

CENTER FOR OPERATIONS RESEARCH & ECONOMETRICS

UNIVERSITE CATHOLIQUE DE LOUVAIN

**Report from the Research Director
for the period July 1, 1986 to June 30, 1987**

1. Personnel	1
2. Research Activities	6
3. Publications	30
4. Seminars and Workshops	44
5. XXth Anniversary of CORE	53
6. Guests	58
7. Academic Visits	59
8. Conference and Meetings	63
9. Institutional Aspects	68

1. PERSONNEL

1.1. During the academic year 1986-1987, the research staff of CORE consisted of *Faculty Members* of the Université Catholique de Louvain (UCL), the Katholieke Universiteit Leuven (KUL), the Université Libre de Bruxelles (ULB), the Facultés Universitaires Saint-Louis, Bruxelles, the Université de Liège, the Faculté Universitaire Catholique de Mons, and the Facultés Notre Dame de la Paix, Namur.

Anton P. BARTEN

Luc BAUWENS

Claude d'ASPREMONT

Guy de GHELLINCK

Jacques H. DREZE

Louis GEVERS

Victor GINSBURGH

Jean JASKOLD GABSZEWICZ

Jean-Paul LAMBERT

Etienne LOUTE

Maurice MARCHAND

Jean-François MERTENS

Michel MOUCHART

Pierre PESTIEAU

Louis PHLIPS

Jean-François RICHARD

Jean-Marie ROLIN

Léopold SIMAR

Yves SMEERS

Frans SPINNEWYN

Jacques THISSE

Henry TULKENS

Jean WAELBROECK

Laurence A. WOLSEY

Researchers

Bernard AVAUX
Serges ANDRIEUX
Jacqueline BOUCHER
Tiziano BRIANZA
Helmuth CREMER
Denis de CROMBRUGGHE
Dominique DEPRINS
Daniel DE WOLF
Geert DHAENE
Christian GOLLIER
Bernadette GOVAERTS
Dominique GUSBIN
Olivier JANSSENS de BISTHOVEN
Bernard LEBRUN
Françoise LEFEVRE
Joseph LEGRAND
Fatemeh MEHTA
Benoît MULKAY
Yves POCHET
Yves RICHELLE
Hugo ROCHE
Anne-Marie RUTGEERTS
Philippe SCHOLTES
Bruno VAN DER LINDEN

Visiting Faculty Members and Research Fellows

Marie ALLARD, Département d'Economie, Université de Sherbrooke.
Robin BOADWAY, Department of Economics, Queen's University.
Jean-Marc BONNISSEAU*, Université Paris I.
Bernard CORNET**, Université Paris I.
José DULA*, University of Michigan, Ann Arbor.

* holds a CORE fellowship.

** Research Director

Alvaro ESCRIBANO*, Department of Economics, University of California,
San Diego.

Françoise FORGES, Fonds National de la Recherche Scientifique.

Peter HAMMOND, Department of Economics, Stanford University.

Kazuya KAMIYA*, Department of Economics, Yale University.

Martine LABBE, Universit Louis Pasteur, Strasbourg.

Bezael PELEG, Department of Mathematics, Hebrew University of
Jerusalem.

Herman VAN DIJK, Erasmus Universiteit, Rotterdam.

David WILDASIN, Department of Economics, Indiana University.

Graduate Students

Choaib BOUSBA, Faculté des Sciences Appliquées.

Fernando CHAU, Faculté des Sciences Economiques, Sociales et Politiques.

Pedro Miguel DUARTE NEVES, Faculté des Sciences Economiques,
Sociales et Politiques.

Brigitte GODBILLON, Faculté des Sciences Economiques, Sociales et
Politiques.

Suzanne KRISTENSEN, Faculté des Sciences Economiques, Sociales et
Politiques.

Xavier MARTINEZ, Faculté des Sciences Economiques, Sociales et Politiques.

Jose Miguel PESSANHA, Faculté des Sciences Economiques, Sociales et
Politiques.

Laura RAZZOLINI, Faculté des Sciences Economiques, Sociales et Politiques.

Eric RUSCHER, Faculté des Sciences Economiques, Sociales et Politiques.

Jorge SOUZA, Faculté des Sciences Appliquées.

Mark STEEL, Faculté des Sciences Economiques, Sociales et Politiques.

Edouard WYLLEMAN, Faculté des Sciences Economiques, Sociales et
Politiques

Liang ZOU, Faculté des Sciences Economiques, Sociales et Politiques.

* holds a CORE fellowship.

1.2. During the next academic year, 4 CORE faculty members will be on leave :

L. BAUWENS will spend the year at GREQE, Université d'Aix-Marseille II, and P. PESTIEAU at Cornell University.

J.-F. RICHARD will stay at Duke University for another year, and

J.-F. THISSE will go to INSEAD for the first semester.

Five young researchers who defended their doctoral dissertation during the period covered by this report have been appointed for the next academic year :

P. GARELLA at Université de Montréal as Assistant Professor,

B. GOVAERTS at University of British Columbia as Assistant Professor,

Y. RICHELLE at Université de Montréal as Visiting Professor,

M. STEEL at Universiteit Tilburg as Assistant Professor, and

E. WYLLEMAN was offered a full-time position at Bell Laboratories,
New York.

1.3. The following visiting faculty members and research fellows will be on residence for all or part of the 1987-1988 academic year

Jean-Marc BONNISSEAU, Université Paris I.

Bernard CORNET*, Université Paris I.

Gérard DEBREU, University of Berkeley.

Abilio Pereira de LUCENA FILHO, Erasmus Universiteit, Rotterdam.

Ezra EINY, Hebrew University of Jerusalem.

Robert GARY-BOBO, Université Paris I.

Jean-Louis GOFFIN, McGill University, Montréal.

Andrew MAS-COLELL, Harvard University, Cambridge.

Philippe MICHEL, Université Paris I.

Abraham NEYMAN, The Hebrew University of Jerusalem.

Tyrrell ROCKAFELLAR, University of Washington.

Richard SCHULER, Cornell University.

Sylvain SORIN, Université de Strasbourg.

Herman VAN DIJK, Erasmus Universiteit, Rotterdam.

Richard WONG, Purdue University, West Lafayette.

* Research Director

1.4. Other items

J.-P. LAMBERT was elected director of the CEREC, the newly created research center in economics at the Facultés Universitaires Saint-Louis, Bruxelles.

L. PHILIPS was elected secretary of the European Economic Association.

J.-F. THISSE has been awarded the Erik Kemps Prize for 1986 in Memory of T. Palander. He was also elected member of the World Council of the Regional Science Association and member of the Board of Directors of the European Economic Association.

2. RESEARCH ACTIVITIES

The first three parts of this section, organised by major areas of research, give abstracts of the discussion papers that appeared in the period covered by this report. The fourth section discusses ongoing research projects at CORE that are sponsored by outside agencies in the form of grants or contracts.

2.1. Operations Research

N. Ravi and R.E. Wendell, The tolerance approach to sensitivity analysis in network linear programming (8632).

The tolerance approach to sensitivity analysis, in contrast to classical sensitivity analysis, allows for simultaneous and independent perturbations of objective function coefficients and of righthand-side terms from their original values. Here we specialize this approach to network problems. The specialization yields streamlined results in that the computations can be performed directly on a network.

Y. Pochet, Valid inequalities and separation for capacitated economic lot sizing (8649).

A family of valid inequalities for the capacitated economic lotsizing problem is given. In the case of equal capacities, studied in more detail, a large subclass of them defines facets.

A heuristic for the separation problem, based on these inequalities, is defined for use in a cutting plane algorithm. We give computational results for 12 and 24 periods test problems and for both the equal and different capacity cases. This cutting plane approach has solved to optimality all 12 period test problems with equal capacities.

We also indicate how to extend this class of inequalities for more general capacitated fixed charge networks.

J.-Ph. Vial, Approximate projections in a projective method for the linear feasibility problem (8707).

The key issue in implementing a projective method is the projection operation. In order to cut down computations several authors have suggested to use approximations instead of the projection itself. Unfortunately, using approximations may not be compatible with the proofs of polynomial complexity. We propose several types of approximations which preserve

the complexity property of the version of Karmarkar's algorithm presented by de Ghellinck and Vial. The analysis is based on a relaxation of the main convergence lemma of de Ghellinck and Vial.

A. de Palma, P. Hansen and M. Labbé, Computers' paths with penalties for early or late arrival time (8712).

We formulate the choice of a best path for a commuter as a generalized shortest path problem. It integrates constant costs for use of arcs, cost functions of travel times depending on (exogenous) congestion and schedule delay. The problem is shown to be NP-hard, polynomial sub-cases are determined and a pseudo-polynomial algorithm is provided for the general case.

J.-Ph. Vial, A fully polynomial time projective method (8713).

This paper proposes a modification of the algorithm of de Ghellinck and Vial, which keeps the size of the numbers occurring in the calculation bounded by a fixed bound, independently of the number of iterations. This algorithm is fully polynomial in time.

K. Kamiya, The decomposition method for systems of nonlinear equations (8724).

The main purpose of this paper is to present an efficient algorithm for computing solutions to a class of systems of nonlinear equations; the special structure of the systems allows us to use the decomposition of the problem. We apply the algorithm to economies with nonconvex technologies; the algorithm is not only an efficient method of computing equilibria but also "generically" a price adjustment mechanism.

M. Labbé, Location of an obnoxious facility on a network : a voting approach (8729).

We consider the location problem of an obnoxious facility with respect to a finite number of inhabitants, where the inhabitants have specified locations at vertices of a network N . A voting solution, called anti-Condorcet point, is defined as a point of N such that no other point is farther from a strict majority of inhabitants. On a general network with an odd number of inhabitants, it is shown that there exists a finite set of points which contains all such solutions. An example shows that this result does not directly extend to an even number of inhabitants on a

general network. In the special case of a tree network, one of the extreme vertices of a diameter is an anti-Condorcet point and a linear algorithm for finding it is presented. Finally, a bound on the maximum decrease of the total distance to the inhabitants is provided when an anti-Condorcet point is preferred to a "maxisum" location.

J.E. Spingarn, On computation of spatial economic equilibria (8731).

An algorithm is described for computing network equilibria, that is finding a circulation x and a differential y such that $y(j) \in T_j(x(j))$ for every arc j of a network and where the T_j are maximal monotone. The T_j are assumed to be specified in a form convenient for the solution of economic equilibria. It is then shown how the algorithm can be applied to solve for equilibrium prices and trade flows in an economy with several commodities and spatially separated markets, each region having its own correspondences between supply and price and between demand and price.

J.R. Birge and J. Dula, Bounding the expectation of convex functions with limited distribution information (8733).

This paper considers bounds on the expectation of a convex function of a random variable when only limited information is available about the underlying distribution. The problem is presented as a generalized moment problem. A special class of functions is shown to have an easily computable solution to this problem with first and second moment constraints. Extensions are given for general convex functions on finite intervals or with finitely valued recession functions.

2.2. Mathematical Economics

P. Dehez and J. Drèze, Competitive equilibria with increasing returns (8623).

This paper proposes a concept of competitive equilibrium at which firms maximise profits given the prices and the demand for their outputs. The equilibrium is called "competitive" because it combines voluntary trading with a minimality condition on output prices. When production sets are convex, the set of equilibria as defined here coincides with the usual set of competitive equilibria. Existence is proved without imposing convexity assumption on either individual or aggregate technologies.

J.-F. Mertens, Repeated games (8624).

Repeated games are a very general model for games that have a time-invariant description. In part A, we describe the economic origins and motivations of the problem. Part B contains a quick guide to (part of) the literature. In part C, we first give a very simple combinatorial normal form for those problems, next obtain the basic recursive structure - a reduction to stochastic games with perfect information - and show some of its implications.

R. Gretlein, J. Hamilton and S. Slutsky, To fight or not to fight : that is the question (8625).

Models with private information held by one side have been used to describe the occurrence of Pareto-inefficient conflicts such as wars, strikes and civil trials. Here a game with private information held by both sides is analyzed. Two sides must agree to divide a fixed surplus or engage in a conflict to enforce their demands. The private information is that each side knows which one of two relative strength levels it will have in the potential conflict. The Nash equilibrium solution to the game is presented for all possible values of the parameters - the size of the surplus, its no-conflict division, the costs of fighting and each side's probabilities of being strong or weak. The qualitative properties of the equilibria are described and compared to outcomes in models of one-sided private information. Comparative statics results for local and global changes in the parameters are presented. Finally, it is shown how this model can be embedded in a multi-stage conflict game with bargaining, information transmission and different commitment structures.

J. Jaskold Gabszewicz and J.-F. Thisse, Vertical product differentiation and competitive discriminatory pricing (8626).

This paper investigates the impact of price discrimination in a vertically differentiated market. We show that : (i) a discriminatory pricing equilibrium exists under rather general conditions; (ii) the equilibrium qualities coincide with the Pareto-optimal qualities; and (iii) all consumers are better off under discriminatory pricing than under uniform pricing.

