODELING LANGUAGE FOR SOLVING MIP PRODUCTION PLANNING PROBLEMS

Much progress has been made in recent years in solving certain classes of production planning problems using mixed integer programming. One of the major challenges is how to make this expertise available and easy to use to the non-specialist and to the practitioners. Here we describe a modeling approach and tool LS-LIB, and report on computational results.

LS-LIB is a library of primitives to declare procedures/subroutines/global constraints in a high-level modeling language that we believe offers an interesting partial answer to this challenge. LS-LIB provides routines for problem reformulation, cut generation, and heuristics to find good feasible solutions quickly. The user must provide an initial formulation of his problem in the modeling language MOSEL. Then using his knowledge of the problem he must first classify each product or sku according to a simple three field scheme: [production type, capacity type, variant] proposed recently. Then it is a simple matter to use the global constraints of LS-LIB by adding a few lines to his initial MOSEL formulation to get a tightened formulation and/or call the appropriate cut separation routines. The heuristic procedures are called in a similar fashion.

We illustrate the use of LS-LIB on an intractable two-level problem, and a hard multi-level problem.

2005/48 JEAN-FRANÇOIS RICHARD, HENRY TULKENS AND MAGALI VERDONCK

TAX INTERACTION DYNAMICS AMONG BELGIAN MUNICIPALITIES, 1984-1997

The purpose of this paper is to test econometrically the existence of fiscal interactions between Belgian municipalities. At the time of writing, the motivation was to provide scientific support to the lively debate on fiscal competition that took place among Belgian politicians in the late nineties.

Two types of taxes are considered, for which Belgian municipalities have the decision power as to rates: the "centimes additionnels" on the personal income tax and the "précompte immobilier" which is a property tax. A dynamic adjustment model is specified and estimated using panel data for 598 municipalities over 15 years.

The empirical results obtained bear upon two main points: (i) Some interaction definitely has prevailed between the municipalities' fiscal choices made during the observation period, for both taxes; (ii) However, the adjustment reactions to the other municipalities' fiscal choices have occurred over time at the very low yearly pace of 6% and 10%, respectively, of the discrepancy between the actual rates and the preferred rates.

2005/49 FERNANDA ESTABAN AND JEAN-MARIE BALAND**MORTALITY RISK AND CHILD LABOR**

In this paper, we investigate the role of young adult mortality on child labor and educational decisions. We show that, in the absence of appropriate insurance mechanisms, the level of child labor is inefficient. It may be too high if parents are not very altruistic and anticipate positive transfers from their children in the future, but it can also be too low, in particular when parents expect to make positive transfers to their children in the future. Imperfect capital markets unambiguously increase the equilibrium level of child labor. We also show that a cash transfer conditional on child's schooling can always restore efficiency regarding child labor.

2005/50 YVES SMEERS**HOW WELL CAN ONE MEASURE MARKET POWER IN RESTRUCTURED ELECTRICITY SYSTEMS ?**

The integration of national electricity systems into a single internal European electricity market is not progressing well with the result that the level of competition in the sector remains unsatisfactory. This has led to proposals to apply ex ante remedies that directly bear on the structure of national incumbents. These measures involve quantitative recommendations such as virtual auctioning of capacity or divestitures that increase the number of competing firms. The evaluation of these measures partly relies on computable oligopoly models of the restructured electricity sector. This paper analyses the recent literature of these models and concludes that they are not currently capable of providing the degree of legal and regulatory certainty that the importance of these ex ante remedies requires. The state of the art in these models is such that their results reflect more a set of non-testable assumptions than observed facts or unambiguous theory. More academic work is necessary before these models can be applied in a legal or regulatory context. The conclusion is that this work on the structure of national electricity market distracts from the fundamental objective to introduce competition in the power sector by integrating the national markets into a single electricity market.

2005/51 RABAH AMIR AND MALGORZATA KNAUFF**RANKING ECONOMICS DEPARTMENTS WORLDWIDE ON THE BASIS OF PHD PLACEMENT**

An objective ranking of economics departments worldwide in terms of graduate education is derived. The central idea is that the value of a department is the sum of the values of its PhD graduates, as reflected in the values of their current employing departments. The scores are thus derived as solutions to a linear system of simultaneous equations in the values. The sample includes the top fifty-four departments, the composition of which is determined endogenously using a criterion requiring a minimum of four placements in the departments comprising the sample. Two other related rankings are proposed, which place more emphasis on more recent faculty recruitments. The results point to a very high concentration in the economics PhD education market worldwide, confirming the dominance of the top U.S. departments, in particular of Harvard and M.I.T. Nevertheless, a modest de-concentration trend is under way. The rankings are in close agreement with the 1994 National Research Council survey ranking based on the perceived quality of PhD programs.

2005/52 DEBASIS MISHRA AND DAVID C. PARKESASCENDING PRICE VICKREY AUCTIONS FOR GENERAL VALUATIONS

Ascending price auctions typically involve a single price path with buyers paying their final bid price. Using this traditional definition, no ascending price auction can achieve the Vickrey-Clarke-Groves (VCG) outcome for general private valuations in the combinatorial auction setting. We relax this definition by allowing discounts to buyers from the final price of the auction (or alternatively, calculating the discounts dynamically during the auction) while still maintaining a single price path. Using a notion called universal competitive equilibrium prices, shown to be necessary and sufficient to achieve the VCG outcome using ascending price auctions, we define a broad class of ascending price combinatorial auctions in which truthful bidding by buyers is an ex post Nash equilibrium. Any auction in this class achieves the VCG outcome and ex post efficiency for general valuations. We define two specific auctions in this class by generalizing two known auctions in the literature [11¹, 24²]

2005/53 DEBASIS MISHRA AND BHARATH RANGARAJANCOST SHARING IN A JOB SCHEDULING PROBLEM

A set of jobs need to be served by a server which can serve only one job at a time. Jobs have processing times and incur waiting costs (linear in their waiting time). The jobs share their costs through compensation using monetary transfers. In the first part, we provide an axiomatic characterization of the Shapley value rule by introducing some fairness axioms that are new in the literature. In the second part, we use linear programming duality to provide an alternate characterization of the Shapley value rule. Here, we use the idea of decomposition of transfers and the notion of pairwise no-envy allocation. Of the family of allocation rules that satisfy pairwise no-envy, the Shapley value rule is the one with the minimum sum of absolute values of transfers. We discuss no-envy rules and show that no-envy is not possible in general. If processing times of all jobs are equal, then it is possible to design no-envy rules, and we characterize all no-envy rules for this case.

2005/54 GIUSEPPE DE FEO AND JEAN HINDRIKSEFFICIENCY OF COMPETITION IN INSURANCE MARKETS WITH ADVERSE SELECTION

There is a general presumption that competition is a good thing. In this paper we show that competition in the insurance markets can be bad when there is adverse selection. Using the dual theory of choice under risk, we are able to fully characterize both the competitive and the monopoly market outcomes. When there are two types of risk, the monopoly dominates competition if and only if competition leads to market unravelling. When there are a continuum of types the efficiency of competition is less trivial. In effect monopoly is shown to provide better insurance but at the cost of driving out some agents from the market.

¹ Sven de Vries, James Schummer and Rakesh V. Vohra. On ascending Vickrey auctions for heterogeneous objects. Working Paper, Kellogg School of Management, Northwestern University, 2005.

² Jerry R. Green and Jean-Jacques Laffont. Characterization of satisfactory mechanisms for the revelation of preferences for public goods. *Econometrica*, 45 :427-438, 1977.

Performing simulation for different distributions of risk, we find that monopoly in general performs (much) better than competition in terms of the realization of the gains from trade across all traders in equilibrium. The reason is that the monopolist can exploit its market power to relax the incentive constraints.

2005/55 KRISTIAN BEHRENS, ANDREA R. LAMORGESE, GIANMARCO I.P. OTTAVIANO AND TAKATOSHI TABUCHI

TESTING THE 'HOME MARKET EFFECT' IN A MULTI-COUNTRY WORLD

We extend Kurgman's (1980)³ two-country two-sector model to a setup with arbitrary numbers of countries and sectors. The extended model predicts an adequately defined 'home market effect' only after controlling for cross-country differential accessibility through a theory-based linear filter. We bring that prediction to data by running a battery of non-parametric sign- and rank tests that are closely related to those used in factor proportions theory. When applied to production and trade data on a cross-section of OECD and non-OECD countries, we find support for the presence of 'home market effects' in a broad number of industries.

2005/56 ANNA RUBINCHIK-PESSACH AND SHLOMO WEBER

BALANCE OF POWER AND DIVERGENCE OF POLICIES IN A MODEL OF ELECTORAL COMPETITION

Two incumbent parties choose their platforms in a unidimensional policy space while facing a credible threat of an entry by the third party. Relative electoral support is the predominant objective of each party, and the third party enters only if it can displace one of the incumbents. In an equilibrium the two incumbents choose to prevent the entry and achieve the balance of power, i.e., splitting the electorate equally. The incumbents' positions might diverge more as compared to a system in which the parties seek to solely maximize the voters' support. Therefore, rank preoccupation under the threat of entry might contribute to more polarized political platforms of the two leading parties.

2005/57 RUSLAN SADYKOV

A BRANCH-AND-CHECK ALGORITHM FOR MINIMIZING THE SUM OF THE WEIGHTS OF THE LATE JOBS ON A SINGLE MACHINE WITH RELEASE DATES

In this paper we consider the scheduling problem of minimizing the sum of the weights of the late jobs on a single machine ($1 | r_j | \sum w_j U_j$). A branch-and-check algorithm is proposed, where a relaxed integer programming formulation is solved by branch-and-bound and infeasible solutions are cut off using infeasibility cuts. We suggest two ways to generate cuts. First we show how the algorithm by Carlier⁴ can be modified to produce tightened "no-good" cuts. We then demonstrate how to create cuts by using constraint propagation. The branch-and-check

³ Krugman, P. Scale economies, product differentiation and the pattern of trade. *American Economic Review*, 70, 950-959, 1980.

⁴ Carlier, J. The one machine sequencing problem, *European Journal of Operations Research*, 11, 42-47, 1982.

algorithm proposed is implemented in the Mosel modelling and optimization language. Computational experiments show that our algorithm outperforms the exact approach of Péridy et al. [22]⁵, which, to our knowledge, is the best reported in the literature.

2005/58 LUC BAUWENS, DAGFINN RIME AND GENERO SUCARRAT

EXCHANGE RATE VOLATILITY AND THE MIXTURE OF DISTRIBUTION HYPOTHESIS

This paper sheds new light on the mixture of distribution hypothesis by means of a study of the weekly exchange rate volatility of the Norwegian krone. In line with other studies we find that the impact of information arrival on exchange rate volatility is positive and statistically significant, and that the hypothesis that an increase in the number of traders reduces exchange rate volatility is not supported. The novelties of our study consist in documenting that the positive impact of information arrival on volatility is relatively stable across three different exchange rate regimes, and in that the impact is relatively similar for both weekly volatility and weekly realised volatility. It is not given that the former should be the case since exchange rate stabilisation was actively pursued by the central bank in parts of the study period. We also report a case in which undesirable residual properties attained within traditional frameworks are easily removed by applying the log-transformation on volatilities.

2005/59 ANDREA SILVESTRINI AND DAVID VEREDAS

TEMPORAL AGGREGATION OF UNIVARIATE LINEAR TIME SERIES MODELS

In this paper we feature state-of-the-art econometric methodology of temporal aggregation for univariate linear time series, namely ARIMA-GARCH models. We present a unified overview of temporal aggregation techniques for this broad class of processes and we explain in detail, although intuitively, the technical machinery behind the results. An empirical application with Belgian public deficit data illustrates the main issues.

2005/60 OLIVIER BOCHET

IMPLEMENTATION OF THE WALRASIAN CORRESPONDENCE: THE BOUNDARY PROBLEM

Consider exchange economies in which preferences are continuous, convex and strongly monotonic. It is well known that the Walrasian correspondence is not Nash implementable. Maskin monotonicity (Maskin, 1999)⁶ is violated for allocations at the boundary of the feasible set. We derive an impossibility result showing that it is in fact not implementable in any solution concept. Next, we construct a sequential mechanism based on price-allocation announcements that fits the very description of Walrasian Equilibrium. Imposing an additional domain restriction, we show that it fully implements the Walrasian correspondence in

⁵ Péridy, L., Pinson, E. and D. Rivraux. Using short-term memory to minimize the weighted number of late jobs on a single machine. *European Journal of Operations Research*, 148, 591-603, 2003.