M.-P. Donsimoni and J. Jaskold Gabszewicz, Is international trade profitable to oligopolistic industries ? (8627)

In the framework of a simple class of examples, we examine whether oligopolistic autarkic industries, operating in two different countries, would gain from the opening of trade. Our findings can be summarized as follows : (i) under homogeneous oligopoly, there is always *at least one* of the two countries where firms make higher profits under autarky than under free trade; (ii) under homogeneous oligopoly, if the industries are of the same size and demand is the same in both countries, then *all* firms in both countries have higher profits under autarky than under free trade; (iii) the same conclusion as in (ii) follows when there are fixed costs and the industry in each country has a number of firms entailing zero-profits at the autarkic Cournot equilibrium; (iv) by contrast, under *differentiated* duopoly, with one firm in each country selling a product of different quality, there are cases where *both firms* make higher profits under international competition than under autarkic monopoly.

J.-M. Bonnisseau and B. Cornet, Fixed-point theorems and Morse's lemma for Lipschitzian functions (8628).

We prove a fixed point theorem for set-valued mappings defined on a nonempty compact subset X of \mathbb{R}^n which can be represented by inequality constraints, i.e., $X = \{x \in \mathbb{R}^n \mid f(x) \leq 0\}$, f locally Lipschitzian and satisfying a nondegeneracy assumption outside of X . This class of sets extends significantly the class of convex, compact sets with a nonempty interior.

Topological properties of such sets X are proved (continuous deformation retract of a ball, acyclicity) as a consequence of a generalization of Morse's lemma for Lipschitzian real-valued function defined on \mathbb{R}^n a result also of interest for itself.

J.-P. Lambert, Conflicting specifications for investment functions in rationing models : a reconciliation (8629)

In this paper, we discuss some of the specifications recently proposed in the literature for investment behaviour in rationing models. After pointing to an inconsistent practice common in the available empirical works, we focus on two specifications among the most attractive ones proposed recently and explain why they are incompatible with each other. We then show what is the correction to be brought in order both to restore compatibility and preserve a type of specification aiming at making the best use of available information.

B. Cornet, The second welfare theorem in nonconvex economies (8630).

The purpose of this paper is to report an extension of the second welfare theorem when both convexity and differentiable assumptions are violated.

M. Marchand, P. Pestieau and S. Wibaut, Optimal commodity taxation and tax reform under unemployment (8631).

This paper derives the optimal commodity tax formula and the tax reform rule which ought to be used in a situation of (orthodox Keynesian) unemployment. The setting considered is that of a four-good one-individual model with fixed real wage implying an excess supply of labor. The presentation is very simple and based on intuitive and graphical arguments, and the emphasis is put on comparing our results with the more traditional results derived under full employment. The paper concludes with an empirical study of tax reform.

H. Cremer and P. Pestieau, A case for differential inheritance taxation (8633).

This paper incorporates the case of a variable number of children in a simple model of the distribution of inherited wealth. In particular, the possibility of childless couples, and hence of bequests from relatives other than parents (i.e., "collateral bequests") is considered. Within such a setting, two questions are raised. First, do collateral bequests increase the distributional inequality of wealth? Second, should one adopt inheritance tax rates that depend on the inheritor's blood relationship to the donor? In other words, does there exist an economic justification for differential inheritance taxation such as it is usual in many countries (e.g., France and Germany).

J. Drèze, Underemployment equilibria : from theory to econometrics and policy (8634).

Presidential address to the European Economic Association. The paper surveys first the theory of output and employment determination, combining Keynesian and classical features as well as price rigidities, found in general equilibrium models with rationing and in the associated macroeconomic theory. Special attention is devoted to increasing returns, to price and quantity dynamics, to the rationale for downward price rigidities and to second-best analysis with Keynesian unemployment. A second part of the paper deals with econometric implementation of the model

with special reference to smoothing by aggregation, and presents an application to Belgian data. The concluding section discusses policy implications, with special reference to the European unemployment problem.

C. d'Aspremont, R. Dos Santos Ferreira and L.A. Gérard-Varet, On monopolistic competition and involuntary unemployment (8635).

In a simple strategic general equilibrium model of imperfect competition in prices, assumptions are introduced to ensure both the existence of equilibrium and the determination of examples in which some involuntary unemployment (in a strong sense) arises.

J.-M. Bonnisseau and B. Cornet, Valuation equilibrium and Pareto optimum in nonconvex economies (8636).

In this paper, we report an extension of the second welfare theorem when both convexity and differentiability assumptions are violated. Our model allows various formalizations of the marginal rule and considers the general setting of a topological vector space of commodities.

K. Kamiya, On the survival assumption in marginal cost pricing (8638).

The purpose of this paper is to show that marginal cost pricing equilibria need not exist without the survival assumption.

F. Forges, Negotiation without a deadline : a job market example (8639).

We consider the negotiation between an informed individual and an uninformed one, who has the decision power. For instance, a candidate (who knows his ability) and an employer (who decides to hire or not and which job to give). A full description of the Nash equilibrium outcomes is given. There exist efficient Nash equilibria which can only be achieved by means of an unbounded conversation (i.e., a finite conversation whose length cannot be determined in advance). The set of communication equilibrium outcomes, which coincides here with the set of correlated equilibrium outcomes, is also fully described.

C. Chamley, M. Marchand and P. Pestieau, Linear incentive schemes to control public firms (8641).

The basic setting of this paper is that of a government and a public firm which pursue different objectives and do not possess the same information. The public manager typically desires the highest compensation for the lowest effort whereas the government's aim is social welfare. Its control of the public firm is hindered by its lack of information on the firm's technology and the manager's effort.

Given this setting, we deal with a linear compensation rule which is based on variables observed by the government, i.e. labour and output. This rule should be designed to induce the manager to achieve the government's objective as much as possible. The paper focuses on the following issue : how far should the public manager's compensation rule encourage him to hire more or less labour ? This is shown to depend upon several factors such as the elasticity of substitution between labour and effort and the output elasticity of the marginal social benefit . A linear schedule is clearly at odds with most findings in the principal-agent literature; it is here adopted for the ease of its practical implementation but by no means does it facilitate the analysis.

C. d'Aspremont and B. Peleg, Ordinal Bayesian incentive compatible representations of committees (8642).

We consider the problem of strategic manipulation for decision schemes that provide "nice" representations of committees. "Strategy-proof representation" is very restrictive : it implies that the committee contains exactly one minimal winning coalition. So we introduce the weaker concept of "Ordinally Bayesian Incentive Compatible representation" and prove the existence of such representations for weak games under some conditions. Finally, constructing examples, we show first how necessary these conditions are - including the use of chance in the voting procedure - and second that we cannot avoid Condorcet's paradox.

S.P. Anderson, A. de Palma and J.-F. Thisse, A representative consumer theory of the logit model (8643).

The logit model is usually derived from a discrete choice approach with stochastic utilities. It is shown here that the logit may also be derived from a very different conceptual basis, the representative consumer approach. Specifically, the logit results from the maximisation of a deterministic, entropy-type utility. This alternative view suggests a generali-

sation of the standard logit which allows total demand to be determined endogenously.

P.G. Garella, Adverse selection and intermediation (8644).

The paper deals with the intervention of an intermediary in a market where adverse selection destroys the agents' trade possibilities. It is assumed that the intermediary, like any other buyer, cannot distinguish the good quality from the bad quality commodity units. The main result is that random price discrimination of the sellers is sufficient to make intermediation profitable, if some conditions on the qualities distribution over the sellers population are satisfied. In particular, random price discrimination is a way of (partially) sorting out qualities, and obtains a reduction in the per unit cost of purchasing a lot of given average quality. The intermediary's intervention leads to an ex ante Pareto improvement.

S.P. Anderson and D.J. Neven, Market efficiency with combinable products (8645)

We allow consumers to combine products to obtain a mix of their characteristics. We show there is a unique sub-game perfect equilibrium in a product location-price game, such that all consumers are able to attain their desired product mix. This solution is the socially optimal one, in stark contrast to "location" models where combinability is debarred by assumption.

Ch. Blackorby, W. Schworm and T. Fisher, Testing for the existence of input aggregates in an economy production function (8646)

Any researcher investigating the characteristics of production technologies must make several decisions about the appropriate level of aggregation of the data and the appropriate interpretation of results obtained from aggregate data.

While the benefits are substantial, the costs of using aggregate data can be high and are typically unknown. If data are aggregated inappropriately, then there is no stable functional relationship among the aggregate variable. Therefore, estimated parameters cannot be interpreted as characterizing such a relationship. In particular, the usual calculations of elasticities of substitution and price elasticities of factor demands would produce numbers that are unrelated to the theoretical concepts.

In this paper, we address three problems with previous tests of input aggregation. First, previous specifications and tests of input aggregation have ignored the fact that an economy's technology is determined by the

technologies of many independent producers. Second, all previous separability tests of which we are aware have tested for homothetic separability which is substantially stronger than separability. Third, separability tests have been plagued by problems with functional forms that degenerate to very special cases when separability restrictions are imposed.

In this paper we present a general procedure for generating functional forms that can test for separability without degenerating to extreme special cases. We also present a particular example which, although not known to be flexible, is capable of modeling elaborate separability structures. In addition, the functional forms are capable of distinguish between separability and homothetic separability and between separability and input aggregation. Standard functional forms are unable to discriminate between separability and input aggregation.

Ch. Blackorby, W. Schworm and A. Venables, Necessary and sufficient conditions for factor price equalization (8647)

There is a substantial literature on the conditions under which factor prices are the same in different countries that trade commodities but do not trade factors of productions.

The conditions that have been presented in the literature as sufficient for factor price equalization (FPE) are quite restrictive.

In this paper, we present necessary and sufficient conditions for FPE under quite general assumptions about the technologies of different countries. In particular, we assume each country has a concave technology relating an arbitrary number of traded goods and non-traded goods which permits joint production, decreasing returns to scale, and differences in the technologies of different countries. We present the necessary and sufficient conditions for FPE in terms of the economy's production function and in terms of the production functions of the firms that operate in countries with FPE. Our conditions are joint restrictions on the technologies and the endowments of countries. We demonstrate that the effects of relaxing the standard assumptions are substantial. The necessary and sufficient conditions we derive are consistent with joint production, decreasing returns to scale, and important differences in the technologies and endowments of different countries.

K. Kamiya, Computation of equilibria in an economy with increasing returns to scale technologies (8648)

In Kamiya [Existence and uniqueness of equilibria with increasing returns, 1986], I proved the existence of equilibria in an economy with increasing returns to scale technologies. The purpose of this paper is

to show that this method of proving existence is well suited to a computational interpretation. The advantage of the approach is that one can investigate not only the effects of tax changes but also the effects of changing pricing rules.

P. Dehez and J. Drèze, Distributive production sets and equilibria with increasing returns (8701).

We give a necessary and sufficient condition on production sets under which average cost pricing is compatible with voluntary trading. This condition defines a class of production sets which is related to supportable cost functions and to Aumann-Shapley average cost prices.

S.P. Anderson, A. de Palma and J.-F. Thisse, Demand for differentiated products, discrete choice models, and the address approach (8702).

We propose a specific address framework in order to construct linkages between alternative conceptual approaches to modelling product differentiation. First, it is shown that a demand system which satisfies the gross substitutes property imposes specific requirements on the addresses of products. In particular, the dimension of the characteristics space must be larger than or equal to the number of products minus one. We then identify a method for casting a given demand system (subject to certain restrictions) into our address framework. This is illustrated for the logit, probit and linear probability models of discrete choice theory. Finally, we find an address representation of the CES representative consumer.

J.P. Lambert and B. Mulkay, Investment in a disequilibrium context or does profitability really matter ? (8703).

This paper examines, both theoretically and empirically, the investment behaviour of firms in a disequilibrium context. In this sense, it is to be regarded as a contribution to the progressive development of more appropriate macroeconomic disequilibrium models which are, up to now, essentially short-term models. The framework adopted here is that of stochastic rationing, in the sense that firms are faced with an uncertain demand. The theoretical analysis of the firm having to decide jointly on its optimal capacities and optimal technical coefficients allows to identify profitability as a prime long-run determinant of desired capacities. An empirical application conducted on the Belgian manufacturing sector supports the hypothesis of a strong role played by profitability developments, particularly in the last decade.

F. Forges, Universal mechanisms (8704).

All solutions of a non-cooperative n -person ($n \geq 3$) game with incomplete information that become feasible once arbitrary devices of communication are available to the players (like direct revelation mechanisms set up by a mediator) can be achieved by means of a mechanism universal in two respects : it does not depend on the specification of the game nor on the solution to achieve and it is easily implemented in any institutional context.

A. de Crombrughe and H. Tulkens, On Pareto improving tax changes under fiscal competition (8705).

This note shows that when a "non cooperative fiscal equilibrium" of the Mintz-Tulkens 1986 model of tax competition is inefficient, the direction of Pareto improving changes is always positive for the taxes of *both* regions. It also identifies the class of such equilibria that are efficient.

J.-F. Thisse and X. Vives, On the strategic choice of spatial price policy (8708).

The strategic incentives with respect to the choice of a price policy in spatial competition are analyzed in a duopoly model. Price discrimination emerges as the unique equilibrium outcome either with simultaneous choice of policy and price or with sequential choice where firms may commit first to a certain price policy (uniform mill pricing) before the actual market stage. This is so even though profits may be higher with uniform pricing. Our models are applied to analyze some common business practices that arise in geographical pricing, like the basing point system, and in the pricing of varieties or options from a base product in a product differentiation context.