⁶ Maskin, E. Nash equilibrium and welfare optimality. *Review of Economic Studies*, 66, 23-38, 1999.

subgame perfect and strong subgame perfect equilibrium. We thus take care of the boundary problem that was prominent in the Nash implementation literature.

2005/61 YASUHIRO SATO AND JACQUES-FRANÇOIS THISSE

COMPETING FOR CAPITAL WHEN LABOR IS HETEROGENEOUS

This paper investigates the impacts of capital mobility and tax competition in a setting with imperfect matching between firms and workers. The small country always gains and the large country always loses from tax competition, thus implying tax competition leads to redistribution from the large to the small country. However, the large country always attains a higher utility than does the small country. These results imply that our model encapsulates both the "importance of being small" as well as the "importance of being large". We also show that tax harmonization leads to redistribution from the large to the small country.

2005/62 MICHELE CONFORTI AND LAURENCE WOLSEY

COMPACT FORMULATIONS AS A UNION OF POLYHEDRA

We explore one method for finding the convex hull of certain mixed integer sets. The approach is to break up the original set into a small number of subsets, find a compact polyhedral description of the convex hull of each subset, and then take the convex hull of the union of these polyhedra. The resulting extended formulation is then compact, its projection is the convex hull of the original set, and optimization over the mixed integer set is reduced to solving a linear program over the extended formulation.

The approach is demonstrated on three different sets: a continuous mixing set with an upper bound and a mixing set with two divisible capacities both arising in lot-sizing, and a single node flow model with divisible capacities that arises as a subproblem in network design.

2005/63 OLIVIER BOCHET

SWITCHING FROM COMPLETE TO INCOMPLETE INFORMATION

We construct an elementary mechanism (Dutta, Sen and Vohra (1995))⁷ that Nash implements the Constrained Walrasian correspondence. We extend it to incomplete and non-exclusive information economies by enlarging the message space of agents. We characterize the set of Bayesian equilibrium outcomes of the mechanism, and thus characterize an extension of the Constrained Walrasian correspondence when one switches from complete to incomplete information. First, measurability restrictions on allocations do not emerge from the strategic behavior of agents: there exist simple economies for which the set of Constrained Rational Expectations equilibrium allocations is not contained in the set of equilibrium outcomes of the mechanism. Next, by imposing measurability restrictions on allocations, the mechanism

⁷ Dutta B., Sen A. and R. Vohra. Nash implementation through elementary mechanisms in economic environments. *Review of Economic Design*, 1, 173-203, 1995.

globally implements the Constrained Rational Expectations Equilibrium correspondence. This result shows game-theoretic connections between these two market equilibrium concepts. However, it is obtained at the price of strong restrictions on the behavior of agents.

2005/64 MARC GERMAIN AND ALPHONSE MAGNUS

PRICES VERSUS QUANTITIES: STOCK POLLUTION CONTROL WITH REPEATED CHOICE OF THE INSTRUMENT

One examines strategies of pollution control through choices between taxes and tradable permits, supposed to be decided at several time periods t_1, t_2, \dots, t_I . At each of these time periods, the choice depends on the solution of a dynamic programming problem involving the expectations of the polluting factor of production function $z(t)$ and the pollutant stock function $S(t)$. According to coefficients of these two functions in the dynamic problem, it is shown under a broad functional setting that permits are decided for a while, followed by decisions of taxes for all the remaining periods. Finite ($I < \infty$), as well as infinite ($I = \infty$) horizon is considered.

2005/65 KRISTIAN BEHRENS AND PIERRE PICARD

WELFARE, HOME MARKET EFFECTS, AND HORIZONTAL FOREIGN DIRECT INVESTMENT

We investigate the spatial distribution and organization of an imperfectly competitive industry when firms may choose to operate more than a single production unit. Focusing on a short-run setting with a fixed mass of firms, we fully characterize the spatial equilibria analytically. Comparing the equilibrium and the first-best, we show that both organizational and spatial inefficiencies may arise. In particular, when fixed costs are low enough the market outcome may well lead to overinvestment and, therefore, to too many multinationals operating from a social point of view. Furthermore, once multinationals are taken into account, the market outcome may well lead to too little agglomeration.

2005/66 PAOLO COLLA, MARC GERMAIN AND VINCENT VAN STEENBERGHE

ENVIRONMENTAL POLICY AND SPECULATION ON MARKET FOR EMISSION PERMITS

Tradable emission permits share many characteristics with financial assets. As on financial markets, speculators are likely to be active on large markets for emission permits such as those developing under the Kyoto Protocol. We show how the presence of speculators on a market for emission permits affects the price of these permits when firms face risk aversion. The agency in charge of the optimal environmental policy should account for the presence of speculators when determining the total amount of permits to issue.

2005/67 YURII NESTEROV

PRIMAL-DUAL SUBGRADIENT METHODS FOR CONVEX PROBLEMS

In this paper we present a new approach for constructing subgradient schemes for different types of nonsmooth problems with convex structure. Our methods are primal-dual since they

are always able to generate a feasible approximation to the optimum of an appropriately formulated dual problem. Besides other advantages, this useful feature provides the methods with a reliable stopping criterion. The proposed schemes differ from the classical approaches (divergent series methods, mirror descent methods) by presence of two control sequences. The first sequence is responsible for aggregating the support functions in the dual space, and the second one establishes a dynamically updated scale between the primal and dual spaces. This additional flexibility allows to guarantee a boundedness of the sequence of primal test points even in the case of unbounded feasible set. We present the variants of subgradient schemes for nonsmooth convex minimization, minimax problems, saddle point problems, variational inequalities, and stochastic optimization. In all situations our methods are proved to be optimal from the view point of worst-case black-box lower complexity bounds.

2005/68 YURII NESTEROV

ACCELERATING THE CUBIC REGULARIZATION OF NEWTON'S METHOD ON CONVEX PROBLEMS

In this paper we propose an accelerated version of the cubic regularization of Newton's method⁸. The original version, used for minimizing a convex function with Lipschitz-continuous Hessian, guarantees a global rate of convergence of order $O\left(\frac{1}{k^2}\right)$, where k is the iteration counter. Our modified version converges for the same problem class with order $O\left(\frac{1}{k^3}\right)$, keeping the complexity of each iteration unchanged. We study the complexity of both schemes on different classes of convex problems. In particular, we argue that for the second-order schemes, the class of non-degenerate problems is different from the standard class.

2005/69 YURII NESTEROV

PERFORMANCE OF TRIGONOMETRIC GENERATING FUNCTIONS ON SOME COMBINATORIAL PROBLEMS

In this paper we analyze computational performance of dual trigonometric generating functions on some integer programming problems. We show that if the number of equality constraints is fixed, then this technique allows to solve the problems in time, which is polynomial in the dimension of the space of variables.

2005/70 SHOSHANA ANILY, MICHAL TSUR AND LAURENCE A. WOLSEY

MULTI-ITEM LOT-SIZING WITH A JOINT SET-UP COST

We consider a multi-item lot-sizing problem in which there are demands, and unit production and storage costs. In addition production of any mix of items is measured in batches of fixed size, and there is a fixed set-up cost per batch in each period. Suppose that the unit production

⁸ Nesterov, Y. and B. Polyak. Cubic regularization of Newton method and its global performance. CORE Discussion paper 2003/41, 2003. Submitted to *Mathematical Programming*.

costs are constant over time, the storage costs are nonnegative, and for any two items the one that has a higher storage cost in one period has a higher storage cost in every period. Then we show that there is a linear program with $O(mT^2)$ constraints and variables that solves the multi-item lot-sizing problem, thereby establishing that it is polynomially solvable, where m is the number of items and T the number of time periods. This generalizes an earlier result of Anily and Tzur who presented a $O(mT^{m+5})$ dynamic programming algorithm for essentially the same problem. Under additional conditions, a similar linear programming result is shown to hold in the presence of backlogging when the batch size is arbitrarily large.

Brief computational results on two instances with varying batch sizes are presented and discussed.

2005/71 EMMANUELE BACCHIEGA AND ANTONIO MINNITI

LOCATION IN A VERTICALLY DIFFERENTIATED INDUSTRY

We analyze a model of a vertically differentiated duopoly with two regions. These two locations differ for the market size or for the distribution of the willingness to pay for quality of their consumers. Firms *sequentially* choose to settle in one region and then *simultaneously* compete in prices, selling their products both on the local market and on the foreigner one. We show that the decision whether to agglomerate or not crucially depends on the extent of regions' asymmetries, but, counter intuitively, there are parametric configurations in which the model predicts that the leader (the first firm choosing location) settles either in the poorer or in the smaller region, leaving the other one to the follower. Welfare analysis completes the paper.

2005/72 OLIVIER BOCHET

NASH IMPLEMENTATION WITH LOTTERY MECHANISMS

Consider the problem of exact Nash Implementation of social choice correspondences. Define a lottery mechanism as a mechanism in which the planner can randomize on alternatives out of equilibrium while pure alternatives are always chosen in equilibrium. When preferences over alternatives are strict, we show that Maskin monotonicity (Maskin, 1999)⁹ is both necessary and sufficient for a social choice correspondence to be Nash implementable. We discuss how to relax the assumption of strict preferences. Next, we examine social choice correspondences with private components. Finally, we apply our method to the issue of voluntary implementation (Jackson and Palfrey, 2001)¹⁰.

⁹ Maskin, E. Nash implementation and welfare optimality. *Review of Economic Studies*, 66, 23-38, 1999.

¹⁰ Jackson M. and T. Palfrey. Voluntary implementation. *Journal of Economic Theory*, 98, 1-25, 2001.

2005/73 ARIE PREMINGER AND SHINICHI SAKATA**A MODEL SELECTION METHOD FOR S-ESTIMATION**

In least squares, least absolute deviations, and even generalized M-estimation, outlying observations sometimes strongly influence the estimation result, masking an important and interesting relationship existing in the majority of observations. The S-estimators are a class of estimators that overcome this difficulty by smoothly downweighting outliers in fitting regression functions to data.

In this paper, we propose a method of model selection suitable in S-estimation. The proposed method chooses a model to minimize a criterion named the penalized S-scale criterion (PSC), which is decreasing in the sample S-scale of fitted residuals and increasing in the number of parameters. We study the large sample behavior of the PSC in nonlinear regression with dependent, heterogeneous data, to establish sets of conditions sufficient for the PSC to consistently select the model with the best fitting performance in terms of the population S-scale, and the one with the minimum number of parameters if there are multiple best performers. Our analysis allows for partial unidentifiability, which is often a practically important possibility when selecting one among nonlinear regression models. We offer two examples to demonstrate how our large sample results could be applied in practice. We also conduct Monte Carlo simulations to verify that the PSC performs as our large sample theory indicates, and assess the reliability of the PSC method in comparison with the familiar Akaike and Schwarz information criteria.

2005/74 STÉPHANE LAMBRECHT**MAINTAINING ENVIRONMENTAL QUALITY FOR OVERLAPPING GENERATIONS: SOME REFLECTIONS ON THE US SKY TRUST INITIATIVE**

Starting from the US Sky Trust claim that "the sky belongs to us equally", this paper distinguishes two sources through which overlapping generations may consent to the use of the environment whom they are the owners: the common consent of all generations reached behind the Rawlsian veil of ignorance and the specific consents of generations born at different time periods. It proposes two institutions: a fund mandated to implement the common consent by auctioning permits to firms and a voting procedure to implement the specific consents by choosing each generation's preferred level of environmental maintenance. The analysis shows how the specific consent may be, each period, operative or inoperative and that there may be at most two switches between these two regimes on the transition path. Starting from the business as usual steady state, the introduction of these institutions always immediately increases the environmental quality, but the magnitude of this gain may be temporary and decrease if capital accumulation is strongly evicted by the policy. On the opposite, we stress a case in which the introduction of the policy has beneficial effects both on wealth and quality.

2005/75 CLAUDE D'ASPREMONTFORMAL WELFAREISM AND INTERGENERATIONAL EQUITY

The formulation of the problem of justice among generations as the problem of finding an ordering of infinite utility streams is examined within the "social welfare functional" approach to social choice. This formulation usually presumes a double reduction, not only the classical "welfarist" reduction, according to which "utility" provides all the information required to construct a social evaluation rule, but also the aggregation of the individual utility levels at each generation into a single utility level. We shall argue that this second type of reduction obliterates the relationship between the values judgments made in the social evaluation of the welfare of the presently living generation with that of future generations and does not emphasize the capacity for many social evaluation criteria (including pure utilitarianism and Leximin) to "proliferate" from the present generation to any larger set of generations. Our results concerning the orderings generated by such proliferating rules are compared to characterisations already given in the literature.

2005/76 MARC GERMAIN AND VINCENT VAN STEENBERGHEINNOVATION UNDER TAXES VERSUS PERMITS: HOW A COMMONLY MADE ASSUMPTION LEADS TO MISLEADING POLICY RECOMMENDATIONS

The literature on the impact of economic instruments (typically taxes and tradable permits) on the level of innovation is usually based on the assumption that innovation reduces the slope of the marginal abatement cost curve. This assumption, which usually leads to the conclusion that taxes induce higher levels of innovation than tradable permits, is however never motivated. In this short article, we analyse the assumption by introducing innovation in the production function of a polluting firm and by showing how it affects the corresponding marginal abatement cost curve. We show that the slope of the marginal abatement cost curve does not necessarily decrease with the level of innovation. As a consequence, previous analyses lead to misleading policy recommendations.

2005/77 JUAN D. MORENO-TERNERO AND JOHN E. ROEMERIMPARTIALITY, PRIORITY, AND SOLIDARITY IN THE THEORY OF JUSTICE

The ethic of 'priority' is a compromise between the extremely compensatory ethic of 'welfare equality' and the needs-blind ethic of 'income equality'. We propose an axiom of priority, and characterize resource-allocation rules that are impartial, prioritarian, and solidaristic. They comprise a class of rules which equalize across individuals some index of resources and welfare. Consequently, we provide an ethical rationalization for the many applications in which such indices have been used (e.g., the 'human development index,' 'index of primary goods,' etc.)

2005/78 INÈS LINDNER

VOTING GAMES WITH ABSTENTION: A PROBABILISTIC CHARACTERIZATION OF POWER AND A SPECIAL CASE OF PENROSE'S LIMIT THEOREM

In general, analyses of voting power are performed through the notion of a simple voting game (SVG) in which every voter can choose between two options: 'yes' or 'no'. Felsenthal and Machover (1997)¹¹ introduced the concept of ternary voting games (TVGs) which recognizes abstention alongside. They derive appropriate generalizations of the Shapley-Shubik and Banzhaf indices in TVGs. Braham and Steffen (2002)¹² argued that the decision-making structure of a TVG may not be justified. They propose a sequential structure in which voters first decide between participation and abstention and then between yes or no. The purpose of this paper is twofold. First, it compares the two approaches and shows how the probabilistic interpretation of power provides a unifying characterization of analogues of the Banzhaf (Bz) measure. Second, using the probabilistic approach we shall prove a special case of Penrose's Limit Theorem (PLT). This theorem deals with an asymptotic property in weighted voting games with an increasing number of voters. It says that under certain conditions the ratio between the voting power of any two voters (according to various measures of voting power) approaches the ratio between their weights. We show that PLT holds in TVGs for analogues of Bz measures, irrespective of the particular nature of abstention.

2005/79 YURII NESTEROV

MINIMIZING FUNCTIONS WITH BOUNDED VARIATION OF SUBGRADIENTS

In many applications it is possible to justify a reasonable bound for possible variation of subgradients of objective function rather than for their uniform magnitude. In this paper we develop a new class of efficient primal-dual subgradient schemes for such problem classes.

2005/80 CATHERINE FRAIKIN, YURII NESTEROV AND PAUL VAN DOOREN

CORRELATION BETWEEN TWO PROJECTED MATRICES UNDER ISOMETRY CONSTRAINTS

In this paper, we consider the problem of correlation between the projections of two square matrices. These matrices of dimensions $m \times m$ and $n \times n$ are projected on a subspace of lower-dimension k under isometry constraints. We maximize the correlation between these projections expressed as a trace function of the product of the projected matrices. First we connect this problem to notions such as the generalized numerical range, the field of values and the similarity matrix. We show that these concepts are particular cases of our problem for choices of m , n and k . The formulation used here applies to both real and complex matrices. We characterize the objective function, its fixed points, its optimal value for Hermitian and normal matrices and finally upper and lower bounds for the general case. An iterative

¹¹ Felsenthal, D. S. and M. Machover. Ternary voting games. *International Journal of Game Theory* 26, 335–351, 1997.

¹² Braham, M. and F. Steffen. Voting power in games with abstentions. In M.J. Holler et al. (eds.), *Power and Fairness*, Jahrbuch für Neue Politische Ökonomie 20, Mohr Siebeck, 2002.

algorithm based on the singular value decomposition is proposed to solve the optimization problem.

2005/81 JUAN D. MORENO-TERNERO AND JOHN E. ROEMEROBJECTIVITY, PRIORITY, AND THE VEIL OF IGNORANCE

The veil of ignorance has been used often as a tool of recommending what justice requires with respect to the distribution of wealth. We complete Harsanyi's model of the veil of ignorance by appending information permitting objective comparisons among persons. We show that the veil-of-ignorance conception of John Harsanyi, so completed, and Donald Dworkin's, when modeled formally, recommend wealth allocations in conflict with the prominently espoused view that priority should be given to the disabled in wealth allocation.

2005/82 HOLGER GORG, PIERRE PICARD AND ERIC STROBLCONTRACTING OUT AND LABOR DEMAND ELASTICITIES

We examine the relationship between contracting out and the wage elasticity of labor demand in outsourcing plants. A simple theoretical model suggests that firms engaged in contracting out have lower wage elasticities. Estimating plant level dynamic labor demand equations for Irish manufacturing we find evidence supportive of this.

2005/83 PAUL BELLEFLAMME AND PIERRE PICARDPIRACY AND COMPETITION

The effects of (private, small-scale) piracy on the pricing behavior of producers of information goods are studied within a unified model of vertical differentiation. Although information goods are assumed to be perfectly differentiated, demands are interdependent because the copying technology exhibits increasing returns to scale. We characterize the Bertrand-Nash equilibria in a duopoly. Comparing equilibrium prices to the prices set by a multiproduct monopolist, we show that competition drives prices up and may lead to price dispersion. Competition reduces total surplus in the short run but provides higher incentives to create in the long run.

2005/84 JEAN J. GABSZEWICZ, PAOLO P. GARELLA AND NATHALIE SONNACNEWSPAPERS' MARKET SHARES AND THE THEORY OF THE CIRCULATION SPIRAL

We consider a model of daily newspapers' competition to test the validity of the so called "theory of the circulation spiral". According to it, the interaction between the newspapers and the advertising markets drives the newspaper with the smaller readership into a vicious circle, finally leading it to death. In a model with two newspapers, we show that, contrary to this conjecture, the dynamics envisaged by the proposers of the theory, does not always lead to the elimination of one of them.

2005/85 LUC BAUWENS AND JEROEN V.K. ROMBOUTS

BAYESIAN INFERENCE FOR THE MIXED CONDITIONAL HETEROSKEDASTICITY MODEL

We estimate by Bayesian inference the mixed conditional heteroskedasticity model of (Haas, Mittnik, and Paoella 2004a)¹³. We construct a Gibbs sampler algorithm to compute posterior and predictive densities. The number of mixture components is selected by the marginal likelihood criterion. We apply the model to the SP500 daily returns.

2005/86 ANTONIO TESORIERE

ENDOGENOUS FIRM ASYMMETRY AND COOPERATIVE R&D IN LINEAR DUOPOLY WITH SPILLOVERS

In a linear model of cost reducing R&D/Cournot competition, firm asymmetry is shown to be sustainable as subgame perfect Nash equilibrium with R&D competition only if the productivity of research is sufficiently large relative to the benefits from imitation. In such a case, industry-wide cost reduction and firms asymmetry are increasing and decreasing functions of the spillover rate, respectively. In the absence of spillovers, a symmetric joint lab generates higher consumer surplus and social welfare than a pair of asymmetric competitors. If spillovers are not too small, asymmetric R&D competition is advantageous to consumers, but not to firms.

2005/87 ANDREW J. MILLER, DEBASIS MISHRA AND DHARMARAJ VEERAMANI

MECHANISM DESIGN FOR MULTIPLE ITEM PROCUREMENT USING A DISTRIBUTED ELLIPSOID ALGORITHM

We study a problem in a procurement setting in which an Original Equipment Manufacturer (OEM) wants to procure a set of items from a set of suppliers. Each supplier incurs a cost for supplying any subset/bundle of items, and each supplier's cost information is known only to him. The goal is to determine (i) an efficient allocation of suppliers to items and (ii) appropriate payments for suppliers. We formulate the problem of determining which supplier should supply what items as an integer program. We develop a method, which is based on the ellipsoid method, that solves the dual of the linear relaxation of the problem in polynomial time. We also show that the linear relaxation has an integral optimal solution.

2005/88 SIMON P. ANDERSON AND JEAN J. GABSZEWICZ

THE MEDIA AND ADVERTISING: A TABLE OF TWO-SIDED MARKETS

Media industries are important drivers of popular culture. A large fraction of leisure time is devoted to radio, magazines, newspapers, the Internet, and television (the illustrative example henceforth). Most advertising expenditures are incurred for these media. They are also mainly supported by advertising revenue. Early work stressed possible market failures in program duplication and catering to the Lowest Common Denominator, indicating lack of cultural diversity and quality. The business model for most media industries is underscored by advertisers' demand to reach prospective customers. This business model has important

¹³ Haas, M., Mittnik, S. and M. Paoella. Mixed normal conditional heteroskedasticity. *Journal of Financial Econometrics*, 2, 211-250, 2004.

implications for performance in the market since viewer sovereignty is indirect. Viewers are attracted by programming, though they dislike the ads it carries, and advertisers want viewers as potential consumers. The two sides are coordinated by broadcasters (or "platforms") that choose ad levels and program types, and advertising finances the programming. Competition for viewers of the demographics most desired by advertisers implies that programming choices will be biased towards the tastes of those with such demographics. The ability to use subscription pricing may help improve performance by catering to the tastes of those otherwise under-represented, though higher full prices tend to favor broadcasters at the expense of viewers and advertisers. If advertising demand is weak, program equilibrium program selection may be too extreme as broadcasters strive to avoid ruinous subscription price competition, but strong advertising demand may lead to strong competition for viewers and hence minimum differentiation ("la pensée unique"). Markets (such as newspapers) with a high proportion of ad-lovers may be served only by monopoly due to a circulation spiral: advertisers want to place ads in the paper with most readers, but readers want to buy the paper with more ads.

2005/89 SALTUK OZERTURK

STOCK RECOMMENDATION OF AN ANALYST WHO TRADES ON OWN ACCOUNT

This paper analyzes how to provide information acquisition and truthful reporting incentives to a financial analyst who privately trades on own account. The analysis exploits the observation that for a given report, the analyst's reward scheme essentially provides him with a portfolio endowment traded in the market. For every signal, the analyst makes the report that corresponds to the portfolio endowment with maximum market value, given security prices. The principal cannot make the analyst strictly prefer to report the true signal: the analyst is truthful only when indifferent between the two reports. The analyst's information acquisition incentive is driven only by private portfolio considerations: he acquires information only if he will be holding a large enough position in the stock he covers. The paper also presents a general 'separation of the optimal report from private information' result and illustrates that performance based reward schemes can fail to induce any information revelation when the analyst privately trades.

2005/90 JACQUES H. DRÈZE

NESTED IDENTIFICATION OF SUBJECTIVE PROBABILITIES

The theory of games against nature relies on complete preferences among all conceivable acts, i.e. among all potential assignments of consequences to states of nature (case 1). Yet most decision problems call for choosing an element from a limited set of acts. And in games of strategy, the set of strategies available to a player is given and not amenable to artificial extensions. In "Assessing Strategic Risk" (CORE DP 2005/20), R.J Aumann and J.H. Drèze extend the basic result of decision theory (maximisation of subjectively expected utility) to situations where preferences are defined only for a given set of acts, and for lotteries among these and sure consequences (case 2). In this paper, we provide a similar extension for two other situations: those where only the set of optimal elements from a given set of acts is known

(case 3); and those where only a single optimal act is known (case 4). To these four cases correspond four nested sets of admissible subjective probabilities over the states or the opponent's strategies, namely a singleton in case 1 and increasing sets in cases 2-4. The results for cases 3 and 4 also define the extent to which subjective probabilities must be specified in order to solve a given decision problem or play a given game.