H. Cremer, M. Marchand and J.-F. Thisse, The public firm as an instrument for regulating an oligopolistic market (8710).

The purpose of this paper is to analyze the extent to which public enterprises can be used as a policy instrument to improve resource allocation in an imperfectly competitive market. More specifically, we want to deal with the following questions. Given n private firms selling a homogeneous product and competing at the Cournot-Nash equilibrium, would it be socially optimal for the government to nationalize some of these firms and to instruct them to maximize social welfare ? If yes, how many of them

should be made public ? Alternatively, would it be socially desirable to create public enterprises, and which of these two policies is better ? On the contrary, if some public firms are already established in the industry, would it be socially advantageous to privatize some or all of them ?

We examine these issues under a set of assumptions which differ from those found in the existing literature. In particular, it is assumed that there are increasing returns to scale at the firms' level and that each public firm faces a budget constraint that forces it to make nonnegative profits. In our framework, it is shown that nationalizing a single firm in an industry with only private firms is the optimal policy for most parameter combinations. In the remaining cases, welfare is maximized through the nationalization of the whole industry. It is also shown that nationalizing an existing firm is always superior to creating a new one.

J.-M. Bonnisseau, General pricing rules, bounded losses and existence of equilibrium in economies with increasing returns (8711).

The purpose of this paper is to show that we can deduce the existence theorems of equilibria in economies with increasing return of Kamiya [Existence and uniqueness of equilibria with increasing returns, 1984] and of Dierker-Guesnerie-Neuefeind [General equilibrium where some firms follow special pricing rules, 1985] from the result of Bonnisseau-Cornet [Existence of equilibria when firms follow bounded losses pricing rules, 1986]. Consequently this last result which mainly rests upon the assumption that the firms have bounded losses when they follow their pricing rules, synthesizes all the existence results with general pricing rules.

R.W. Boadway and D.E. Wildasin, A median voter model of social security (8714).

This paper presents a theoretical median voter analysis of the determination of the level of social security. The framework for the analysis is a continuous-time overlapping-generations model with non-altruistic households. Households are assumed to be unable to borrow against future social security benefits to finance current consumption or against future wages or both. In this model, a majority voting equilibrium can be shown to exist, in which the median voter is liquidity constrained. In steady states, and also, under some conditions, outside of steady states, the median voter is of median age. The desired level of social security for each voter is a declining function of the pre-existing level of social security. A consequence is that a sequence of votes on social security, beginning with a zero level, will result in initial overshooting in which the

level of the program exceeds its steady state value. It is also shown that the steady state equilibrium level of social security is lower, the shorter is the time between successive votes.

P.J. Hammond, Consequentialist foundations for expected utility (8716).

Behaviour norms are considered for decision trees which allow both objective probabilities and uncertain states of the world with unknown probabilities. Terminal nodes have consequences in a given domain. Behaviour is required to be consistent in subtrees. Consequentialist behaviour, by definition, reveals a consequence choice function independent of the structure of the decision tree. It implies that behaviour reveals a revealed preference ordering satisfying both the independence axiom and a novel form of sure-thing principle. Continuous consequentialist behaviour must be expected utility maximizing. Other familiar assumptions then imply additive utilities, subjective probabilities, and Bayes' rule.

Ch. Gollier, The role of wage setting in entry-deterrence (8717).

In a competitive market model, I show how established firms can negotiate with labour unions to regulate both entry and prices. If industry-wide wage agreements can be implemented, incumbents could prefer to maintain high wages for marginal workers in view to control the total output of the industry. Consequently, hiring wage stickiness and unemployment emerge in some circumstances. This is also an explanation of the limited phenomenon of wage discrimination by hiring dates.

I. Barany, Fair distribution protocols or how the players replace fortune (8718).

There are $n = 2$ players P_1, P_2, \dots, P_n each of them having an alphabet A_1, \dots, A_n and there is a probability distribution p on $A = A_1 \times \dots \times A_n$. What the players want to do is to choose an a from A according to p in such a way that P_i knows the i^{th} component, a_i , of a only. This can be done by the help of an impartial person or "fortune" who chooses $a \in A$ according to p and informs P_i on a_i only. But what happens if no such person is available? Can the players find a procedure that replaces fortune? As an application it is shown that any correlated equilibrium of a non-cooperative n -person game ($n = 4$) coincides with a Nash-equilibrium of an extended game involving plain conversations only.

R. Boadway, P. Pestieau and D. Wildasin, Tax-transfer policies and the voluntary provision of public goods (8719).

The purpose of this paper is twofold. First, it extends previous models of non-cooperative private funding of pure public goods by allowing both for distortionary taxation of private goods and for subsidies based on contributions to the public goods. Second, it clarifies the type of behavioral and informational assumptions which are needed to result in neutrality of both lump-sum and distortionary policies. The analysis is developed in the context of fiscal federalism.

D.E. Wildasin, Nash equilibria in models of fiscal competition (8720).

This paper analyzes Nash equilibria in a simple model of an economy with jurisdictions engaging in fiscal competition. Small-number Nash equilibria in which tax rates are the strategic variables are shown not to coincide with Nash equilibria in which public expenditure levels are the strategic variables.

D.E. Wildasin, Distortionary taxation and demand estimation for public goods (8721).

This paper considers the problem of estimation of the demand for public goods when these goods are financed by distortionary taxation, instead of by distortionless taxes as is usually assumed. It is shown that failure to take account of tax distortions leads to a misspecification of the effective price of public goods. This biases the estimates of the price and income elasticities of demand. Sample calculations are presented which illustrate the potential magnitude of the errors involved.

J.-M. Bonnisseau and B. Cornet, Existence of marginal cost pricing equilibrium in an economy with several nonconvex firms (8723).

This paper considers a general equilibrium model of an economy where some firms may exhibit increasing returns to scale or more general types of non-convexities. The firms are instructed to follow the standard marginal cost pricing rule or to fulfill the first-order necessary conditions for profit maximization. A general existence theorem of equilibria is proved in the case of an arbitrary number of firms. No assumption is made to imply the aggregate productive efficiency of equilibria, a condition that has to be excluded in the nonconvex case.

P. Chander, Surplus-sharing rules and incentives in planning procedures for public goods (8726).

The paper analysis strategic behavior under the assumption of myopia in a new MDP type of procedure in which surplus is distributed according to a time dependent distribution profile which is determined on the basis of the information revealed in the procedure. In particular, the distribution parameters are proportional to the revealed marginal rates of substitution of the consumers. It is shown that unique Nash equilibria exist with the property that $\pi^i(t) \geq \pi^j(t) \Leftrightarrow \psi^i(t) \geq \psi^j(t)$, where $\pi^i(t)$ is the true marginal rate of substitution and $\psi^i(t)$ is the Nash strategy of consumer i at point t . In a second part of the paper the "free rider" problem is examined in relationship with the new procedure. It is shown that the Fujigaki and Sato procedure [Incentives in the generalized MDP procedure for the provision of public goods, 1981] leads to downright free riding whereas the new procedure does not. This is shown to be true irrespective of whether the agents behave truthfully or adopt Nash behavior.

P. Chander, Cost-sharing local games in dynamic processes for public goods (8727).

The paper considers a general class of nontatonnement planning processes for an economy involving one public and one private good. It is argued that from a decentralization point of view the reallocations at each step of a nontatonnement process should be justifiable as the outcome of some kind of a bargaining discussion or social interaction among the agents at that step rather than as the ones imposed by the planning authority. This leads us to a cost-sharing problem and to certain n -person cooperative games in characteristic function form which are defined at each step of the process. It is shown that if a certain cost-sharing rule is adopted then these games are convex and the imputation induced by the process is the Shapley value of the corresponding game. A new MDP type of process is obtained as a byproduct. In a second part of the paper a cost-sharing problem is defined as a division problem without reference to a dynamic process and an axiomatic characterization of the proposed cost-sharing rule is given. Another class of n -person cooperative games in characteristic function form is defined which are shown to be convex. It is shown that the proposed cost-sharing rule leads to a core imputation.

J.-F. Mertens, Ordinality in non cooperative games (8728).

We first analyse what a conceptual definition of ordinality for non cooperative games should be. The resulting concept is highly abstract and

apparently unmanageable. Nevertheless we obtain in a second part a very simple and fully operational characterization. In the last part, this is used to check the ordinality of a number of concepts that have been proposed in the literature.

Ch. Gollier, Intergenerational discrimination in insider-outsider models with implicit labour contracts (8732).

The labour market has failed to spread risk among different generations. Unlucky generations entering the labour market during a recession bear almost all risks, whereas older workers are protected by implicit contracts offering a downward rigid wage. Using three two-period models with overlapping generations of workers, we analyze the conflict of interest between insiders with a contract and outsiders (unemployed and the young cohort entering the labour market). The wage discrimination between generations will depend upon the incentive of insiders to raise the hiring wage. An intermediary wage discrimination is shown to be efficient in order to promote employment for outsiders, although limiting the cost of layoff for insiders.

M. Allard, C. Bronsard and Y. Richelle, Roy-consistent expectations (8734).

In this paper we define a new class of expectations which, under proper specification, implies either the exogenous expectations case or the static expectations one or the rational expectations hypothesis. This class allows thus to bridge the gap between arbitrary expectation functions (like those used in the temporary equilibrium framework - see Grandmont [Money and value : A reconsideration of classical and neoclassical monetary theories, 1983]) and rational expectations. On the other hand, with this class of expectations it is shown that the short-run demands display some of the neo-classical properties, and this is a partial answer to the Polemarchakis (1983) theorem about the arbitrariness of the short-run demands.

J.-F. Mertens, Non differentiable T.U. markets. The value. (8735).

T.U. economies with private production are shown to have a value - as defined in Mertens [The Shapley value in the non-differentiable case, 1983] - without any differentiability or interiority or other restriction. An explicit formula is given, describing the value as a barycenter of the core, for a probability distribution depending only on the set of net trades at equilibrium.

2.3. Econometrics

J.-M. Dufour, Exact tests and confidence sets in linear regressions with autocorrelated errors (8637).

This paper proposes a general method to build exact tests and confidence sets in linear regressions with first-order autoregressive Gaussian disturbances. Because of a nuisance parameter problem, we argue that generalized bounds tests and conservative confidence sets provide natural inference procedures in such a context. Given an exact confidence set of the autocorrelation coefficient, we describe how to obtain a similar simultaneous confidence set of the autocorrelation coefficient and any sub-vector of regression coefficients. Conservative confidence sets for the regression coefficients are then deduced by a projection method. For any hypothesis which specifies jointly the value of the autocorrelation coefficient and any set of linear restrictions on the regression coefficients, we get exact similar tests. For testing linear hypotheses about the regression coefficients only, we suggest bounds-type procedures. Exact confidence sets for the autocorrelation coefficient are built by "inverting" autocorrelation tests. The method is illustrated with a money demand equation.

J. Waelbroeck, Some pitfalls in applied general equilibrium modelling (8640).

The paper surveys problem areas in applied general equilibrium modelling. A first section examines problems of aggregation over agents, estimation, and computation in the Arrow-Debreu general equilibrium model, from which money is absent. The second discusses models that use the concept of a general equilibrium with rationing to describe the functioning of an economy with price rigidities, when money is present.

H.K. van Dijk, A product of multivariate T densities as upper bound for the posterior kernel of simultaneous equation model parameters (8650).

Given certain integrability conditions, a tractable upper bound function for the posterior kernel of simultaneous equation model parameters is derived for the case of noninformative prior information on unrestricted structural parameters. The upper bound is a constant times a product of multivariate Student t densities defined in a recursive way; compare Drèze and Richard [Bayesian analysis of simultaneous equation systems, 1983]. The integrability conditions are interpreted in terms of restrictions on the structural parameters and a restriction on a prior degrees of freedom parameter.

J.-P. Florens, M. Mouchart and J.-M. Rolin, Non-causality and marginal Markov processes (8706).

A subprocess of a Markov process is Markovian if a condition of non-causality is satisfied. A Markovian condition is a natural condition to analyze the role of the horizon (finite or infinite) in the property of non-causality. We also show that under suitable technical conditions a process is both jointly and marginally Markovian only if there is both finite and infinite non-causality and a process verifies both finite and infinite non-causality only if it is Markovian. Counter-examples are also given for the cases where some technical conditions are not satisfied.

B. Govaerts, A note on a method to compute the asymptotic distribution of the sample second order moments of dynamic linear normal variables (8709).

This paper describes a method for the computation of the asymptotic distribution of any statistic or estimator which is a continuous function of sample second order moments of random variables having a dynamic linear normal distribution of the form :

$$z_t = \Pi z_{t-1} + \epsilon_t \text{ where } \epsilon_t \sim iN(0, \Sigma).$$

The method uses a general theorem due to Hannan [Multiple time series, 1970] and simplifies it in decomposing Π in Jordan canonical form.

A. Escribano, Co-integration, time co-trends and error-correction systems : an alternative approach (8715).

In this paper we propose a concept of time trend and a concept of integrated stochastic process that are not model dependent. We show how these concepts allow us to distinguish among stochastic processes that are dominated by the long run components, thus permitting us to consider different types of long run economic relationships and to derive the corresponding error-correction representations. We restrict the class of stochastic processes to second order processes. In so doing, we show that integrated processes in variance form a subclass of the models with time trends in variance and that the error-correction representations are based only on that source of growing stochastic behaviour. The proposed concepts are illustrated by some examples and are related to the types of stochastic processes used in the literature on unit roots, on co-integration and on common trends.