2005/91 KRISTIAN BEHRENS AND PIERRE PICARD

TAX COMPETITION, LOCATION, AND HORIZONTAL FOREIGN DIRECT INVESTMENT

We develop a model of capital tax competition in which imperfectly competitive firms choose both the number of plants they operate and their location. When compared to models with single-plant firms, the presence of multinationals reverses some standard results. First, instead of being subsidized, capital may actually be taxed in equilibrium, which shows that the presence of taxable 'multinational rents' relaxes tax competition. Second, even when firms are subsidized, their subsidy-inclusive profits may be decreasing in subsidies, due to fiercer price competition by more multinationals. Third, multinationals may give rise to multiple equilibria in the tax game, one of which can be a 'subsidy trap' characterized by many multinationals, high subsidy levels, and low welfare.

2005/92 MICHELE CONFORTI, MARCO DI SUMMA AND LAURENCE WOLSEY

THE MIXING SET WITH FLOWS

We consider here the mixing set with flows:

$$s + x_t \geq b_t, x_t \leq y_t \text{ for } 1 \leq t \leq n; \quad s \in \mathfrak{R}_+^1, x \in \mathfrak{R}_+^n, y \in Z_+^n.$$

It models the "flow version" of the basic mixing set introduced and studied by Günlük and Pochet, as well as the most simple stochastic lot-sizing problem with recourse, and more generally is a relaxation of certain mixed integer sets that arise in the study of production planning problems.

We study the polyhedron obtained by convexifying the above set. Specifically we provide a system of inequalities that gives its external description and characterize its vertices and rays.

2005/93 JEAN HINDRIKS, SUSANA PERALTA AND SHLOMO WEBER

FISCAL COMPETITION, REVENUE SHARING, AND POLICY-INDUCED AGGLOMERATION

Revenue sharing can be used to discourage low tax regions from competing for capital and firms with high tax regions. However, with heterogeneous regions, revenue sharing involves net transfers across regions and creates a "moral-hazard" problem - that is, regions may want to invest less in market fostering public good when the benefits are shared across nations. This paper analyzes these costs and benefits of revenue sharing. When asymmetric regions compete in capital income taxes only, we show that revenue sharing can be desirable for the high tax region if it is pushed far enough (i.e., J-curve effect), while tax harmonization is always harmful for the low tax region. When regions also compete through public investments, we find that tax competition distorts (downwards) public investments. While revenue sharing

discourages public investments due to moral-hazard effect, it remains beneficial in most cases. Moreover, there are new agglomeration forces resulting from public investments, because the inflow of capital raises the incentive for public investments which in turn attract more capital. This leads to the possibility of policy-induced agglomeration (which is different from the classical agglomeration forces in the New Economic geography).

2005/94 FALILOU FALLENDOGENOUS PERSISTENT INEQUALITY

The purpose of this paper is to demonstrate that inherited human capital is a powerful vector of inequality formation and persistence, irrespective of its links with financial wealth endowment. This paper argues that the agents who inherit a low level of human capital bear a greater utility cost in their educational investment and that there are different profiles of returns on human capital within the economy. These two arguments are sufficient to generate an endogenous formation of workers' and entrepreneurs' groups and a continuum of steady states with inequality. Allowing for self-employment in the model generates the possibility of equality at equilibrium in addition to the inequality equilibrium with the emergence of a middle class.

2005/95 JEAN J. GABSZEWICZ AND FILOMENA GARCIAA NOTE ON EXPANDING NETWORKS AND MONOPOLY PRICING

We obtain explicitly the optimal path of prices for a monopolistic operating in a network industry during a finite number of periods. We describe this optimal path as a function of network intensity and horizon length and show that the prices are increasing in time and that, for very low network intensity, or very high horizon length, the monopolist will offer the good at zero price in the initial period.

2005/96 JEAN J. GABSZEWICZ AND FILOMENA GARCIAQUALITY IMPROVEMENT AND NETWORK EXTERNALITIES

We analyse the optimal pricing choice of an incumbent firm that sells a good with network externalities and is threatened by the entry of a higher quality variant. In the framework of a vertical differentiation model, we find a necessary and sufficient condition under which quality improvement occurs as a result of this competition.

2006/1 KRISTIAN BEHRENS AND YASUHIRO SATOLABOR MARKET INTEGRATION AND MIGRATION: IMPACTS ON SKILL FORMATION AND THE WAGE STRUCTURE

We analyze the impacts of labor market integration and migration on skill formation, wage structures, and per capita GDP of host and source countries. To do so, we propose a model in which heterogeneous agents invest in the acquisition of skills, and in which final good production exhibits increasing returns to scale in the range of available skills. Labor market

integration, by allowing for migration in response to wage differentials, changes the wage structures and, therefore, the incentives to become skilled in both host and source countries.

We show that our model can largely replicate the empirical evidence concerning international migration, the widening international income dispersion, the narrowing national income dispersion, and the divergence in the rates of skill formation in host and source countries.

2006/2 NOEMI NAVARRO

ASYMMETRIC INFORMATION, WORD-OF-MOUTH AND SOCIAL NETWORKS: FROM THE MARKET FOR LEMONS TO EFFICIENCY

I analyze a market where there is a homogeneous good, which quality is chosen, and therefore known, by a single producer. Consumers do not know the quality of the good but they use their acquaintances in order to obtain information about it. Information transmission exhibits decay and consumers assign a common initial willingness-to-pay before information transmission takes place. I define an equilibrium concept for this type of situation and characterize the set of resulting equilibria for any possible social network. The main conclusion from this characterization is that, if there is a maximal level of quality (given by technological knowledge) that can be chosen, then, the producer may choose lower levels of quality as the population of consumers is getting more internally connected, due to free-riding on information by consumers when quality levels are low. This "adverse-selection" effect vanishes if consumers are expected to coordinate on the most favorable equilibria for the producer, if there is zero initial willingness-to-pay or if there are no technological constraints.

2006/3 PARKASH CHANDER AND HENRY TULKENS

COOPERATION, STABILITY AND SELF-ENFORCEMENT IN INTERNATIONAL ENVIRONMENTAL AGREEMENTS: A CONCEPTUAL DISCUSSION

In essence, any international environmental agreement (IEA) implies cooperation of a form or another. The paper seeks for logical foundations of this. It first deals with how the need for cooperation derives from the public good aspect of the externalities involved, as well as with where the source of cooperation lies in cooperative game theory. In either case, the quest for efficiency is claimed to be at the root of cooperation.

Next, cooperation is considered from the point of view of stability. After recalling the two competing concepts of stability in use in the IEA literature, new insights on the nature of the gamma core in general are given as well as of the Chander-Tulkens solution within the gamma core. Free riding is also evaluated in relation with the alternative forms of stability under scrutiny.

Finally, it is asked whether with the often mentioned virtue of "self enforcement" any conceptual gain is achieved, different from what is meant by efficiency and stability. A skeptical answer is offered, as a reply to Barrett's (2003)¹⁴ attempt at giving the notion a specific content.

¹⁴ Barrett, S. *Environment and Statecraft: The Strategy of Environmental Treaty-Making*. Oxford University Press, Oxford, 2003.

2006/4 SERGIO O. PARREIRAS AND ANNA RUBINCHIK-PESSACHCONTESTS WITH HETEROGENEOUS AGENTS

We study tournaments with many ex-ante asymmetric contestants, whose valuations for the prize are independently distributed. First, we characterize the equilibria in monotone strategies, second, we provide sufficient conditions for the equilibrium uniqueness and, finally, we reconcile the experimental evidence documenting the 'workaholic' behavior in contests with the related theory by introducing heterogeneity among participants. It is a 'weak' participant that might become a 'workaholic' in an equilibrium, that is, his effort density might crease at the highest valuation - weak, either because he is more risk averse or because his rivals consider that it is very unlikely that he has a high value for the prize. In contrast, effort densities are always decreasing in case of symmetry with identically distributed values for the prize and identical attitudes towards risk in case of CARA, as well as in contests with only two participants. Moreover, we show that for low valuations more risk averse agents are less likely to exert low effort than their 'strong' rivals, while those with dominated distribution of the prize valuation are more likely to do so. An explicit solution for the uniform distribution case with contestant-specific support is provided as well.

2006/5 DAVID CRAINICH, HERVÉ LELEU AND ANA MAULEONTHE OPTIMALITY OF HOSPITAL FINANCING SYSTEM: THE ROLE OF PHYSICIAN-MANAGER INTERACTIONS

In a paper published by Ma (1994)¹⁵ it was argued that the prospective payment system in the hospital industry was superior to the cost based reimbursement system to achieve both cost reduction and quality improvement objectives. In the analysis, it was assumed that quality and costs decisions were made by a single agent. Our paper compares these two financing systems assuming that the main decisions taken within the hospital are shared between physicians (quality of treatment) and hospital managers (cost reduction). If Ma's conclusions hold in the US context (where the hospital managers bear the whole cost of treatment), we show that the ability of a prospective payment system to achieve both objectives is very depending of the type of interaction between the agents when physicians bear a part of the treatment cost as it is the case in many European countries.

2006/6 INGMAR SCHUMACHER AND BENTENG ZOUHABIT IN POLLUTION. A CHALLENGE FOR INTERGENERATION EQUITY

In this article we extend the recent literature on overlapping generations and pollution by allowing each generation's utility to depend on past levels of pollution. To conform with the literature on habit in consumption we call this extension habit in pollution. Habit in pollution can visualize itself as either a concern for the flow of pollution only, or for the stock, or anything in between.

¹⁵ Ma, C.A. Health care payment systems: cost and quality incentives. *Journal of Economics and Management Strategy*, 8(2), 93-112, 1994.

We show that habit in pollution has not only significant consequences for the level of pollution and capital, but also for the evolution of utility over time. We observe that habit in pollution can lead to violations of two standard criteria of sustainability, which suggests that habit in pollution can be another source of intergenerational inequity.

2006/7 ANNA BOGOMOLNAIA, MICHEL LE BRETON, ALEXEI SAVVATEEV AND SHLOMO WEBER

STABILITY UNDER UNANIMOUS CONSENT, FREE MOBILITY AND CORE

In this paper we consider an urban population represented by a continuum of individuals uniformly distributed over the real line that faces a problem of location and financing of multiple public facilities. We examine three notions of stability of emerging jurisdiction: stability under unanimous consent, free mobility and core and provide a characterization of stable partitions under these notions of stability.

2006/8 RABAH AMIR, FILOMENA GARCIA AND MALGORZATA KNAUFF

ENDOGENOUS HETEROGENEITY IN STRATEGIC MODELS: SYMMETRY-BREAKING VIA STRATEGIC SUBSTITUTES AND NONCONCAVITIES

This paper is an attempt to develop a unified approach to endogenous heterogeneity by constructing general class of two-player symmetric games that always possess only asymmetric pure-strategy Nash equilibria. These classes of games are characterized in some abstract sense by two general properties: payoff non-concavities and some form of strategic substitutability. We provide a detailed discussion of the relationship of this work with Matsuyama's symmetry breaking framework and with business strategy literature. Our framework generalizes a number of models dealing with two-stage games, with long term investment decisions in the first stage and product market competition in the second stage. We present the main examples that motivate this study to illustrate the generality of our approach.

2006/9 SALTUK OZERTURK

HEDGE MARKETS FOR EXECUTIVES AND CORPORATE AGENCY

This paper analyzes the implications of executive hedge markets for firm value maximization in an optimal contracting framework. The main results are as follows: without any hedging ability, the manager underinvests in risk at the firm level to diversify his own compensation risk. If the manager can trade a security correlated with firm specific risk, the underinvestment in risk is reduced, optimal managerial share ownership and equilibrium effort increase. If the manager can hedge by simulating the sale of his shares, however, he can completely undo any incentive scheme. The model predicts that a higher degree of financial market development implies higher managerial share ownership and more efficient risk taking at the firm level.

2006/10 LUC BAUWENS, WALID BEN OMRANE AND ERICK RENGIFOINTRA-DAILY FX OPTIMAL PORTFOLIO ALLOCATION

We design and implement optimal foreign exchange portfolio allocations. An optimal allocation maximizes the expected return subject to a Value-at-Risk (VaR) constraint. Based on intradaily data, the optimization procedure is carried out at regular time intervals. For the estimation of the conditional variance from which the VaR is computed, we use univariate and multivariate GARCH models. The result for each model is given by the best intradaily investment recommendations in terms of the optimal weights of the currencies in the risky portfolio.

2006/11 LUC BAUWENS, ARIE PREMINGER AND JEROEN ROMBOUTSREGIME SWITCHING GARCH MODELS

We develop univariate regime-switching GARCH (RS-GARCH) models wherein the conditional variance switches in time from one GARCH process to another. The switching is governed by a time-varying probability, specified as a function of past information. We provide sufficient conditions for stationarity and existence of moments. Because of path dependence, maximum likelihood estimation is infeasible. By enlarging the parameter space to include the state variables, Bayesian estimation using a Gibbs sampling algorithm is feasible. We apply this model using the NASDAQ daily return series.

2006/12 LUC BAUWENS, CHRISTIAN HAFNER AND JEROEN ROMBOUTSMULTIVARIATE MIXED NORMAL CONDITIONAL HETEROSKEDASTICITY

We propose a new multivariate volatility model where the conditional distribution of a vector time series is given by a mixture of multivariate normal distributions. Each of these distributions is allowed to have a time-varying covariance matrix. The process can be globally covariance-stationary even though some components are not covariance-stationary. We derive some theoretical properties of the model such as the unconditional covariance matrix and autocorrelations of squared returns. The complexity of the model requires a powerful estimation algorithm. In a simulation study we compare estimation by maximum likelihood with the EM algorithm and Bayesian estimation with a Gibbs sampler. Finally, we apply the model to daily U.S. stock returns.

2006/13 MICHAEL BAESSMOOTHING TECHNIQUES IN EUCLIDEAN JORDAN ALGEBRAS

We extend the powerful smoothing techniques of Yu. Nesterov to the framework of Euclidean Jordan algebras. This study allows us to design a new scheme for minimizing the largest eigenvalue of an affine function on a Euclidean Jordan algebra. We prove that its complexity is in the order of $O(1/\varepsilon)$, where ε is the absolute tolerance on the value of the objective. Particularizing our result, we propose a new algorithm to minimize a sum of Euclidean norms and we perform its complete complexity analysis.

2006/14 PAUL BELLEFLAMME AND CECILIA VERGARI

INCENTIVES TO INNOVATE IN OLIGOPOLIES

In the spirit of Arrow (1962)¹⁶, we examine, in an oligopoly model with horizontally differentiated products, how much a firm is willing to pay for a process innovation that it would be the only one to use. We show that different measures of competition (number of firms, degree of product differentiation, Cournot vs Bertrand) affect incentives to innovate in non-monotonic, different, and potentially opposite ways.

2006/15 HELMUTH CREMER, FIROUZ GAHVARI AND PIERRE PESTIEAU

PENSIONS WITH HETEROGENEOUS INDIVIDUALS AND ENDOGENOUS FERTILITY

This paper studies the design of pension schemes in a society where fertility is endogenous and parents differ in their ability to raise children. In a world with perfect information, a pay-as-you-go social security system is characterized by equal pensions for all but different contributions which may or may not increase with the number of children. Additionally, fertility must be subsidized at the margin to correct for the externality that accompanies fertility. In a world of asymmetric information, incentive-related distortions supplement the Pigouvian subsidy. These may either require an additional subsidy or an offsetting tax on fertility depending on whether the redistribution is towards people with more or less children. In the former case, pensions are decreasing in the number of children; in the latter case, they are increasing.

2006/16 HELMUTH CREMER, JEAN-MARIE LOZACHMEUR AND PIERRE PESTIEAU

DISABILITY TESTING AND RETIREMENT

This paper studies the design of retirement and disability policies. It illustrates the often observed exit from the labor force of healthy workers through disability insurance schemes. Two types of individuals, disabled and leisure-prone ones, have the same disutility for labor and cannot be distinguished. However, they are not counted in the same way in social welfare. Benefits depend on retirement age and on the (reported) health status. We determine first- and second-best optimal benefit levels and retirement ages and focus on the distortions, which may be induced in the individuals' retirement decision. Then we introduce the possibility of testing which sorts out disabled workers from healthy but retirement-prone workers. We show that such testing can increase both social welfare and the rate of participation of elderly workers; in addition disabled workers are better taken care of. It is not optimal to test all applicants. Surprisingly, the (second-best) solution may imply later retirement for the disabled than for the leisure prone. In that case, the disabled are compensated by higher benefits.

¹⁶ Arrow, K. Economic welfare and the allocation of resources for inventions. In R. Nelson (ed.), *The Rate and Direction of Inventive Activity*. Princeton University Press, Princeton, 1962.

2006/17 HELMUTH CREMER, JEAN-MARIE LOZACHMEUR AND PIERRE PESTIEAUSOCIAL DESIRABILITY OF EARNINGS TESTS

In many countries pension systems involve some form of earnings test; i.e., an individual's benefits are reduced if he has labor income. This paper examines whether or not such earning tests emerge when pension system and income tax are optimally designed. We use a simple model with individuals differing both in productivity and their health status. The working life of an individual has two "endings": an official retirement age at which he starts drawing pension benefits (while possibly supplementing them with some labor income) and an effective age of retirement at which professional activity is completely given up. Weekly work time is endogenous, but constant in the period before official retirement and again constant (but possibly at a different level), after official retirement. Earnings tests mean that earnings are subject to a higher tax after official retirement than before. We show under which conditions earnings tests emerge both under a linear and under a nonlinear tax scheme. In particular, we show that earning tests will occur if heterogeneities in health or productivity are more significant after official retirement than before.

2006/18 HELMUTH CREMER AND PIERRE PESTIEAUPRIVACY PREVENTION AND THE PRICING OF INFORMATION GOODS

This paper develops a simple model of piracy to analyze its effects on prices and welfare and to study the optimal enforcement policy. A monopolist produces an information good (involving a "large" development cost and a "small" reproduction cost) that is sold to two groups of consumers differing in their valuation of the good. We distinguish two settings: one in which the monopoly is regulated and one in which it maximizes profits and is not regulated, except that the public authority may be responsible for the control of piracy. We show that copying or piracy might be welfare enhancing because it is a way to "provide" the good to some individuals (those with a low willingness to pay) without undermining the firm's ability to finance the development cost via the pricing scheme applied to high valuation consumers. The level of piracy control differs according to the regulatory environment. Three levels of piracy control emerge. The highest is the one chosen by the private monopoly. The next level is the one chosen by the regulated monopoly. The lowest, that can be zero, is the level of control chosen by the public authority when the good is sold (and priced) by a private monopoly.

2006/19 HELMUTH CREMER, JEAN-MARIE LOZACHMEUR AND PIERRE PESTIEAUSOCIAL SECURITY AND RETIREMENT DECISION: A POSITIVE AND NORMATIVE APPROACH

Social insurance for the elderly is judged responsible for the widely observed trend towards early retirement. In a world of *laissez-faire* or in a first-best setting, there would be no such trend. However, when first-best instruments are not available, because health and productivity are not observable, the optimal social insurance policy may imply a distortion on the retirement decision. The main point we make is that while there is no doubt that retirement systems induce an excessive bias towards early in many countries, a complete elimination of this bias

(i.e., a switch to an actuarially fair system) is not the right answer. This is so and for two reasons. First, some distortions are second-best optimal. This is the normative argument. Second, and on the positive side, the elimination of the bias might be problematic from a political perspective. Depending on the political process, it may either not be feasible or alternatively it may tend to undermine the political support for the pension system itself.

2006/20 GANI ALDASHEV**POLITICAL INFORMATION ACQUISITION FOR SOCIAL EXCHANGE**

We model political information acquisition in large elections, where the probability of being pivotal is negligible. Our model builds on the assumption that informed citizens enjoy discussing politics with other informed citizens. The resulting information acquisition game exhibits strategic complementarities. We find that information acquisition depends negatively on the social distance between citizens. Next, we build an application of the model to the distributive politics game. Equilibrium policies are biased towards regions/groups with lower social distance between citizens. Finally, we present evidence for the basic model's main prediction based on the data from the 2000 U.S. National Elections Study. Citizens with a shorter residence span (thus having a less developed local social network, i.e. facing a larger social distance) acquire significantly less political information than the otherwise similar long-term residents.

2006/21 LUC BAUWENS AND GENARO SUCCARAT**GENERAL TO SPECIFIC MODELING OF EXCHANGE RATE VOLATILITY: A FORECAST EVALUATION**

The general-to-specific (GETS) approach to modelling is widely employed in the modelling of economic series, but less so in financial volatility modelling due to computational complexity when many explanatory variables are involved. This study proposed a simple way of avoiding this problem and undertakes an out-of-sample forecast evaluation of the methodology applied to the modelling of weekly exchange rate volatility. Our findings suggest that GETS specifications are especially valuable in conditional forecasting, since the specification that employs actual values on the uncertain information performs particularly well.

2006/22 THIERRY BRÉCHET AND STÉPHANE LAMBRECHT**INTERTEMPORAL EQUILIBRIUM WITH A RESOURCE BEQUEST MOTIVE**

In this paper we question the role of a joy-of-giving bequest motive of a privately-owned renewable resource for sustainability. We model an overlapping generations economy in which individuals are endowed with a renewable resource. This resource can be exploited at no cost by the young households and provided to production or bequeathed to the next generation. We highlight two main results. First, the mere existence of a bequest motive does not guarantee a sustainable outcome. Second, when the resource is preserved in equilibrium, its level does not necessarily coincide with the efficient one. Whether the resource stock is too high or too low the capital stock should be lower than the golden rule level.

2006/23 JAKUB GROWIECFERTILITY CHOICE AND SEMI-ENDOGENOUS GROWTH: WHERE BECKER MEETS JONES

Introducing fertility choice into an R&D-based semi-endogenous growth model makes it possible for the economy's long-run growth rate to be again fully endogenously determined. A positive growth rate along the balanced growth path requires a certain knife-edge assumption, though. In the usual framework, it would be the assumption that the intertemporal elasticity of substitution in consumption be exactly unity ($IES=1$). We argue that such an assumption constitutes the ultimate source of long-run growth in these models; thus, we analyze the alternatives. If one relaxes the $IES=1$ assumption, and introduces a minimum "subsistence" fertility level to the model, there may (but may not) emerge an asymptotic balanced growth path with positive growth rates, to which the economy eventually converges as levels of variables diverge to infinity. This balanced growth path is either saddle-path stable or completely stable. We also address the issue of the economy's invariance towards fertility-promoting policy within the semi-endogenous growth framework. We conclude that such policy can bring long-run effects only in the knife-edge case of $IES=1$ type. Jones' policy invariance result is typically consistent with endogenous fertility.

2006/24 RAOUF BOUCEKKINE, DAVID DE LA CROIX AND OMAR LICANDROVINTAGE CAPITAL

We highlight the salient characteristics and implications of the seminal contributions in the field of vintage capital growth theory (proposed entry for the new Palgrave dictionary of economics, 2nd edition).

2006/25 JEAN-PIERRE FLORENS, JAN JOHANNES AND SÉBASTIEN VAN BELLEGEMINSTRUMENTAL REGRESSION IN PARTIALLY LINEAR MODELS

We consider the semiparametric regression $X^t \beta + \phi(Z)$ where β and $\phi(\cdot)$ are unknown slope coefficient vector and function, and where the variables (X, Z) are endogeneous. We propose necessary and sufficient conditions for the identification of the parameters in the presence of instrumental variables. We also focus on the estimation of β . An incorrect parametrization of ϕ generally leads to an inconsistent estimator of β , whereas consistent nonparametric estimators for β have a slow rate of convergence. An additional complication is that the solution of the equation necessitates the inversion of a compact operator which can be estimated nonparametrically. In general this inversion is not stable, thus the estimation of β is ill-posed. In this paper, a \sqrt{n} -consistent estimator for β is derived under mild assumptions. One of these assumptions is given by the so-called source condition which we explicit and interpret in the paper. Finally we show that the estimator achieves the semiparametric efficiency bound, even if the model is heteroskedastic.

2006/26 ROLAN IWAN LUTTENS AND ERWIN OOGHE

IS IT FAIR TO 'MAKE WORK PAY' ?