D.F. Hendry and J.-F. Richard, Recent developments in the theory of encompassing (8722).

The paper surveys and discusses recent contributions on the notion of (parametric) encompassing, whereby a model is required to account for salient features of rival models. Both asymptotic and finite sample versions of encompassing are examined. A class of Wald encompassing tests is applied to various examples among which the choice of regressors problem. Linear dynamic models are formally analysed and the treatment of exogenous variables in the construction of encompassing tests is discussed. A notion of parsimonious-encompassing is examined and its properties are discussed within the information matrix framework. Finally Bayesian notions of encompassing and specificity are analysed.

T. Brianza, L. Philips and J.-F. Richard, Futures markets, inventories and monopoly (8725).

The possibility for a futures market to exist when the underlying commodity (called the cash market) is monopolized has been studied only recently after a long period of neglect, possibly due to the implicit assumption that, since futures markets are typically competitive, the corresponding cash markets are also competitive.

In the present paper we study a monopoly model of a storable good in a dynamic framework. The influence of the monopolist's futures position on his intertemporal pricing and production policy and the reciprocal influence of the latter on the equilibrium of the futures market are analyzed. The possibility of taking a short position increases the monopolist's output and reduces the variability of the cash price. Our analysis highlights the essential role played by expectations for the existence of a futures market. Contract curves for futures positions are derived under the condition that the monopolist and the speculators have different expectations.

A. Escribano, Error-correction systems : nonlinear adjustments to linear long-run relationships (8730).

In this paper a unifying approach, based on conditional expectations, is used to generate nonlinear time series models. In particular, we show how to derive nonlinear error-correction models that postulate as targets linear long-run relationships and allow for nonlinear short-run adjustments. This framework incorporates both a variety of integrated stochastic processes and departures from long-run relationships with broad time series

properties. The analysis is done for system of equations in reduced and structural form. Furthermore, since most of the empirical applications available are based on single equation models, we derive also the corresponding single equation models and discuss the appropriateness of the concept of weak exogeneity in error-correction models.

2.4. Research Projects under Contracts

Research teams of CORE have been involved in several sponsored research projects.

A. *Projects on Energy*

The work in energy has continued in several directions but with a more important focus on applications. A "mini model for the evaluation of gas investments" has been delivered to the World Bank in Washington and applied to the development of the Kalimantan field in Indonesia. Under a contract for the National Committee of Energy, an analysis of the Algerian gas deliveries to Belgium has been undertaken and completed. This study which dealt with a complex renegotiation problem certainly constituted one of the most demanding model applications to real world situations that we went through. Except for this latter work, the activities on natural gas have been rather dormant; they are expected to surge again next year with studies on the impact of the internal market in the Community. More standard developments were undertaken in the context of the Energy/Environment project financed by grants from both the European Commission and the Belgian Ministry of Economic Affairs. These projects aim at extending the existing models so as to make them able to accommodate the new environmental regulation currently enforced in the Community. Although the work has mainly been devoted to model developments, several applications of it are foreseen for the coming year. Last, a preliminary investigation of the possibilities offered by equilibrium models for studying the economic impact of new technologies has been completed for the Development Center of OECD; this study, although not specifically related to energy, was very much inspired by some of the methodologies used for analyzing economy/energy interactions.

B. *Performance Studies on Belgian Public Services*

Under a grant from the Belgian Fonds de la Recherche Fondamentale Collective, Henry TULKENS has pursued the setting up of a data bank on Belgian public services. With the help of Thérèse GEELS from Facultés Universitaires Saint-Louis in Brussels, productivity measures by means of the French "méthode des surplus" have been made for all six urban transit companies of Belgium. On the other hand, measures of technical efficiency have been developed both in cross-sectional and in private banking services as well as for some of the urban transit companies mentioned above. These activities have taken place in close cooperation with Pierre PESTIEAU and Bernard THIRY from Université de Liège, as well as Léopold SIMAR from Facultés Saint-Louis in Brussels, under the heading of "Groupe Liège-Louvain-Saint-Louis d'Economie Publique".

C. *CEPS Macroeconomic Policy Group*

Jacques DREZE has continued to serve as Chairman of the CEPS Macroeconomic Policy Group. Together with Charles Wyplosz of INSEAD, he has assumed major responsibility for the 1987 report of the group entitled "The two-handed growth strategy for Europe : Autonomy through flexible cooperation". That report, co-authored with C. Bean, F. Giavazzi and M. Giersch, is forthcoming on a CEPS paper. A summary version is also forthcoming in the *European Economic Review*.

D. *European Unemployment Programme*

Jacques DREZE, Richard LAYARD and Henri SNEESSENS are coordinating a cooperative effort by researchers in ten European countries to apply the same theoretical framework and econometric methodology to the study of employment and unemployment there. This calls for estimating small disequilibrium macroeconomic models of supply and demand for goods and labour in open economies. The models also cover price and wage formation and are currently being extended to investment. A meeting was held in Louvain-la-Neuve in June 1987 to review progress. The French model is constructed in cooperation by Jean-Paul LAMBERT and researchers at INSEE. Two researchers, Fatemeh MEHTA and Philippe SCHOLTES have worked at CORE on that project, which is sponsored by the Commission of the European Communities.

E. A close cooperation has been installed between CORE, the Faculté Libre des Sciences Economiques de Lille and the Facultés Universitaires Saint-Louis, Brussels on some sponsored research projects which are carried out partly in Lille and partly at CORE. During this year, this has been the case for two projects (financed respectively by the Commission of the European Community and the Commissariat Général du Plan, France) aiming at contributing to the development of medium-run disequilibrium macroeconomic models by properly endogenizing investment behaviour in these models. Jean-Paul LAMBERT and Benoît MULKAY have been involved in this work.

F. A research project funded by the Ministry of Public Health to study new ways of reimbursing laboratory tests started in the second half of 1985. This project is directed jointly by Maurice MARCHAND (CORE) and Francis ROGER, M.D. (School of Public Health). In 1986-87, the research focused on the possibility of using the patients' medical records to fix the budget for laboratory expenditures of hospitals. To this end, an empirical study has been undertaken in three Belgian university hospitals to assess how far inter-patient variations of laboratory expenditures could be explained by the patients' DRG (the DRG methodology is used in the U.S. to classify medicare patients). The first results of the analysis are encouraging. Improvements in the DRG classification are currently under study to take better account of the severity of patient illnesses.

G. Under a contract financed by the Belgian Department of Science Policy until December 1986 and the Ministry of Economic Affairs afterward, Bruno VAN DER LINDEN has pursued his research on various aspects of the setting of electricity rates. The model estimating the time-of-day structure of marginal costs has been made operational and applied to several years that differ according to the tightness of generating capacity. Maurice MARCHAND and Bruno VAN DER LINDEN have developed general equilibrium models to derive welfare improving directions for electricity rates under a minimum profit constraint. They have also been involved in specific studies such as the setting of electricity (sale and purchase) prices for cogenerating industries.

Michel MOUCHART and Hugo ROCHE completed a study on the household demand of electricity, in particular on his time pattern, sponsored by the Belgian Department for Science Policy (Final Report : E3/I/6.1., February 1987). On the

basis of a national household survey carried out in 1986 (Project SPPS, 86026), Michel MOUCHART and Hugo ROCHE started the analysis of the demand of electricity by individual appliances (i.e., end-uses), and estimated a short-run or conditional demand for electricity model.

3. PUBLICATIONS

3.1. The following Discussion Papers were issued during the period covered by this report.

- 8623 Competitive equilibria with increasing returns,
P. Dehez and J. Drèze.
- 8624 Repeated games,
J.-F. Mertens.
- 8625 To fight or not to fight : that is the question,
R. Gretlein, J. Hamilton and S. Slutsky.
- 8626 Vertical product differentiation and competitive discriminatory pricing,
J. Jaskold Gabszewicz and J.-F. Thisse.
- 8627 Is international trade profitable to oligopolistic industries ?
M.-P. Donsimoni and J. Jaskold Gabszewicz.
- 8628 Fixed-point theorems and Morse's lemma for Lipschitzian functions,
J.-M. Bonnisseau and B. Cornet.
- 8629 Conflicting specifications for investment functions in rationing models : a reconciliation,
J.-P. Lambert.
- 8630 The second welfare theorem in nonconvex economies,
B. Cornet.
- 8631 Optimal commodity taxation and tax reform under unemployment,
M. Marchand, P. Pestieau and S. Wibaut.
- 8632 The tolerance approach to sensitivity analysis in network linear programming,
N. Ravi and R.E. Wendell.
- 8633 A case for differential inheritance taxation,
H. Cremer and P. Pestieau.
- 8634 Underemployment equilibria : from theory to econometrics and policy,
J.H. Drèze.
- 8635 On monopolistic competition and involuntary unemployment,
C. d'Aspremont, R. Dos Santos Ferreira and L.-A. Gérard Varet.
- 8636 Valuation equilibrium and Pareto optimum in nonconvex economies,
J.-M. Bonnisseau and B. Cornet.
- 8637 Exact tests and confidence sets in linear regressions with autocorrelated errors,
J.-M. Dufour.
- 8638 On the survival assumption in marginal cost pricing,
K. Kamiya.

- 8639 Negotiation without a deadline : a job market example,
F. Forges.
- 8640 Some pitfalls in applied general equilibrium modelling,
J. Waelbroeck.
- 8641 Linear incentive schemes to control public firms,
C. Chamley, M. Marchand and P. Pestieau.
- 8642 Ordinal Bayesian incentive compatible representations of committees,
C. d'Aspremont and B. Peleg.
- 8643 A representative consumer theory of the logit model,
S.P. Anderson, A. de Palma and J.-F. Thisse.
- 8644 Adverse selection and intermediation,
P.G. Garella.
- 8645 Market efficiency with combinable products,
S.P. Anderson and D.J. Neven.
- 8646 Testing for the existence of input aggregates in an economy production function,
Ch. Blackorby, W. Schworm and T. Fisher.
- 8647 Necessary and sufficient conditions for factor price equalization,
Ch. Blackorby, W. Schworm and A. Venables.
- 8648 Computation of equilibria in an economy with increasing returns to scale technologies,
K. Kamiya.
- 8649 Valid inequalities and separation for capacitated economic lot sizing,
Y. Pochet.
- 8650 A product of multivariate T densities as upper bound for the posterior kernel of simultaneous equation model parameters,
H.K. van Dijk.
- 8701 Distributive production sets and equilibria with increasing returns,
P. Dehez and J. Drèze.
- 8702 Demand for differentiated products, discrete choice models, and the address approach,
S.P. Anderson, A. de Palma and J.-F. Thisse.
- 8703 Investment in a disequilibrium context or does profitability really matter ?
J.-P. Lambert and B. Mulkay.
- 8704 Universal mechanisms,
F. Forges.
- 8705 On Pareto improving tax changes under fiscal competition,
A. de Crombrugge and H. Tulkens.

- 8706 Non-causality and marginal Markov processes,
J.-P. Florens, M. Mouchart and J.-M. Rolin.
- 8707 Approximate projections in a projective method for the linear feasibility problem,
J.-Ph. Vial.
- 8708 On the strategic choice of spatial price policy,
J.-F. Thisse and X. Vives.
- 8709 A note on a method to compute the asymptotic distribution of the sample second order moments of dynamic linear normal variables,
B. Govaerts.
- 8710 The public firm as an instrument for regulating an oligopolistic market,
H. Cremer, M. Marchand and J.-F. Thisse.
- 8711 General pricing rules, bounded losses and existence of equilibrium in economies with increasing returns,
J.-M. Bonnisseau.
- 8712 Computers' paths with penalties for early or late arrival time,
A. de Palma, P. Hansen and M. Labbé.
- 8713 A fully polynomial time projective method,
J.-Ph. Vial.
- 8714 A median voter model of social security,
R.W. Boadway and D.E. Wildasin.
- 8715 Co-integration, time co-trends and error-correction systems : an alternative approach,
A. Escribano.
- 8716 Consequentialist foundations for expected utility,
P.J. Hammond.
- 8717 The role of wage setting in entry-deterrence,
Ch. Gollier.
- 8718 Fair distribution protocols or how the players replace fortune,
I. Barany.
- 8719 Tax-transfer policies and the voluntary provision of public goods,
R. Boadway, P. Pestieau and D. Wildasin.
- 8720 Nash equilibria in models of fiscal competition,
D.E. Wildasin.
- 8721 Distortionary taxation and demand estimation for public goods,
D.E. Wildasin.
- 8722 Recent developments in the theory of encompassing,
D.F. Hendry and J.-F. Richard.