The design of the income transfer program for the lower incomes is a hot issue in current public policy debate. Should we stick to a generous welfare state with a sizeable basic income, but high marginal tax rates for the lower incomes and thus little incentives to work ? Or should we 'make work pay' by subsidizing the work of low earners, but possibly at the cost of a smaller safety net? We think it is difficult to answer this question without making clear what individuals are (held) responsible for and what not. First, we present a new fair allocation, coined a Pareto Efficient and Shared resources Equivalent (PESE) allocation, which compensates for different productive skills, but not for different tastes for working. We also characterize a fair social ordering, which rationalizes the PESE allocation. Second, we illustrate the optimal second-best allocation in a discrete Stiglitz (1982¹⁷, 1987¹⁸) economy. The question whether we should have subsidies for the low earners or not crucially depends on whether the low-skilled have a strictly positive or zero skill. Third, we simulate fair taxes for a sample of Belgian singles. Our simulation results suggest that 'making work pay' policies can be optimal, according to our fairness criterion, but only in the unreasonable case in which none of the unemployed are ever willing to work.

2006/27 RAOUF BOUCEKKINE, FERNANDO DEL RIO AND BLANCA MARTINEZ

TECHNOLOGICAL PROGRESS, OBSOLESCENCE AND DEPRECIATION

We construct a vintage capital model à la Whelan (2002)¹⁹ with both exogenous embodied and disembodied technical progress, and variable utilization of each vintage. The lifetime of capital goods is endogenous and it relies on the associated maintenance costs. We study the properties of the balanced growth paths. First, we show that the lifetime of capital is an increasing (resp. decreasing) function of the rate of disembodied (resp. embodied) technical progress. Second, we show that both the use-related depreciation rate and the scrapping rate increase when embodied technical progress accelerates. However, the latter drops when disembodied technical progress accelerates while the former remains unaffected. A key feature of our model is that the age-related depreciation rate does depend on the obsolescence rate in sharp contrast to the neoclassical model.

2006/28 YURII NESTEROV

TOWARDS NONSYMMETRIC CONIC OPTIMIZATION

In this paper we propose a new interior-point method, which is based on an extension of the ideas of self-scaled optimization to the general cases. We suggest using the primal correction process to find a scaling point. This point is used to compute a strictly feasible primal-dual pair

¹⁷ Stiglitz, J.E. Self-selection and Pareto efficient taxation. *Journal of Public Economics* 17, 213-240, 1992.

¹⁸ Stiglitz, J.E. Pareto efficient and optimal taxation and the new welfare economics. In Auerbach, A.J. and M. Feldstein (eds.), *Handbook of Public Economics*, 2. North-Holland, Elsevier, 1987.

¹⁹ Whelan, K. Computers, obsolescence, and productivity. *The Review of Economics and Statistics*, 84, 445-461, 2002.

by simple projection. Then, we define an affine-scaling direction and perform a prediction step. This is the only moment when the dual barrier is used. Thus, we need only to compute its value, which can even be done approximately. In the second part of the paper we develop a $4n$ -self-concordant barrier for n -dimensional p -cone, which can be used for numerical testing of the proposed technique.

2006/29 DAVID CRAINICH, HERVÉ LELEU AND ANA MAULEON

HOSPITAL'S ACTIVITY-BASED FINANCING SYSTEM AND MANAGER-PHYSICIAN INTERACTION

Hospital financing systems determine major decisions made by physicians and managers within hospitals. This paper examines the impact of the transition toward an activity-based reimbursement system that has emerged in most OCDE countries. We consider two initial situations, one for a private for-profit sector where both hospitals and physicians are paid on a fee-for-service basis and the other for a public sector under prospective budget and salaried physicians. For the private sector, our model focuses on the type of interaction (simultaneous, sequential or joint decision-making games) that should emerge between agents after the introduction of the activity-based financing system. In the public sector, the elasticity of the demand to the level of inputs seems to play a more crucial rôle in the transition.

2006/30 YURI NESTEROV

CONSTRUCTING SELF-CONCORDANT BARRIERS FOR CONVEX CONES

In this paper we develop a technique for constructing self-concordant barriers for convex cones. We start from a simple proof for a variant of standard result²⁰ on transformation of a v -self-concordant barrier for a set into a self-concordant barrier for its conic hull with parameter $(3.08 \sqrt{\eta} + 3.57)^2$. Further, we develop a convenient composition theorem for constructing barriers directly for convex cones. In particular, we can construct now good barriers for several interesting cones obtained as a conic hull of epigraph of a univariate function. This technique works for power functions, entropy, logarithm and exponent function, etc. It provides a background for development of polynomial-time methods for separable optimization problems. Thus, our abilities in constructing barriers for convex sets and cones become now identical.

2006/31 PAULA GONZALEZ, JEAN HINDRIKS, BEN LOCKWOOD AND NICOLAS PORTEIRO

POLITICAL BUDGET CYCLES AND FISCAL DECENTRALIZATION

In this paper, we study a model à la Rogoff (1990)²¹ where politicians distort fiscal policy to signal their competency, but where fiscal policy can be centralized or decentralized. Our main focus is on how the equilibrium probability that fiscal policy is distorted in any region (the

²⁰ R. W. Freund, F. Jarre, and S. Schaible . On self-concordant barrier functions for conic hulls and fractional programming. *Mathematical Programming*, 74, 237 – 246, 1996.

²¹ Rogoff, K. Equilibrium political budget cycles. *American Economic Review*, 80, 21-36, 1990.

political budget cycle, PBC) differs across fiscal regimes. With centralization, there are generally two effects that change the incentive for pooling behavior and thus the probability of a PBC. One is the possibility of selective distortion : the incumbent can be re-elected with the support of just a majority of regions. The other is a cost distribution effect, which is present unless the random cost of producing the public goods is perfectly correlated across regions. Both these effects work in the same direction, with the general result that overall, the PBC probability is larger under centralization (decentralization) when the rents to office are low (high). Voter welfare under the two regimes is also compared: voters tend to be better off when the PBC probability is lower, so voters may either gain or lose from centralization. Our results are robust to a number of changes in the specification of the model.

2006/32 PHILIPPE DE DONDER AND JEAN HINDRIKS

DOES PROPITIOUS SELECTION EXPLAIN WHY RISKIER PEOPLE BUY LESS INSURANCE ?

Empirical testing of asymmetric information in the insurance market has uncovered a negative correlation between risk levels and insurance purchases, rather than the positive correlation predicted by the standard insurance theory. Hemenway (1990)²² proposes an explanation for this negative correlation, called "propitious selection". He argues that potential insurance buyers have different tastes for risk and that "individuals who are highly risk avoiding are more likely both to try to reduce the hazard and to purchase insurance" (p. 1064). Chiappori and Salanié (2000)²³ also suggest that this line of argument, which they call "cherry picking", may explain the observed negative correlation.

In this paper, we show that the propitious selection argument does not imply negative correlation between risk levels and insurance purchases, because it fails to take into account the supply side of the insurance market. To illustrate this claim, we provide a model where, although we assume that individuals differ in risk aversion and that the more risk averse individuals exert more precaution and buy more insurance, we end up with a positive correlation between risk and insurance purchases at equilibrium. The reason is that, in any separating equilibrium, the more risk averse individuals face insurance overprovision which, combined with moral hazard, increases their risk relative to the less risk averse individuals. To obtain the negative correlation between risk and insurance purchases, one further needs the extra condition of decreasing marginal willingness to pay for the less risk averse individuals. Finally, we find that propitious selection has profound policy implications for social insurance.

2006/33 PHILIPPE DE DONDER AND JEAN HINDRIKS

EQUILIBRIUM SOCIAL INSURANCE WITH POLICY-MOTIVATED PARTIES

We study the political economy of social insurance with double heterogeneity of voters (i.e., different income and risk levels). Social insurance is financed through distortionary taxation and redistributes across income and risks. Individuals vote over the extent of social insurance, which they can complement on the private market. Private insurance suffers from adverse

²² Hemenway, D. Propitious selection. *The Quarterly Journal of Economics*, 105(4), 1063-69, 1990.

²³ Chiappori, P.-A., and B. Salanié. Testing for asymmetric information in insurance markets. *Journal of Political Economy*, 108, 56-78, 2000.

selection which results into insurance rationing. We model political competition à la Wittman, with two parties maximizing the utility of their members. Party membership is endogenously determined. We show that although individuals differ in two dimensions, their preference for social insurance can be aggregated into a single dimensional type function. We then resort to numerical simulations to solve the political equilibrium outcome as a function of the distribution of income and risk.

We obtain equilibrium policy differentiation with the Left party proposing more social insurance than the Right party. The Left party's equilibrium membership is made of low risk and high income individuals, with high risk and low income individuals forming the Right party's constituency. In equilibrium, each party is tying for winning. Unlike the median voter outcome, our equilibrium outcome depends on the whole income and risks distribution, and increasing income polarization leads both parties to propose less social insurance. We also compare the political equilibrium outcome with the Rawlsian and utilitarian outcomes.

2006/34 YURII NESTEROV

NONSYMMETRIC POTENTIAL-REDUCTION METHODS FOR GENERAL CONES

In this paper we propose two new nonsymmetric primal-dual potential-reduction methods for conic problems. The methods are based on *the primal-dual lifting*²⁴. This procedure allows to construct a strictly feasible primal-dual pair related by an exact *scaling* relation even if the cones are not symmetric. It is important that all necessary elements of our methods can be obtained from the standard solvers for *primal* Newton system. The first of the proposed schemes is based on the usual affine-scaling direction. For the second one, we apply a *new first-order* affine-scaling direction, which incorporates in a symmetric way the gradients of primal and dual barriers. For both methods we prove the standard $O\left(\sqrt{\eta} \ln \frac{1}{\varepsilon}\right)$ complexity estimate, where ν is the parameter of the barrier and ε is the required accuracy.

2006/35 THIERRY BRÉCHET AND STÉPHANE LAMBRECHT

FAMILY ALTRUISM WITH A RENEWABLE RESOURCE AND POPULATION GROWTH

We develop an overlapping-generation model à la Diamond with a non-constant population growth in which households privately own a natural renewable resource and have a family-altruism resource bequest motive. The natural resource can be either extracted and sold to the producing firms as a production factor, or bequeathed to the offspring to increase his adult disposable income. With a numerical application, we analyze how family altruism interplays with population growth to shape the dynamics of the whole economy. We also highlight the role of altruism in the case of a temporary negative demographic shock. The simulations we present show that a fall in the size of families increases the family natural resource stock but reduces resource extraction on the transition, through a reinforcement of family altruistic links. Hence, family altruism plays a key role in the recovery of the economy after the shock.

²⁴ Yu. Nesterov. Towards nonsymmetric conic optimization. CORE Discussion Paper 2006/28, 2006.

2006/36 ANNA BOGOMOLNAIA, MICHEL LE BRETON, ALEXEI SAVVATTEEV AND SHLOMO WEBER**HETEROGENEITY GAP IN STABLE JURISDICTION STRUCTURES**

This paper examines a model of multi-jurisdiction formation where individuals' characteristics are uniformly distributed over a finite interval. Every jurisdiction locates a public facility and distributes its cost equally among the residents. We consider two notions of stability: Nash stability and its refinement local Nash stability, and examine the existence and characterization of stable partitions. The main feature of this analysis is that, even under the uniform distribution, there are stable structures that exhibit a high degree of heterogeneity of jurisdiction sizes.

2006/37 MALGORZATA KNAUFF**MARKET TRANSPARENCY AND BERTRAND COMPETITION**

We investigate the effects of market transparency on prices in the Bertrand duopoly model for both the cases of strategic complementarities and strategic substitutes. For the former class of games "conventional wisdom" concerning prices is confirmed, since they decrease. The consumers are always better off with higher transparency but changes in firm's profits are ambiguous. For the latter class of games, an increase in market transparency may lead to an increase in one of the prices, which implies ambiguity in consumers' utility and firms' profits.

2006/38 HYLKE VANDENBUSSCHE AND MAURIZIO ZANARDI**THE GLOBAL CHILLING EFFECTS OF ANTIDUMPING PROLIFERATION**

Advocates of antidumping (AD) laws downplay their effects by arguing that the trade flows that are subject to AD are small and their distortions negligible. This paper is the first to counter that notion by quantifying the worldwide effect of AD laws on aggregate trade flows. The recent proliferation of AD laws across countries provides us with a natural experiment to estimate the trade effects of adopting versus using AD laws; differences in the intensity of use among countries with older AD laws allow us to investigate reputation effects. For this purpose, we estimate worldwide trade flows using a gravity equation spanning 21 years (1980-2000) of annual observations. Our estimates confirm that AD effects are not small. Among other findings, new tough users have their aggregate imports depressed by 15.7 billion US\$ a year (or 6.7%) as a result of the AD measures they have imposed. For a traditional user like the United States, current AD measures depress annual imports by almost 20 billion US\$ on top of the cumulative negative effect of reputation. For some countries, the dampening effects of AD laws on trade flows are found to nearly offset the gains from trade liberalization.

2006/39 YURI NESTEROVCUBIC REGULARIZATION OF NEWTON'S METHOD FOR CONVEX PROBLEMS WITH CONSTRAINTS

In this paper we derive efficiency estimates of the regularized Newton's method as applied to constrained convex minimization problems and to variational inequalities. We study a one-step Newton's method and its multistep accelerated version, which converges on smooth convex problems as $O\left(\frac{1}{k^3}\right)$, where k is the iteration counter. We derive also the efficiency estimate of a second-order scheme for smooth variational inequalities. Its global rate of convergence is established on the level $O\left(\frac{1}{k}\right)$.

2006/40 THIERRY BRÉCHET AND PIERRE-ANDRÉ JOUVETENVIRONMENTAL INNOVATION AND THE COST OF POLLUTION ABATEMENT

The impact of environmental innovation on the marginal pollution abatement cost at the firm level is investigated. We show that the common assumption that innovation reduces the marginal abatement cost is wrong. We draw some implications about the incentives to innovate under environmental regulation. In particular, we find that adopting an environmental friendly technology may lead to more pollution and less profit at the firm level.

2006/41 FRANÇOISE FORGESCORRELATED EQUILIBRIUM IN GAMES WITH INCOMPLETE INFORMATION REVISITED

A mistake in "Five legitimate definitions of correlated equilibrium in games with incomplete information" motivates a re-examination of some extensions of the solution concept that Aumann introduced.

2006/42 ARIE PREMINGER AND CHRISTIAN M. HAFNERDECIDING BETWEEN GARCH AND STOCHASTIC VOLATILITY VIA STRONG DECISION RULES

The GARCH and stochastic volatility (SV) models are two competing, well-known and often used models to explain the volatility of financial series. In this paper, we consider a closed form estimator for a stochastic volatility model and derive its asymptotic properties. We confirm our theoretical results by a simulation study. In addition, we propose a set of simple, strongly consistent decision rules to compare the ability of the GARCH and the SV model to fit the characteristic features observed in high frequency financial data such as high kurtosis and slowly decaying autocorrelation function of the squared observations. These rules are based on a number of moment conditions that is allowed to increase with sample size. We show that our selection procedure leads to choosing the best and simple model with probability one as the sample size increases. The finite sample size behaviour of our procedure is analyzed via simulations. Finally, we provide an application to stocks in the Dow Jones industrial average index.

2006/43 JEAN GABSZEWICZ AND SKERDILAJDA ZANAJ

UPSTREAM MARKET FORECLOSURE

This paper investigates how an incumbent monopolist can weaken potential rivals or deter entry in the output market by manipulating the access of these rivals in the input market. We analyze two polar cases. In the first one, the input market is assumed to be competitive with the input being supplied inelastically. We show that this situation opens the door to entry deterrence. Then, we assume that the input is supplied by a single seller who chooses the input price. In this case, we show that entry deterrence can be reached only through merger with the seller of the input.

2006/44 MARCO DI SUMMA AND LAURENCE A. WOLSEY

LOT-SIZING ON A TREE

For the problem of lot-sizing on a tree with constant capacities, or stochastic log-sizing with a scenario tree, we present various reformulations based on mixing sets. We also show how earlier results for uncapacitated problems involving (Q, S_0) inequalities can be simplified and extended. Finally some limited computational results are presented.

2006/45 DAVID DE LA CROIX AND ALESSANDRO SOMMACAL

A THEORY OF MEDICINE EFFECTIVENESS, DIFFERENTIAL MORTALITY, INCOME INEQUALITY AND GROWTH FOR PRE-INDUSTRIAL ENGLAND

We study how mortality reductions and income growth interact, looking at their relationship prior to the Industrial Revolution, when income per capita was stagnant. We first present a model of individual medical spending giving a rationale for individual health expenditures even when medicine was not effective in postponing death. We then explain the rise of effective medicine by a learning process function of expenditures in health. The rise in effective medicine can then be linked to the take-off of the eighteenth century through life expectancy increases, and fostered capital accumulation. The rise of effective medicine has also an impact on the relation between growth and inequality and on the intergenerational persistence of differences in income. These channels are operative through differential mortality induced by medicine effectiveness that turns out to determine a differential in the propensity to save among income groups.

2006/46 SALVADOR BARRIOS, LUISITO BERTINELLI AND ERIC STROBL

CLIMATIC CHANGE AND RURAL-URBAN MIGRATION: THE CASE OF SUB-SAHARAN AFRICA

We investigate the role that climatic change has played in the pattern of urbanization in sub-Saharan African countries compared to the rest of the developing world. To this end we assemble a cross-country panel data set that allows us to estimate the determinants of urbanization. The results of our econometric analysis suggest that climatic change, as proxied

by rainfall, has acted to change urbanization in sub-Saharan Africa but not elsewhere in the developing world. Moreover, this link has become stronger since decolonization, which is likely due to the often simultaneous lifting of legimovement of native Africans.

2006/47 HELMUTH CREMER, PHILIPPE DE DONDER, DARIO MALDONADO AND PIERRE PESTIEAU

DESIGNING A LINEAR PENSION SCHEME WITH FORCED SAVINGS AND WAGE HETEROGENEITY

This paper studies the optimal linear pension scheme when society consists of rational and myopic individuals. Myopic individuals have, ex ante, a strong preference for the present even though, ex post, they would regret not to have saved enough. While rational and myopic persons share the same ex post intertemporal preferences, only the rational agents make their savings decisions according to these preferences. Individuals are also distinguished by their productivity. The social objective is "paternalistic": the utilitarian welfare function depends on ex post utilities. We examine how the presence of myopic individuals affects both the size of the pension system and the degree of redistribution it operates. The relationship between proportion of myopic individuals and characteristics of the pension system turns out to be much more complex than one would have conjectured. Neither the impact on the level of pensions nor the effect on their redistributive degree are unambiguous. Nevertheless, we show that under some plausible assumptions adding myopic individuals increases the level of pension benefits and leads to a shift from a flat or even targeted scheme to a partially contributory one. However, we also provide an example where the degree of redistribution is not a monotonic function of the proportion of myopic individuals.

2006/48 TANGUY ISAAC

INFORMATION REVELATION IN MARKETS WITH PAIRWISE MEETINGS: DYNAMIC CASE WITH CONSTANT ENTRY FLOW

We study information revelation in markets with pairwise meetings. We focus on the one sided case and perform a dynamic analysis of a constant entry flow model. The same question has been studied in an identical framework in Serrano and Yosha (1993)²⁵ but they limit their analysis to the stationary steady states. Blouin and Serrano (2001)²⁶ study information revelation in a one-time entry model and obtain results different than Serrano and Yosha (1993)¹. We show that there is dramatically loss when restricting the analysis of a constant flow entry model to stationary steady states. Nevertheless, we show that this loss might not explain completely the difference in the results presented in the two papers.

2006/49 KRISTIAN BEHRENS AND YASUSADA MURATA

GAINS FROM TRADE AND EFFICIENCY UNDER MONOPOLISTIC COMPETITION: A VARIABLE ELASTICITY CASE

We present a general equilibrium model of monopolistic competition with variable demand elasticities and investigate the impact of free trade on welfare and efficiency. First, contrary to

²⁵ Serrano, R. and O. Yosha. Information revelation on a market with pairwise meetings: the one sided information case. *Economic Theory*, 3, 481-499, 1993.

²⁶ Blouin, M.R. and R. Serrano. A decentralized market with common value uncertainty: non-steady states. *Review of Economic Studies*, 68, 323-346, 2001.

the constant elasticity case, in which all gains from trade are due to increasing product diversity, our model features gains from pro-competitive effects. Second, we prove that the market outcome is not efficient because too many firms operate at an inefficiently small scale. Last, we illustrate that free trade raises efficiency by reducing the gap between the equilibrium utility and the optimal utility.

2006/50 LUC BAUWENS AND MICHEL LUBRANO

BAYESIAN INFERENCE IN DYNAMIC DISEQUILIBRIUM MODELS: AN APPLICATION TO THE POLISH CREDIT MARKET

We review Bayesian inference for dynamic latent variable models using the data augmentation principle. We detail the difficulties of simulating dynamic latent variables in a Gibbs sampler. We propose an alternative specification of the dynamic disequilibrium model which leads to a simple simulation procedure and renders Bayesian inference fully operational. Identification issues are discussed. We conduct a specification search using the posterior deviance criterion of Spiegelhalter, Best, Carlin and van der Linde (2002)²⁷ for a disequilibrium model of the Polish credit market.

2006/51 JACQUES DRÈZE AND FERNANDA ESTEVAN

RESEARCH AND HIGHER EDUCATION IN ECONOMICS: CAN WE DELIVER THE LISBON OBJECTIVES?

Can European economics become "the most dynamic and competitive in the world"? Using readily accessible data, the paper documents the following aspects: (i) today, the US outperform Europe by a factor of the order of 3, with no clear trend; the Lisbon goal is not in sight; (ii) Europe is not homogeneous; the UK and the small countries in North-central Europe outperform significantly the Big 4 continental countries (France, Germany, Italy, Spain); the Big 4 should accept English as the lingua franca of economics, and implement major institutional reforms; (iii) some 30 leading economics departments (ten from each of these three areas) account for some 70-75% of Europe's research output; (iv) the concentration of research in leading departments is substantial but not exclusive; it is comparable in Europe and the US, but leading US departments have incomparably more resources and benefit from access to an integrated labour market; (v) few PhD programs are of efficient size, especially in Europe, calling for further concentration; (vi) second-best funding of higher education calls for block grants to efficient programs; in Europe, these should be organised at EU level. "I conclude with a modest proposal (15 million euros per year) consisting of block grants to leading departments and to young academic researchers. My optimistic verdict is that substantial progress towards the Lisbon goal is at hand, but requires significant departures from current practices".

²⁷ Spiegelhalter, D.J., Best, N.G., Carlin, B.M. and A. Van Der Linde. Bayesian measures of complexity and fit. *Journal of the Royal Statistical Society, Ser. B*, 64, 583-639, 2002.

2006/52 LUISITO BERTINELLI, ERIC STROBL AND BENTENG ZOUPOLLUTING TECHNOLOGIES AND SUSTAINABLE ECONOMIC DEVELOPMENT

We study how the import of older and more polluting technologies alters the relationship between output and environmental quality in developing countries within a vintage capital framework. Our results show that old technologies prolong the period until which pollution may eventually decrease and cause this turning point to be reached at a higher level of pollution. An empirical analysis using export data of vintage technologies from the US and Europe to developing countries supports our theoretical findings.

2006/53 ANA MAULEON, HUASHENG SONG AND VINCENT VANNETELBOSCHNETWORKS OF FREE TRADE AGREEMENTS AMONG HETEROGENEOUS COUNTRIES

The paper examines the formation of free trade agreements as a network formation game. We consider a three-country model in which international trade occurs between economies with imperfectly competitive product markets. Labor markets can be unionized and non-unionized in each country. We show that if all countries are of the same type (all of them are either unionized or non-unionized), the global free trade network is both the unique pairwise stable network and the unique efficient network. If some countries are unionized while others are non-unionized, other networks apart from the global free trade network are likely to be pairwise stable. However, the efficient network is always the global free trade network. Thus, a conflict between stability and efficiency may occur. Moreover, starting from the network in which no country has signed a free trade agreement, all sequences of networks due to continuously profitable deviations do not lead (in most cases) to the global free trade network, even when global free trade is stable.

2006/54 PIERRE PESTIEAU, GREGROY PONTHIÈRE AND MOTOHIRO SATOLONGEVITY AND PAY-AS-YOU-GO PENSIONS

This paper aims at investigating whether or not a utilitarian social planner should subsidize longevity-enhancing expenditures in an economy with a PAYG pension system. For that purpose, a simple two-period OLG model is developed, in which the length of the second period of life can be raised by private health spendings. Focussing on the steady-state, it is shown that the sign of the optimal subsidy on health expenditures tends to be negative when the replacement ratio is sufficiently large. Moreover, the optimal health subsidy is also shown to depend significantly on the longevity production process and on the production technology.