- 8723 Existence of marginal cost pricing equilibrium in an economy with several nonconvex firms,
J.-M. Bonnisseau and B. Cornet.
- 8724 The decomposition method for systems of nonlinear equations,
K. Kamiya.
- 8725 Futures markets, inventories and monopoly,
T. Brianza, L. Philips and J.-F. Richard.
- 8726 Surplus-sharing rules and incentives in planning procedures for public goods,
P. Chander.
- 8727 Cost-sharing local games in dynamic processes for public goods,
P. Chander
- 8728 Ordinality in non cooperative games,
J.-F. Mertens
- 8729 Location of an obnoxious facility on a network : a voting approach,
M. Labbé.
- 8730 Error-correction systems : nonlinear adjustments to linear long-run relationships,
A. Escribano.
- 8731 On computation of spatial economic equilibria,
J.E. Spingarn.
- 8732 Intergenerational discrimination in insider-outsider models with implicit labour contracts,
Ch. Gollier.
- 8733 Bounding the expectation of convex functions with limited distribution information,
J.R. Birge and J. Dula.
- 8734 Roy-consistent expectations,
M. Allard, C. Bronsard and Y. Richelle.
- 8735 Non differentiable T.U. markets - The value,
J.-F. Mertens

CORE Discussion Papers undergo an internal refereeing process which is more informal than, but similar to, journal refereeing.

3.2. CORE published Reprints of the following articles during this period :

694. Jacqueline BOUCHER and Yves SMEERS. The Manne-Chao-Wilson algorithm for computing competitive equilibria : a modified version and its implementation. *Mathematical Programming*, 34, 302-332, 1986.
695. Jacques H. DREZE. Moral expectation with moral hazard. In *Contributions to Mathematical Economics. In honor of Gérard Debreu*, edited by Werner Hildenbrand and Andreu Mas-Colell. Amsterdam, North-Holland, 187-204, 1986.
696. Denis KESSLER, Sergio PERELMAN and Pierre PESTIEAU. Public debt, tax, and consumption : a test on O.E.C.D. countries. *Public Finance/Finances Publiques*, 41(1), 63-70, 1986.
697. Tony J. VAN ROY and Laurence A. WOLSEY. Valid inequalities for mixed 0-1 programs. *Discrete Applied Mathematics*, 14, 199-213, 1986.
698. David ENCOUA, Alexis JACQUEMIN and Michel MOREAUX. Global market power and diversification. *The Economic Journal*, 96, 525-533, 1986.
699. Camille BRONSARD and Lise SALVAS-BRONSARD. Commodity and asset demands with and without quantity constraints in the labour market. *Journal of Applied Econometrics*, 1, 185-208, 1986.
700. Françoise FORGES. Correlated equilibria in repeated games with lack of information on one side : a model with verifiable types. *International Journal of Game Theory*, 15(2), 65-82, 1986.
701. Henri R. SNEESSENS and Jacques H. DREZE. What, if anything, have we learned from the rise of unemployment in Belgium, 1974-1983. *Cahiers Economiques de Bruxelles*, 110/111, 21-26, 1986.
702. Claude d'ASPREMONT and Jean JASKOLD GABSZEWICZ. On the stability of collusion. In *New Developments in the Analysis of Market Structure*, edited by Joseph E. Stiglitz and C. Frank Mathewson. Cambridge (Mass.), The MIT Press, 243-264, 1986.
703. Eric AMBROISE, Jacqueline BOUCHER, Steph PROOST and Yves SMEERS. Gas import contracts, renegotiating strategies and optimal pricing. In *Gas and Electricity Market in Europe. Prospects and Policies*. (Proceedings of the European Conference, September 23-25, 1985, Luxembourg), edited by P.R. Odell and J. Daneels. Brussels, Benelux Association of Energy Economists, 280-295, 1986.
704. Henri R. SNEESSENS and Jacques H. DREZE. A discussion of Belgian unemployment, combining traditional concepts and disequilibrium econometrics. *Economica*, 53, 89-119, 1986.

705. Jean JASKOLD GABSZEWICZ and Martine QUINZII. The dynamics of capacity adjustments in a competitive economy. *European Economic Review*, 30, 729-748, 1986.
706. Jean JASKOLD GABSZEWICZ. Comments on a paper by O. Hart. In *Frontiers in Economics*, edited by K.J. Arrow and S. Honkapohja. Oxford, B. Blackwell, 150-169, 1985.
707. Jean JASKOLD GABSZEWICZ, Avner SHAKED, John SUTTON and Jacques-François THISSE. Segmenting the market : the monopolist's optimal product mix. *Journal of Economic Theory*, 39(2), 273-289, 1986.
708. Louis GEVERS. Walrasian social choice : some simple axiomatic approaches. In *Social Choice and Public Decision Making. Essays in Honor of Kenneth J. Arrow*, Vol. 1, edited by Walter P. Heller, Ross M. Starr and David A. Starrett. Cambridge, Cambridge University Press, 97-114, 1986.
709. Jean-Marie ROLIN. Asymptotic behaviour of posterior expectations in dynamical models. In *Asymptotic Theory for Non I.I.D. Processes*. Proceedings of the 5th Franco-Belgian Meeting of Statisticians, November 1984, edited by J.-P. Florens. Bruxelles, Publications des Facultés Universitaires Saint-Louis, 93-120, 1986.
710. Jean-Pierre FLORENS, Michel MOUCHART and Jean-Marie ROLIN. Exact estimability in conditional models. In *Asymptotic Theory for Non I.I.D. Processes*. Proceedings of the 5th Franco-Belgian Meeting of Statisticians, November 1984, edited by J.-P. Florens. Bruxelles, Publications des Facultés Universitaires Saint-Louis, 121-143, 1986.
711. John D. GEANAKOPOLOS and Heraklis M. POLEMARCHAKIS. Existence, regularity, and constrained suboptimality of competitive allocations when the asset market is complete. In *Uncertainty, Information and Communication. Essays in honor of Kenneth J. Arrow*, Vol. 3, edited by Walter P. Heller, Ross M. Starr and David A. Starrett. Cambridge, Cambridge University Press, 65-95, 1986.
712. Michel LUBRANO, Roger G. PIERSE AND J.-F. RICHARD. Stability of a U.K. money demand equation : a Bayesian approach to testing exogeneity. *Review of Economic Studies*, 53, 603-634, 1986.
713. Jean JASKOLD GABSZEWICZ and Jacques-François THISSE. Spatial competition and the location of firms. In *Location Theory (Fundamentals of Pure and Applied Economics, 5)*, edited by J. Jaskold Gabszewicz and J.-F. Thisse, M. Fujita and U. Schweizer. London, Harwood Academic Publishers, 1-71, 1986.
714. Charles BLACKORBY and David DONALDSON. Can risk-benefit analysis provide consistent policy evaluations of projects involving loss of life ? *The Economic Journal*, 96, 757-773, 1986.

715. John D. GEANAKOPOLOS and Heraklis M. POLEMARCHAKIS. Walrasian indeterminacy and Keynesian macroeconomics. *Review of Economic Studies*, 53, 755-779, 1986.
716. Elon KOHLBERG and Jean-François MERTENS. On the strategic stability of equilibria. *Econometrica*, 54(5), 1003-1037, 1986.
717. Jean JASKOLD GABSZEWICZ and Paolo GARELLA. "Subjective" price search and price competition. *International Journal on Industrial Organization*, 4, 305-316, 1986.
718. Jean-François MERTENS. The minmax theorem for U.S.C.-L.S.C. payoff functions. *International Journal of Game Theory*, 15(4), 237-250, 1986.
719. Denis KESSLER, Sergio PERELMAN et Pierre PESTIEAU. L'hypothèse d'équivalence entre impôt et emprunt : un test sur les pays de l'OCDE. *Annales d'Economie et de Statistique*, 3, 141-149, 1986.
720. Jan SVEJNAR. Bargaining power, fear of disagreement, and wage settlements : theory and evidence from U.S. industry. *Econometrica*, 54(5), 1055-1078, 1986.
721. Françoise FORGES. An approach to communication equilibria. *Econometrica*, 54(6), 1375-1385, 1986.
722. Robert J. AUMANN and Jacques H. DREZE. Values of markets with satiation or fixed prices. *Econometrica*, 54(6), 1271-1318, 1986.
723. Jacqueline BOUCHER and Yves SMEERS. Economic forces in the European gas market. A 1985 prospective. *Energy Economics*, 9(1), 2-16, 1987.
724. Guy de GHELLINCK and Jean-Philippe VIAL. A polynomial Newton method for linear programming. *Algorithmica*, 1, 425-453, 1986.
725. Pierre HANSEN, Jacques-François THISSE and Richard E. WENDELL. Efficient points on a network. *Networks*, 16, 357-368, 1986.
726. Bernard CORNET and Jean-Philippe VIAL. Lipschitzian solutions of perturbed nonlinear programming problems. *SIAM Journal on Control and Optimization*, 24(6), 1123-1137, 1986.
727. Jacques H. DREZE. Work-sharing : some theory and recent European experience. *Economic Policy*, 1(3), 561-619, 1986.
728. Imre BARANY, Jack EDMONDS and Laurence A. WOLSEY. Packing and covering a tree by subtrees. *Combinatorica*, 6(3), 221-233, 1986.
729. P. HANSEN, J.-F. THISSE and R.E. WENDELL. Equivalence of solutions to network location problems. *Mathematics for Operations Research*, 11(4), 672-678, 1986.

730. Pierre HANSEN, Martine LABBE, Dominique PEETERS and Jacques-François THISSE. Single facility location on networks. *Annals of Discrete Mathematics*, 31, 113-146, 1987.
731. Martin J. BECKMANN and Jacques-François THISSE. The location of production activities. In *Handbook of Regional and Urban Economics*, Vol. 1, edited by P. Nijkamp. Amsterdam, North-Holland, 21-95, 1986.
732. Helmuth CREMER, Denis KESSLER and Pierre PESTIEAU. Fertility differentials and the regressive effect of public debt. *Economica*, 54, 79-87, 1987.
733. Renzo ORSI. On the dynamic specification of disequilibrium econometrics : an analysis of Italian labour market. *Statistica*, 46(3), 305-323, 1986.
734. Henry TULKENS. The performance approach in public enterprise economics : an introduction and an example. *Annals of Public and Co-operative Economy (Annales de l'économie publique, sociale et coopérative)*, 4, 429-443, 1986.
735. Jean-Pierre FLORENS and Michel MOUCHART. Some examples of Bayesian experiments. *Statistica*, 46(4), 439-448, 1986.
736. W. Bentley MACLEOD, Georges NORMAN and Jacques-François THISSE. Competition, tacit collusion and free entry. *The Economic Journal*, 97(35), 189-198, 1987.
737. Jacques H. DREZE. Underemployment equilibria. From theory to econometrics and policy. *European Economic Review*, 31, 9-34, 1987.
738. Serge WIBAUT. A model of tax reform for Belgium. *Journal of Public Economics*, 32, 53-77, 1987.
739. Jean-Marie DUFOUR. Bias of S^2 in linear regressions with dependent errors. *The American Statistician*, 40(4), 284-285, 1987.
740. Eric de COOMAN and Maurice MARCHAND. Rules and incentives for hospitals : the Belgian financing system. *Health Policy*, 7, 227-239, 1987.
741. Henry TULKENS. La performance productive d'un service public. Définitions, méthodes de mesure et application à la Régie des Postes en Belgique. *L'Actualité Economique, Revue d'Analyse Economique*, 62(2), 306-335, 1986.
742. Jean-François RICHARD. Exogeneity and control in econometric time series modelling. In *Developments of Control Theory for Economic Analysis*, edited by C. Carraro and D. Sartore. Dordrecht, Martinus Nijhoff Publishers, 327-339, 1987.
743. Marie-Cécile NOËL and Yves SMEERS. Nested decomposition of multistage nonlinear programs with recourse. *Mathematical Programming*, 37, 131-152, 1987.

744. Masahisa FUJITA and Jacques-François THISSE. Spatial competition with a land market : Hotelling and Von Thunen unified. *Review of Economic Studies*, 53, 819-841, 1986.
745. Jean-Pierre FLORENS, Michel MOUCHART and Jean-François RICHARD. Structural time series modeling : a Bayesian approach. *Applied Mathematics and Computation*, 20, 365-400, 1986.
746. Victor GINSBURGH, Pierre PESTIEAU and Jacques-François THISSE. A spatial model of party competition with electoral and ideological objectives. In *Spatial Analysis and Location-Allocation Models*, edited by Avijit Ghosh and Gerard Rushton. New York, Van Nostrand Reinhold Company, 101-117, 1987.
747. Pierre HANSEN, Martine LABBE, Dominique PEETERS and Jacques-François THISSE. Facility location analysis. In *Systems of Cities and Facility Location*, edited by Jacques Lesourne and Hugo Sonnenschein. (Fundamentals of Pure and Applied Economics, 22). London, Harwood Academic Publishers, 1-70, 1987.
748. Bernard CORNET et Georges HADDAD. Théorèmes de viabilité pour les inclusions différentielles du second ordre. *Israel Journal of Mathematics*, 57(2), 225-238, 1987.
749. Jacqueline BOUCHER and Yves SMEERS. Using column generation techniques for treating dynamic multisectoral models with price-dependent coefficients. *Operations Research*, 34(5), 718-725, 1986.
750. Jean-Pierre FLORENS et Michel MOUCHART. Exhaustivité, ancillarité et identification en statistique bayésienne. *Annales d'Economie et de Statistique*, 4, 63-93, 1986.