2006/55 PIERRE M. PICARD AND DAO-ZHI ZENGINDUSTRIAL LOCATION: A SYNTHESIS OF CHAMBERLIN AND RICARDO

This paper investigates the joint impact of Chamberlinian monopolistic competition and Ricardian comparative advantages on the structure of trade and industries. We develop a trade model with several industries employing local factors. We then investigate the structure of trade and industries as well as the possibilities of catastrophic changes and endogenous

asymmetries in industry distribution. Three configurations are studied: multiple industries with local factor advantages at small trade costs, single industry with local factor advantage and two industries with comparative advantages for any trade costs. The last setting synthesizes the traditional results of Chamberlin and Ricardo.

2006/56 JAKUB GROWIEC

A NEW CLASS OF PRODUCTION FUNCTIONS AND AN ARGUMENT AGAINST PURELY LABOR-AUGMENTING TECHNICAL CHANGE

This paper follows Jones (2005)²⁸ in his approach to deriving the global production function from microfoundations. His framework is generalized by allowing for dependence between the Pareto distributions of labor- and capital-augmenting developments. Using the Clayton copula family to capture this dependence, we derive a "Clayton-Pareto" class of production functions that nests both the Cobb-Douglas and the CES. Embedding the resultant production function in a neoclassical growth framework, we draw conclusions for the long-run direction of technical change. Jones's result of Cobb-Douglas global production functions and purely labor-augmenting technical change hinges on the assumption of independence of marginal Pareto distributions. In our more general case, the shape of local production functions matters for the shape of the global production function, and technical change augments both factors in the long run. Furthermore, the elasticity of substitution between capital and labor may exceed unity and thus yield endogenous growth.

2006/57 LUISITO BERTINELLI, ERIC STROBL AND BENTENG ZOU

SUSTAINABLE ECONOMIC DEVELOPMENT AND THE ENVIRONMENT: THEORY AND EVIDENCE

The relationship between growth and pollution is studied through a vintage capital model, where new technologies are more environmentally friendly. We find that once the optimal scrapping age of technologies is reached, an economy may achieve two possible cases of sustainable development, one in which pollution falls and another in which it stabilizes, or a catastrophic outcome, where environmental quality reaches its lower bound. The outcome will depend on countries' investment path and their propensity to innovate in environmentally clean technologies, both of which are likely to differ across economies. Empirical results using long time series for a number of developed and developing countries indeed confirm heterogeneous experiences in the pollution-output relationship.

2006/58 RAOUF BOUCEKKINE, BLANCA MARTINEZ AND CAGRI SAGLAM

CAPITAL MAINTENANCE VERSUS TECHNOLOGY ADOPTION UNDER EMBODIED TECHNICAL PROGRESS

We study an optimal growth model with one-hoss-shay vintage capital, where labor resources can be allocated freely either to production, technology adoption or capital maintenance. Technological progress is partly embodied. Adoption labor increases the level of embodied

²⁸ Jones, C.I. The shape of production functions and the direction of technical change. *Quarterly Journal of Economics*, 120(2), 517-549, 2005.

technical progress. First, we are able to disentangle the amplification-propagation role of maintenance in business fluctuations: in the short run, the response of the model to transitory shocks on total factor productivity in the final good sector are definitely much sharper compared to the counterpart model without maintenance but with the same average depreciation rate. Moreover, the one-hoss shay technology is shown to reinforce this amplification-propagation mechanism. We also find that accelerations in embodied technical progress should be responded by a gradual adoption effort, and capital maintenance should be the preferred instrument in the short run.

2006/59 PAUL BELLEFLAMME AND FRANCIS BLOCH

SUSTAINABLE COLLUSION ON SEPARATE MARKETS

When firms can supply several separate markets, collusion can take two forms. Either firms establish production quotas on all the markets, or they share markets. This paper compares production quotas and market sharing agreements in a Cournot duopoly where firms incur a fixed cost for serving each market. We show that there exists a threshold value of the fixed cost such that collusion is easier to sustain with production quotas below the threshold and with market sharing agreements above the threshold. These results are obtained both under Nash reversion strategies and the globally optimal punishment strategies introduced by Abreu (1986)²⁹.

2006/60 PIERRE M. PICARD AND DAVID E. WILDASIN

LABOR MARKET POOLING, OUTSOURCING AND CONTRACTS IN CHAMBERLINIAN REGIONS

Economic regions, such as urban agglomerations, face external demand and price shocks that produce income risk. Workers in large and diversified agglomerations may benefit from reduced wage volatility, while firms may outsource the production of intermediate goods and realize benefits from Chamberlinian externalities. Firms may also protect workers from wage risks through fixed wage contracts. This paper explores the relationships between firms' risks, workers' contracts, and the structure of production in cities.

2006/61 MASSIMO DEL GATTO, GIORDANO MION AND GIANMARCO I.P. OTTAVIANO

TRADE INTEGRATION, FIRM SELECTION AND THE COSTS OF NON-EUROPE

In models with heterogeneous firms trade integration has a positive impact on aggregate productivity through the selection of the best firms as import competition drives the least productive ones out of the market. To quantify the impact of firm selection on productivity, we calibrate and simulate a multi-country multi-sector model with monopolistic competition and variable markups using firm-level data and aggregate trade figures on a panel of 11 EU countries. We find that EU trade has a sizeable impact on aggregate productivity. In 2000 the introduction of prohibitive trade barriers would have caused an average productivity loss of

²⁹ Abreu, D. External equilibria of oligopolistic supergames. *Journal of Economic Theory*, 39, 191-225, 1986.

roughly 13 per cent, whereas a reduction of intra-EU trade costs by 5 per cent would have generated a productivity gain of roughly 2 per cent. Productivity losses and gains, however, vary a lot across countries and sectors depending on market accessibility and trade costs. We provide evidence that our results are robust to alternative distance and productivity measures.

2006/62 CARMEN HERRERO, JUAN D.MORENO-TERNERO AND GIOVANNI PONTI

ON THE ADJUDICATION OF CONFLICTING CLAIMS: AN EXPERIMENTAL STUDY

This paper reports an experimental study on three well-known solutions for problems of adjudicating conflicting claims: the constrained equal-awards, the proportional, and the constrained equal-losses rules. We first let subjects play three games designed such that the unique equilibrium allocation coincides with the recommendation of one of these three rules. In addition, we let subjects play an additional game, that has the property that all (and only) strategy profiles in which players coordinate on the same rule constitute a strict Nash equilibrium. While in the first three games subjects' play easily converges to the unique equilibrium rule, in the last game the proportional rule overwhelmingly prevails as a coordination device, especially when we frame the game with an hypothetical bankruptcy situation. We also administered a questionnaire to a different group of students, asking them to act as impartial arbitrators to solve (among others) the same problems played in the lab. Also in this case, respondents were sensitive to the framing of the questions, but the proportional rule was selected by the vast majority of respondents.

2006/63 JAKUB GROWIEC AND INGMAR SCHUMACHER

ON TECHNICAL CHANGE IN THE ELASTICITIES OF RESOURCE INPUTS

This article considers an economy whose production function takes both renewable and non-renewable resources as inputs. We extend the current literature by allowing for exogenous technical change in the elasticity of substitution between these two types of resources. In addition, we study the consequences of biased technical change which alters the resources' relative productivities. We derive long-run asymptotic results, which we use to compare several cases. In the benchmark case of no technical change, our results are close to those obtained by Dasgupta and Heal (1974)³⁰. In the case of technical change in the elasticity of substitution, we observe that this kind of technical change helps obtain positive long-run production despite the depletion of non-renewable resources. In the biased technical change case, long-run production is only possible either if non-renewable resources are non-essential or if biased technical change is quick enough to compensate for the decreasing flow of non-renewable resources.

We embed our production function in an optimal growth model and study its dynamics. As a steady state (or a balanced growth path) is only attainable as time goes to infinity, we resort to numerical simulations to convey what is happening during the short and medium run. Our

³⁰ Dasgupta, P. and G. Heal. The optimal depletion of exhaustible resources. *The Review of Economic Studies*, 41 (Symposium on the Economics of Exhaustible Resources), 3-28, 1974.

results provide new considerations for the debate on natural resources. We suggest that technical change should be directed to the resource, which is most important for production.

2006/64 DAVID DE LA CROIX, THOMAS LINDH AND BO MALMBERG

GROWTH AND LONGEVITY FROM THE INDUSTRIAL REVOLUTION TO THE FUTURE OF AN AGING SOCIETY

Aging of the population will affect the growth path of all countries. To assess the historical and future importance of this claim we use two popular approaches and evaluate their merits and disadvantages by confronting them to Swedish data. We first simulate an endogenous growth model with human capital linking demographic changes and income growth. Rising longevity increases the incentive to get education, which in turn has ever-lasting effects on growth through a human capital externality. Secondly, we consider a reduced-form statistical model based on the demographic dividend literature. Assuming that there is a common DGP guiding growth through the demographic transition, we use an estimate from post-war global data to backcast the Swedish historical GDP growth. Comparing the two approaches, encompassing tests show that each of them contains independent information on the Swedish growth path, suggesting that there is a benefit from combining them for long-term forecasting.

2006/65 FRANCIS BLOCH AND AXEL GAUTIER

ACCESS PRICING AND ENTRY IN THE POSTAL SECTOR

Postal markets have been open to competition for a long time. But, with a few exceptions, the competitors of the incumbent postal operator are active on the upstream segments of the market -preparation, collection, outward sorting and transport of mail products. With the further steps planned in the liberalization process, there are new opportunities to extend competition to the downstream segments of the market -the delivery of mails. In the future, two business models will be possible for the new postal operators: (1) *access*: where the firm performs the upstream operations and uses the incumbent's delivery network and (2) *bypass* where the competing firm controls the entire supply chain and delivers mails with its own delivery network. These two options have different impacts on welfare and the profit of the incumbent operator.

The choice between access and bypass depends on the entrant's delivery cost relative to the cost of buying access to the incumbent operator (the access price). In this paper, we derive optimal -welfare maximizing- stamp and access prices for the incumbent operator when these prices have an impact on the delivery method chosen by the entrant. We show how prices should be re-balanced when the entry method is considered as endogenous i.e. affected by the incumbent's prices.

2006/66 CARMEN HERRERO AND RICARDO MARTINEZ

BALANCED ALLOCATION METHODS FOR CLAIMS PROBLEMS WITH INDIVISIBILITIES

We study claims problems in which a certain amount of indivisible units (of an homogeneous good) has to be distributed among a group of agents, when this amount is not enough to fully satisfy agents' demands. We are interested in finding solutions satisfying robustness and

fairness properties. To do that, we define the *M-down methods*, which are the unique robust (*composition down and consistency*) and fair (*balancedness or conditional full compensation*) rules. Besides, we also establish the relationships between these *M-down methods* and the *constrained equal awards rule*.

2006/67 ANTONIO COSMA AND FAUSTO GALLI

A NONPARAMETRIC ACD MODEL

We carry out a nonparametric analysis of financial durations. We make use of an existing algorithm to describe nonparametrically the dynamics of the process in terms of its lagged realizations and of a latent variable, its conditional mean. The devices needed to effectively apply the algorithm to our dataset are presented. On simulated data, the nonparametric procedure yields better estimates than the ones delivered by an incorrectly specified parametric method. On a real dataset, the nonparametric analysis can convey information on the nature of the data generating process that may not be captured by the parametric specification. In this view, the nonparametric method proposed can be a valuable preliminary analysis able to suggest the choice of a "good" parametric specification, or a complement of a parametric estimation.

2006/68 ARIE PREMINGER AND GIUSEPPE STORTI

A GARCH (1,1) ESTIMATOR WITH (ALMOST) NO MOMENT CONDITIONS ON THE ERROR TERM

A least squares estimation approach for the estimation of a GARCH (1,1) model is developed. The asymptotic properties of the estimator are studied given mild regularity conditions, which require only that the error term has a conditional moment of some order. We establish the consistency, asymptotic normality and the law of iterated logarithm for our estimate. The finite sample properties are assessed by means of an extensive simulation study.