3.3. Other papers which did not appear in the Discussion Paper or Reprint Series :

A. Working Papers

- A. BARTEN, Academisch economisch onderzoek in Nederland : produktie, produktiviteit, en profilering (with F. de ROOS, W. BUITER, H. DAEMS, and J. SNIPPE). Ministerie van Onderwijs en Wetenschappen, The Hague, 1986.
- A. BARTEN, Models of the rational consumer. 1986 Lectures of the Chair of the Vereniging voor Economie, Brussel, 1987.
- L. BAUWENS, Théorie de l'information et diagnostic médical (avec L. EECKHOUDT et Th. LEBRUN). A paraître dans *L'Actualité Economique*.

- L. BAUWENS, The computation of posterior moments and densities of simultaneous equation model parameters by direct simulation (with H. VAN DIJK and A. ZELLNER). FUCAM, 1978.
- L. BAUWENS, The determinants of intra-European trade in manufactured goods. The World Bank, 1987.
- L. BAUWENS, Medical decision-making and the concern for safety : an application to the solitary pulmonary nodule problem (with L. EECKHOUDT and M. BEUTHE). FUCAM, 1987.
- R. BOADWAY, Voting models of social security determination (with D. WILDASIN). Mimeo, 1987.
- R. BOADWAY, Non-cooperative behavior and efficient provision of public goods (with P. PESTIEAU and D. WILDASIN). Mimeo, 1987.
- H. CREMER, Les déterminants de la mobilité résidentielle (with J. GOTHAN). To appear in *Cahiers Economiques de Bruxelles*, 1987.
- M. LABBE, Algorithms for voting and competitive location on a network (with P. HANSEN). To appear in *Transportation Science*, 1987.
- M. LABBE, Optimal location : minimum versus equilibrium allocation (with J. KRARUP). Mimeo, 1987.
- M. LABBE, A tree-network has the fixed point property (with J.-F. THISSE). Mimeo, 1987.
- J.-P. LAMBERT, Endogenising investment in disequilibrium models with applications on Belgian and French data. Final Research Report for DG II of the Commission of the European Community, 1986.
- J.-P. LAMBERT, Towards a unified approach to assessing disequilibria : a quarterly rationing model with business survey data (with F. GAGEY and B. OTTENWAEALTER). Bruxelles, CEREC and Paris, INSEE, 1987.
- M. MOUCHART, Bayesian test and model specification (with J.-P. FLORENS). Mimeo, 1987.
- M. MOUCHART, Dynamic error-in-variables models and limited information analysis (with J.-P. FLORENS and J.-F. RICHARD). Mimeo, 1987.
- B. MULKAY, Présentation d'une base de données individuelles d'entreprise (with A. ABOU). Note 69/930, Unité de Recherche (INSEE).
- P. PESTIEAU, La pauvreté en Belgique : interprétation d'une enquête auprès de 583 ménages wallons (avec A. LUTTGENS and S. PERELMAN). A paraître in *Cahiers Economiques de Bruxelles*, 1987.

P. PESTIEAU, Pensions publiques et niveau de vie des personnes âgées (with D. KESSLER). Mimeo, 1987.

P. PESTIEAU, The performance of public enterprises : a comparative efficiency study of railways and postal services (with S. PERELMAN). Mimeo, 1987.

P. PESTIEAU, Technical performance in public enterprises : a comparative study of railways and postal services (with S. PERELMAN). Mimeo, 1987.

H. VAN DIJK, Some advances in Bayesian estimation using Monte Carlo integration. Report 8704, Econometric Institute, Rotterdam.

D. WILDASIN, Comparative dynamic tax analysis with variable labor supply. Mimeo, 1986.

D. WILDASIN, The demand for public goods in the presence of tax exporting. Mimeo, 1986.

D. WILDASIN, The effect of government borrowing in an economy with intergenerational altruism and endogenous family size. Mimeo, 1986.

D. WILDASIN, Federal-state - local fiscal relations : a review of the Treasury Report. To appear in *Public Finance Quarterly*.

D. WILDASIN, Indirect distributional effects in benefit-cost analysis of small projects. Mimeo, 1986.

D. WILDASIN, Interjurisdictional capital mobility : fiscal externality and a corrective subsidy. To appear in *Journal of Urban Economics*, 1987.

D. WILDASIN, The public finances of American federalism. Mimeo, 1987.

B. Published Papers

L. BAUWENS, La valeur diagnostique de la scintigraphie au Thallium 201 dans la détermination de la malignité du nodule froid thyroïdien (avec L. EECKHOUDT et al). *Bulletin du Cancer*, 74, 88-94, 1987.

L. GEVERS, Eléments d'analyse comparative des dépenses sociales locales, avec B. ADNET, P. DE BUCQUOIS and B. MEUNIER). 7ème Congrès des Economistes Belges de Langue Française, Commission 5, Rapport Préparatoire, 185-224, 1987.

L. GEVERS, Redistributive taxation, majority decisions and the minmax set (with J.C. JACQUEMIN). *European Economic Review*, 31, 202-211, 1987.

V. GINSBURGH, Les prestations des salariés en heures supplémentaires. Résultats d'une enquête (with S. PERELMAN and P. PESTIEAU). *Cahiers Economiques de Bruxelles*, 112, 1986.

L. PHILIPS, Information and collusion. In *The Economics of Market Dominance*, edited by D. Hay and J. Vickers. Oxford, B. Blackwell, 1987.

3.4. The following books by members of the CORE staff were published during the period covered by this report.

B. CORNET (ed.), *Nonlinear Analysis and Optimization* (with V.H. NGUYEN and J.-Ph. VIAL). (Mathematical Programming Study, 30). Amsterdam, North-Holland, 1987.

J. DREZE, *Essays on Economic Decision under Uncertainty*. Cambridge, Cambridge University Press, 1987.

V. GINSBURGH and P. PESTIEAU, eds., *L'économie informelle*. Bruxelles, Ed. Labor Nathan, 1987.

J. JASKOLD GABSZEWICZ and J.-F. THISSE. M. FUJITA and U. SCHWEIZER (eds), *Location Theory*. (Fundamentals of Pure and Applied Economics, 5). London, Harwood Academic Publishers, 1986.

J. JASKOLD GABSZEWICZ, *Théorie microéconomique*. Bruxelles, De Boeck Université, 1987.

L. SIMAR (associate editor), *Spatial Processes and Spatial Time Series Analysis*. Proceedings of the 6th Franco-Belgian Meeting of Statisticians, November 1985. Bruxelles, Publications des Facultés Universitaires Saint-Louis, 1987.

H. TULKENS, *Fondements d'économie politique*, (avec A. JACQUEMIN). Bruxelles, De Boeck Université, 1987.

3.5. Editorial Activities.

A. BARTEN,	associate editor, <i>European Economic Review</i> , <i>Economic Modelling</i>
R. BOADWAY,	editor, <i>Canadian Journal of Economics</i>
B. CORNET,	associate editor, <i>Journal of Mathematical Economics</i>
Cl. d'ASPREMONT,	guest editor, <i>European Economic Review</i>

- L. GEVERS, associate editor,
Journal of Public Economics
European Economic Review
Social Choice and Welfare
- V. GINSBURGH, associate editor,
European Economic Review
Annales d'Economie et de Statistique
- J. JASKOLD GABSZEWICZ, guest editor,
European Economic Review
- P. PESTIEAU, advisory editor,
Public Finance/Finances Publiques
- L. PHILIPS, editor,
Journal of Industrial Economics,
*Papers and Proceedings of the First Annual Congress
of the European Economic Association, (European
Economic Review)*
- J.-F. THISSE, associate editor,
Journal of Regional Science,
Regional Science and Urban Economics,
Annales d'Economie et de Statistique,
Recherches Economiques de Louvain
- H. TULKENS, associate editor,
Public Finance/Finances Publiques
- D. WILDASIN, associate editor,
Regional Science and Urban Economics

3.6. Seven Research Associates at CORE successfully defended their **Doctoral Dissertation** :

On September 22, 1986, Edouard WYLLEMAN, "On the use of business survey information in macroeconomic models", (Docteur en Sciences Economiques, Université Catholique de Louvain), under the supervision of J.-F. RICHARD.

On December 9, 1986, Yves RICHELLE, "Essays on temporary equilibrium theory", (Docteur en Sciences Economiques, Facultés Universitaires Notre-Dame de la Paix, Namur), under the supervision of R. DESCHAMPS and L. GEVERS.

On December 17, 1986, Paolo GARELLA, "Imperfect information in markets with few competitors", (Docteur en Sciences Economiques, Université Catholique de Louvain), under the supervision of J. JASKOLD GABSZEWICZ.

On January 16, 1987, Bernadette GOVAERTS, "Application of the encompassing principle to linear dynamic models", (Docteur en Sciences, Université Catholique de Louvain), under the supervision of J.-F. RICHARD.

On May 7, 1987, Bruno VANDERLINDEN, "Contribution à l'étude de la tarification de l'électricité en Belgique", (Docteur en Sciences Appliquées, Université Catholique de Louvain), under the supervision of M. MARCHAND.

On May 25, 1987, Mark STEEL, "A Bayesian analysis of multivariate exogeneity testing in a general instrumental variables framework" (Docteur en Sciences Economiques, Université Catholique de Louvain), under the supervision of J.-F. RICHARD.

On June 16, 1987, Helmuth CREMER, "Essays in public economics", (Docteur en Sciences Economiques, Université Catholique de Louvain), under the supervision of Cl. d'ASPREMONT and J.-F. THISSE.

4. SEMINARS AND WORKSHOPS

The three regular weekly seminars in operations research, mathematical economics and econometrics were held from September through June. CORE also continued its participation in the sponsorship of the Séminaire Economique de Louvain.

4.1. The Operations Research Seminar met as follows :

1. November 25, 1986, Imre BARANY, Hungarian Academy of Science, Hungary and University College, London :
Computing the volume is difficult.
2. December 9, 1986, Jean-Philippe VIAL, Université de Genève :
Approximate projections in a projective method for the linear feasibility problem.
3. February 10, 1987, José DULA, CORE :
Generating bounds on the expectation of convex functions.
4. March 17, 1987, J.J. STRODIOT, Facultés Universitaires de Namur :
A rapidly convergent five point algorithm for univariate minimization.
5. March 24, 1987, James C. BEAN, University of Michigan :
Aggregation in dynamic programming.
6. March 31, 1987, Gilbert LAPORTE, Ecole des Hautes Etudes Commerciales, Montréal :
An exact algorithm for the orienteering problem.
7. April 23, 1987, Zvi ROSBERG, IBM T.J. Watson Research Center and Department of Computer Science, Technion :
Golden ratio splitting of sequences in communication.
8. May 5, 1987, Michel THERA, Faculté des Sciences de Limoges :
Existence results for the nonlinear complementarity problem : applications to the nonlinear analysis.
9. May 12, 1987, Jonathan SPINGARN, CORE and Georgia Institute of Technology :
Iterative procedures for convex programming.
10. June 9, 1987, S. Louis HAKIMI, University of California, Davis :
A general network location-allocation problem.
11. May 26, 1987, Nguyen VAN THOAI, Universität Trier and Institute of Mathematics, Hanoi :
Design centering problems with Lipschitzian structure.

12. June 19, 1987, Ludo VAN DER HEYDEN, Yale University, New Haven, and INSEAD, Fontainebleau :
Heavy traffic approximations in queueing networks : a mathematical programming approach.

4.2. The Mathematical Economics Seminar met as follows :

1. September 18, 1986, Benyamin SHITOVITZ, University of Haifa :
Coalitional fair core allocations in differentiable mixed markets with a finite number of types in the ocean.
2. September 22, 1986, Joseph GREENBERG, University of Haifa :
Stable standards of behavior : a unifying approach to solution concepts.
3. September 25, 1986, Chaim FERSHTMAN, Hebrew University of Jerusalem :
Equilibrium incentives in oligopoly.
4. October 6, 1986, Bezalel PELEG, Hebrew University of Jerusalem :
An axiomatization of the core of market games.
5. October 13, 1986, Joseph ABDOU, Université Pierre et Marie Curie, Paris :
Cores of effectivity functions with an infinity of players and issues.
6. October 27, 1986, David E. WILDASIN, CORE :
Randomization of commodity taxes.
7. November 3, 1986, Peter HAMMOND, CORE :
Credible budget constraints in credit markets.
8. November 17, 1986, Robin BOADWAY, CORE :
Social security and the failure of annuity markets.
9. November 17, 1986, Ken BINMORE, London School of Economics :
Modeling rational players.
10. December 1, 1986, Jean-Marc BONNISSEAU, Bernard CORNET and Kazuya KAMIYA, CORE :
General equilibrium theory and increasing returns.
11. December 8, Jean-Pascal BENASSY, CEPREMAP :
The objective demand curve in models of price competition : A general equilibrium approach.
12. December 8, Adam BRANDENBURGER, Churchill College, Cambridge :
On an axiomatic approach to refinements of Nash equilibrium.
13. February 2, 1987, Françoise FORGES, CORE :
Universal mechanisms.

14. February 9, 1987, R. DURIER, Université de Bourgogne :
Continuous location theory under majority rule.
15. February 16, 1987, Yves RICHELLE, CORE :
Instability in a simple temporary equilibrium framework.
16. March 9, 1987, Giacomo BONANNO, Nuffield College, Oxford :
Vertical restraints in a model of vertical differentiation.
17. March 16, 1987, Ariel RUBINSTEIN, London School of Economics :
The structure of Nash equilibrium in repeated games with finite automata.
18. March 16, 1987, Robert GARY-BOBO, Université Paris I :
Cournot-Walras and locally consistent equilibria.
19. March 30, 1987, Wayne SHAFER, U.S.C. and Universität Bonn :
Solving systems of equations in economic models.
20. April 27, 1987, Philippe MICHEL, Université Paris I :
Marginal added-value analysis and applications.
21. April 27, 1987, Jean-Pierre PONSSARD, Ecole Polytechnique and
ENSAE :
Extensive games, forward induction and economic analysis.
22. April 30, 1987, Rodolph DOS SANTOS FERREIRA,
Université Louis Pasteur, Strasbourg :
Keynes aggregate supply function and the principle of effective demand.
23. May 11, 1987, Patrick REY, INSEE :
The role of exclusive territories in reducing competition.
24. May 18, 1987, Marie ALLARD and Yves RICHELLE, CORE :
Roy-consistent expectations, consumers short demand and temporary Pareto
optimum theory.
25. May 18, 1987, Christian GOLLIER, CORE :
The role of wage setting in entry-deterrence.
26. May 25, 1987, Avner SHAKED, London School of Economics :
Multiproduct firms and market structure.
27. June 11, 1987, Jonathan SPINGARN, Georgia Institute of Technology :
Economic equilibria.
28. June 12, 1987, Parkash CHANDER, Indian Statistical Institute :
Surplus-sharing rules and incentives in planning procedures for public goods.

4.3. The Econometric Seminar met as follows :

1. October 15, 1986, Marcel DAGENAIS, Université de Montréal :
Estimating the Tobit model with serial correlation : an operational approach.

2. October 29, 1986, David WISE, Harvard University :
Individual retirement accounts and saving : limits and asset choice.
3. November 5, 1986, Alvaro ESCRIBANO, CORE :
Nonlinear error-correction : the case of money demand in the U.K. (1878-1970).
4. November 12, 1986, M. CATINAT, R. CAWLEY, F. ILZKOVITZ,
A. ITALIANER and M. MORS, Commission of the European Communities
(DG II) :
The determinants of investment.
5. November 19, 1986, G. TULLIO, Commission of the European Communities
(DG II) :
Inflation and currency depreciation in Germany 1920-1923 : a dynamic model
of prices and the exchange rate.
6. November 26, 1986, Frank LAD, Division of Research and Statistics Federal
Reserve Board :
Implications of the operational-subjective theory of probability for economic
theory and econometrics.
7. December 3, 1986, Mark STEEL, CORE :
Recursive natural-conjugate analysis of the seemingly unrelated regression
model.
8. December 10, 1986, Erik SCHOKKAERT, K.U. Leuven :
Estimation of a complete system of demand equations for food consumption
in the 16th century.
9. December 17, 1986, Stephen NICKELL, Oxford University :
Why is wage inflation in Britain so high ?
10. February 4, 1987, Marcel GERARD and Carine VANDEN BERGHE, ICHEC,
Brussels :
Time varying parameters investment functions and the incidence of fiscal in-
centives.
11. February 18, 1987, Alvaro ESCRIBANO, CORE :
Co-integration, time co-trends and error correction systems : a general ap-
proach.
12. February 25, 1987, Luc BAUWENS, CORE and FUCAM :
The computation of posterior moments and densities of SEM (simultaneous
equation model) parameters by direct simulation.
13. March 4, 1987, Agustin MARAVALL, Servicio de Estudios, Bank of Spain :
Unobserved components estimation : an application to Spanish monetary
control.
14. March 11, 1987, Charles BEAN, London School of Economics :
Employment in the coal industry : a bargaining approach.

15. March 18, 1987, Michel MOUCHART, CORE :
Bayesian tests and model specification.
16. March 25, 1987, Walter KRÄMER, Universität Hannover :
Testing for structural change : some recent developments.
17. April 1, 1987, Vladimir DLOUHY, Czechoslovak Academy of Sciences, Prague :
The problems of macroeconomic modelling in centrally planned economies.
18. April 22, 1987, Bronwyn H. HALL, Stanford University and NBER :
R & D patents, and market value revisited : is there a second (technological opportunity) factor ?
19. April 29, 1987, Anton P. BARTEN, K.U.L. and CORE :
Price formation of fish : an application of an inverse demand system.
20. May 6, 1987, Jacques MAIRESSE, ENSAE and EHESS, Paris :
The laws of production are not what they used to be.
21. May 13, 1987, A.C. HARVEY, London School of Economics :
Multivariate time series models, control groups and intervention analysis.
22. May 20, 1987, Elvezio RONCHETTI, Université de Genève :
Introduction to robust statistics.

4.4. The Séminaire Economique de Louvain met as follows :

1. September 25, 1986, Robert F. OWEN, Université de Rennes I :
Exchange rate uncertainty and strategic export behavior (an international model of duopoly).
2. October 9, 1986, Ph. DEFEYT et O. LEFEBVRE, IRES :
Perspectives conjoncturelles l'automne 1986 : soutien européen confirmé.
3. October 30, 1986, J.-M. VIAENE, Erasmus Universiteit Rotterdam :
The macroeconomics of foreign investments.
4. November 6, 1986, J. PAELINCK, Erasmus Universiteit Rotterdam :
"Sunrise econometrics" : Facteurs d'introduction de nouvelles technologies et de nouveaux produits.
5. November 13, 1986, Knud MUNK, C.E.E., Bruxelles :
A public finance approach to E.E.C. agricultural policy.
6. November 27, 1986, F. MICHON, Université Paris I :
Aménagement et réduction du temps de travail : expériences françaises et réflexion.
7. December 8, 1986, P. BUIGUES, C.E.E., Bruxelles :
Emploi, compétitivité et structures industrielles.

8. February 5, 1987, J. MERCENIER, U.L.B. (C.E.M.E.) :
Stabilité du taux de change et règle d'intervention optimale : une étude du comportement des banques centrales européennes.
9. February 12, 1987, O. FAVEREAU, Université du Maine :
Les représentations du fonctionnement du marché du travail : évolution récente des théories.
10. February 19, 1987, A. INGHAM, University of Southampton :
The direct estimation of a flexible vintage model.
11. March 5, 1987, F. POULON, Université de Bordeaux I :
La condition de crise dans le circuit Keynésien. Application à la Belgique et à la France.
12. March 12, 1987, P. MALGRANGE, C.N.R.S. and C.E.P.R.E.M.A.P. :
Rationalité des comportements et des anticipations dans les blocs réels des modèles macroéconométriques.
13. March 19, 1987, H. PESARAN, Trinity College, Cambridge :
Econometric analysis of aggregation in linear models : application to the determination of employment.
14. March 23, 1987, M. BOURLARD, Faculté de Droit :
Evolutions récentes du droit du travail et implication pour le marché du travail.
15. March 26, 1987, A. BARRERE, Université Paris I :
L'avenir du système de Keynes : synthèse néo-classique ou généralisation.
16. April 2, 1987, M. DEWATRIPONT, U.L.B. :
Flexibilité et stabilité sur le marché du travail : enseignements à tirer de la théorie des contrats.
17. April 23, 1987, G. LAROQUE, I.N.S.E.E., Paris :
Estimation d'un modèle à prix fixes à plusieurs marches.
18. April 30, 1987, R. DOS SANTOS FERREIRA, U. L.-P., Strasbourg :
Keynes' aggregate supply function and the principle of effective demand.
19. May 7, 1987, D. GROS, Département des Sciences Economiques :
The EMS and the determination of the European price level.
20. May 12, 1987, M. LAVIGNE, Université Paris I :
Coopération industrielle et entreprises conjointes entre Est et Ouest.
21. May 14, 1987, J. MAZIER, Université de Paris XIII :
Niveau des coûts de production et performances extérieures des grands pays industrialisés.
22. May 21, 1987, A. LAPIDUS, Université de Picardie et Université Paris I :
Les mutations d'un héritage : genèse de l'hétérodoxie dans les théories de la valeur.

23. May 27, 1987, J. GALBRAITH, Oxford University :
Modelling the formation of expectations.

4.5. Workshops

- 4.5.1. A workshop on *Recent Advances on Increasing Returns* was organized by B. CORNET and J. DREZE on June 9 and 10, 1987

June 9, 1987 :

E. DIERKER, Universität Wien :
Quantity guided price setting.

J.-M. BONNISSEAU, CORE and Université Paris I :
Existence of equilibria when firms follow general pricing rules.

A. VILLAR, University of Alicante and St. Antony's College, Oxford :
General equilibrium in a nonlinear Leontieff framework.

A. KHAN, University of Illinois :
On the existence of Lindhal-Hotelling equilibria.

B. CORNET, CORE and Université Paris I :
Existence of marginal (cost) pricing equilibria and properties of the set of attainable production plans.

P. DEHEZ, Institut Universitaire Européen de Florence :
Distributive production sets and equilibria with increasing returns.

June 10, 1987 :

K. KAMIYA, CORE and Yale University :
The decomposition method for nonlinear equation systems.

J. GEANAKOPOLOS, Yale University and W. SHAFER, Universität Bonn :
Solving systems of simultaneous equations in economics.

C. WEDDEPOHL, Universiteit Amsterdam :
Increasing returns and selling costs.

T. ICHIISHI, The Ohio State University :
The role of increasing returns with respect to coalition size in extensive games.

R. GUESNERIE, EHESS, Paris :
Increasing returns to size and their limits.

M. QUINZII, Université Paris II and University of Southern California :
Core and optimality with increasing returns.

- 4.5.2. A workshop in *Public Economics* was organized by H. TULKENS.

1. October 2, 1986, M. MARCHAND, CORE :
Linear incentive schemes to central public firms.

2. October 9, 1986, D. WILDASIN, CORE and Indiana University, and R. BOADWAY, CORE and Queen's University :
Intertemporal taxation.
3. October 16, 1986, R. BOADWAY, CORE and Queen's University, and D. WILDASIN, CORE and Indiana University :
A median voter model of social security determination.
4. October 23, 1986, R. BOADWAY, CORE and Queen's University :
Annuity market failure.
5. November 6, 1986, H. CREMER, CORE and Université de Liège :
Residential choice and local public goods.
6. November 13, 1986, J. MINTZ, Queen's University :
Corporate tax design in an international setting : tax competition and the openness of the economy.
7. November 20, 1986, J. MINTZ, Queen's University :
A survey of issues.
8. November 20, 1986, A. de CROMBRUGGHE, London School of Economics,
Commodity tax competition revisited.
9. November 27, 1986, Marcel GERARD, ICHEC, Brussels :
Tax reform in Belgium.
10. December 4, 1986, H. CREMER, CORE and Université de Liège,
M. MARCHAND, CORE, and J.-F. THISSE, CORE :
Public enterprises in oligopolistic markets.
11. December 11, 1986, P. HAMMOND, CORE and Stanford University :
Limited information and markets as failures.
12. December 18, 1986, L. GEVERS, CORE and Facultés Notre Dame de la Paix,
Namur :
Exit the median voter model.
13. February 12, 1987, P. PESTIEAU, CORE and Université de Liège :
Optimal taxation under unemployment.
14. February 19, 1987, D. WILDASIN, CORE and Indiana University :
Comparative dynamic tax incidence with variable labor supply.
15. February 26, 1987, B. THIRY, Université de Liège :
Effects of changes in indirect taxes on income distribution : an analysis with complete systems of demand equations.
16. March 5, 1987, E. SCHOKKAERT, Katholieke Universiteit Leuven :
Equity and efficiency of indirect taxes in Belgium.
17. March 12, 1987, F. VAN WINDEN, Universiteit Amsterdam :
Local government finance and decentralized decision making.

18. March 19, 1987, M. ALLARD, CORE and Sherbrooke University :
Voluntary contributions, conjectures, and the supply of public goods.
19. March 26, 1987, P. STREUFERT, University of Wisconsin :
An abstract theory of intergenerational equilibrium, with applications to government debt, primary education, and the primary distribution of wealth.
20. April 2, 1987, D. BÖS, Universität Bonn :
Privatization of public enterprises.
21. April 23, 1987, A. RITZEN, Erasmus Universiteit Rotterdam :
Economics of population and savings.

5. XXth ANNIVERSARY OF CORE

On the occasion of the XXth anniversary of CORE, an international symposium was held in Louvain-la-Neuve on "Research and Decision-Making in Economics, Management and Engineering".

Organizing Committee

- H. TULKENS, Université Catholique de Louvain (Chairman)
- A. BARTEN, Katholieke Universiteit Leuven
- L. GEVERS, Facultés Universitaires Notre-Dame de la Paix, Namur
- V. GINSBURGH, Université Libre de Bruxelles
- P. PESTIEAU, Université de Liège
- L. SIMAR, Université Catholique de Louvain and Facultés Universitaires Saint-Louis, Bruxelles
- L. WOLSEY, Université Catholique de Louvain

January 19, 1987

CORE Advanced Research Seminars

A. Mathematical Economics Seminar

Chairman : Claude d'ASPROMONT, CORE, Université Catholique de Louvain

Werner HILDENBRAND, Universität Bonn :
CORE and equilibria of large economies : the last twenty years.

Truman BEWLEY, Yale University :
Knightian decision theory.

Jean-Michel GRANDMONT, CEPREMAP, Paris :
Competitive business cycles.

Roger GUESNERIE, Ecole des Hautes Etudes en Sciences Sociales, Paris :
Minimum wage legislation as a second-best policy.

Martin HELLWIG, Universität Bonn :
A general-equilibrium model of the transactions demand for money.

John ROBERTS, Stanford University :
Equilibrium without market clearing.

B. Mathematical Programming Seminar

Chairman : Guy de GHELLINCK, CORE, Université Catholique de Louvain

Michael TODD, Cornell University :
Projective algorithms for linear programming.

William PULLEYBLANK, University of Waterloo and Universität Bonn :
Projecting combinatorial polyhedra.

Laurence WOLSEY, CORE and Ecole Polytechnique de Lausanne :
Strong valid inequalities for mixed integer programming.

Thomas MAGNANTI, Massachusetts Institute of Technology :
Linear programming and fixed charge network flow problems.

Yves SMEERS, CORE :
Large scale linear programming : developments and applications.

Bernard CORNET, CORE and Université de Paris I :
Optimality and decentralization in non-convex models.

C. Econometrics Seminar

Chairman : Jacques DREZE, CORE, Université Catholique de Louvain

David F. HENDRY, Oxford University, and Jean-François RICHARD, CORE
and Duke University :
The encompassing principle and its applications to econometric modelling :
recent developments.

Anton P. BARTEN, CORE and Katholieke Universiteit Leuven :
Towards a levels version of the Rotterdam and related demand systems.

Jean-Pierre FLORENS, Université de Toulouse :
Bayesian tests and model specification.

Peter KOOIMAN, Central Bureau of Statistics, The Netherlands :
Estimating average excess supply on goods and labour markets from a cross
section of business survey reports.

Kenneth WALLIS, University of Warwick :
Comparing macroeconomic models.

January 20, 1987

1966-1986 Survey Sessions

Game Theory

Robert AUMANN, The Hebrew University of Jerusalem :
CORE as a macrocosm of game-theoretic research, 1967-1987.

Comments :

Jean-François MERTENS, CORE, Université Catholique de Louvain
Claude d'ASPREMONT, CORE, Université Catholique de Louvain

Operations Research

Thomas MAGNANTI, Massachusetts Institute of Technology :
20 years of mathematical programming.

Comments :

Etienne LOUTE, CORE and Facultés Universitaires Saint-Louis, Bruxelles
Alexandre H.G. RINNOOY KAN, Erasmus Universiteit, Rotterdam

Economic Theory

Paul CHAMPSAUR, Direction de la Prévision, Paris :
Information, incentives and general equilibrium.

Comments :

Peter HAMMOND, CORE and Stanford University
Robin BOADWAY, CORE and Queen's University

Econometrics

Adrian PAGAN, Australian National University and University of Rochester :
Econometrics, 20 years after.

Comments :

Michel MOUCHART, CORE, Université Catholique de Louvain
Jean WAELBROECK, CORE and Université Libre de Bruxelles

January 21, 1987

Plenary Session

Pierre MACQ, Recteur de l'Université Catholique de Louvain :
Allocution.

Jacques DREZE, CORE, Université Catholique de Louvain :
Méthodes quantitatives et décisions économiques.

Philippe MAYSTADT, Ministre des Affaires Economiques :
Allocution.

Jacques DELORS, Président de la Commission des Communautés
Européennes :
Allocution

Parallel Sessions on Specific Topics on Decision-Making

Macroeconometric Models

Henri SNEESSENS, Université Catholique de Louvain :
Recent developments in macroeconomic modelling.

M.M.G. FASE, De Nederlandsche Bank, N.V., Amsterdam :
Macro-economic modelling as a means to economic policy.

Discussants :

Michael EMERSON, European Economic Community

Pierre MALGRANGE, CEPREMAP, Paris

Calcul Economique dans le Secteur Public

Maurice MARCHAND, CORE, Université Catholique de Louvain :
Deux défis pour l'économie publique.

Michel DELEAU, Banque Européenne d'Investissement :
Modélisation économique et décision publique : quelques enseignements de
l'expérience française.

Robert MALDAGUE, Commissariat au Plan, Bruxelles :
Le calcul économique appliqué à la fiscalité.

Sectoral Models of Investment

Yves SMEERS, CORE, Université Catholique de Louvain :
A long history of sectoral investment models : the case of power generation.

Alexander MEERAUS, World Bank, Washington D.C. :
Sector models for project design and policy planning.

Discussants :

Martin BROWN, O.E.C.D.

Kelvin LAYDON, European Economic Community

Industrial Market Models

Louis PHILIPS, CORE, Université Catholique de Louvain :
Designing industrial market models.

David STOUT, Unilever PLC, London :
Competition strategy : trying to put the models to work.

Discussants :

Raymond de BONDT, Katholieke Universiteit Leuven

Patrick COENE, Data Resources Inc. Europe, Bruxelles.

Closing Session

Melchior WATHELET, Ministre-Président de la Région Wallonne :
Allocution.

Jean JASKOLD GABSZEWICZ, CORE, Université Catholique de Louvain :
Closing address.

The Proceedings of the symposium, edited by B. CÔRNET and H. TULKENS, will be published by MIT Press (papers of the first two days) and De Boeck Université (papers of the third day) under the title : "*Contributions to Operations Research and Econometrics*."

6. GUESTS

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

J. ABDOU,	Université Paris 6.
I. BARANY,	Hungarian Academy of Sciences, Budapest.
P. CHANDER,	Indian Statistical Institute.
P. DEHEZ,	European University Institute, Florence.
E. DIERKER,	University of Vienna.
J. DUTTA,	Columbia University.
J.-P. FLORENS,	Université de Toulouse.
M. FUJITA,	University of Pennsylvania.
J. GEANAKOPLIS,	Cowles Foundation.
Y. GREENBERG,	University of Haifa.
J. HAMILTON,	University of Florida.
A. HAURIE,	Ecole des Hautes Etudes Commerciales, Montréal.
M. HELLWIG,	Universität Bonn.
Ph. LEDERER,	University of Pennsylvania.
Ph. MICHEL,	Université Paris 1.
J. MICHELOT,	Université de Dijon.
J. MINTZ,	Queen's University.
G. NEMHAUSER,	Georgia Technological Institute, Atlanta.
M. QUINZII,	Université Paris 1.
W. SHAFER,	University of South California.
B. SHITOVITZ,	Hebrew University of Jerusalem.
J. SPINGARN,	Georgia Technological Institute, Atlanta.
G. ZACCOUR,	Ecole des Hautes Etudes Commerciales, Montréal.

7. ACADEMIC VISITS

Academic visits by CORE members to other institutions :

July 1986 :

M. MOUCHART, University of Warwick

August 1986 :

M. MOUCHART, University of Warwick

September 1986 :

A. BARTEN, University of Pennsylvania, Philadelphie
D. GUSBIN, Ispra, Italy
J.-P. LAMBERT, INSEE, Paris
Y. SMEERS, Ispra, Italy

October 1986 :

Y. SMEERS, Christian Michelsen Institute, Bergen

November 1986 :

J. BOUCHER, The World Bank, Washington D.C.
J.-P. LAMBERT, INSEE, Paris
M. MOUCHART, Institut National pour la Planification et la Statistique,
Alger
Y. SMEERS, The World Bank, Washington D.C.
D. WILDASIN, Université de Liège

December 1986 :

R. BOADWAY, Vrije Universiteit, Amsterdam
M. MOUCHART, Institut National pour la Planification et la Statistique,
Universita degli Studi, Bologna Alger

January 1987 :

M. LABBE,	Ecole des Hautes Etudes Commerciales, Montréal RUTCOR, Rutgers University
K. KAMIYA,	Rijksuniversiteit te Tilburg
M. MOUCHART,	Université de Toulouse I GREQE, Université d'Aix Marseille
H. TULKENS,	Indian Statistical Institute, New Delhi
D. WILDASIN,	Universitaire Fakulteiten St Ignatius, Antwerpen

February 1987 :

R. BOADWAY,	Universität Dortmund
F. FORGES,	London School of Economics University of Oxford University of Cambridge
M. LABBE,	Northwestern University University of Pittsburgh
H. TULKENS,	Indian Statistical Institute, New Delhi.
D. WILDASIN,	London School of Economics.

March 1987 :

R. BOADWAY,	University of York University of Oxford Norwegian School of Economics, Bergen Rijksuniversiteit te Leiden
J.-P. LAMBERT,	INSEE, Paris Centrum voor Economische Studiën, Katholieke Universiteit Leuven
Y. SMEERS,	Rijksuniversiteit te Groningen

April 1987 :

L. BAUWENS,	GREQE-EHESS, Université d'Aix Marseille
R. BOADWAY,	University College, Cork University of Dublin Universität Kiel

T. BRIANZA,
F. FORGES,
V. GINSBURGH,
B. GOVAERTS,
K. KAMIYA,
M. LABBE,

J.-P. LAMBERT,

M. MOUCHART,

May 1987 :

R. BOADWAY,

B. CORNET,
F. FORGES,

B. GOVAERTS,

D. GUSBIN,
K. KAMIYA,

J.-P. LAMBERT,
M. MOUCHART,

Graduate Center, Columbia University, New York
European University Institute, Firenze
Université d'Aix-Marseille
Duke University
Rijksuniversiteit te Tilburg
Aarhus Universitet
Københavns Universitet
INSEE, Paris
Facultés Universitaires Notre-Dame de la Paix, Namur
Universitaire Fakulteiten St Ignatius, Antwerpen
GREQE, Université d'Aix Marseille

Universität Heidelberg
Universität Stuttgart
Universität Bonn
Universidad Autonoma de Barcelona
University of Southampton
University of Essex
Université de Nice
Universidad Autonoma de Barcelona
Universität Bonn
Université Louis Pasteur, Strasbourg
Duke University
University of British Columbia
University Western Ontario
ENSIMAG, Grenoble
Kernforschungsanlage, Jülich, GmbH
Vrije Universiteit, Amsterdam
Katholieke Universiteit Nijmegen.
INSEE, Paris
Universidad de Granada

June 1987 :

L. BAUWENS,	Duke University The World Bank, Washington D.C. Graduate School of Business, University of Chicago
R. BOADWAY,	Universität München
A. ESCRIBANO,	University of California, San Diego
J. JASKOLD GABSZEWICZ,	Technion, Haifa
L. PHLIPS,	Wissenschaftszentrum, Berlin
D. WILDASIN	Universität Bonn Universität Dortmund

8. CONFERENCES AND MEETINGS

CORE members attended the following conferences and most presented a paper

July, 1986 :

International Conference on Practical Bayesian Statistics. The Institute of Statisticians, Cambridge (U.K.).

M. MOUCHART

August, 1986 :

First Annual Congress of the European Economic Association, Vienna

L. PHILIPS (programme chairman),

H. CREMER, J. JASKOLD GABSZEWICZ, L. GEVERS, J.P. LAMBERT, M. MARCHAND, J.-F. THISSE, D. WILDASIN.

Conference of the International Institute of Public Finance, Athens

P. PESTIEAU.

Econometric Society European Meeting, Budapest,

B. CORNET.

Workshop on Strategic Behavior and Competition, Northwestern University

F. LEFEVRE.

September, 1986 :

International Symposium on Probability and Bayesian Statistics, Innsbrück

L. BAUWENS, H. VAN DIJK.

Workshop on Mathematical Economics, San Miniato,

B. CORNET, J. JASKOLD GABSZEWICZ, J.-F. MERTENS.

The 13th Seminar of the European Group of Risk and Insurance Economists, Hamburg

Ch. GOLLIER.

6èmes Journées de l'Association d'Economie Sociale, Lille

J.-P. LAMBERT.

First World Congress of the Bernoulli Society for Mathematical Statistics and Probability, Tashkent (U.S.S.R.)

D. DEPRINS, M. MOUCHART, L. SIMAR.

International Seminar on Bayesian Analysis, Milano

M. MOUCHART

Conference on Economic and Demographic Change, Hagen,

P. PESTIEAU.

Prague International Congress on Stochastic Programming, Prague,

Y. SMEERS.

October, 1986 :

Chaire Quetelet, Populations âgées et révolution grise, Louvain-la-Neuve

P. PESTIEAU.

Imperfect Competition and Related Topics, Centre International de Rencontres Mathématiques, Marseille Luminy,

L. PHILIPS

TIMS/ORSA Meeting, Miami

Y. SMEERS.

November, 1986 :

The Eurostat Seminar on "The Use of Purchasing Power Parities", Luxemburg

A. BARTEN

7èmes Rencontres Franco-Belges de Statisticiens, Rouen,

M. MOUCHART, L. SIMAR (co-organizers),

J.-M. ROLIN, H. VAN DIJK.

December, 1986 :

Combinatorial Group, 20th Anniversary, INRIA, Rocquencourt,

Y. POCHET

January, 1987 :

Meeting on Mathematical Economics, Oberwolfach

B. CORNET

Conference on "Economic Models and Distributive Justice", Facultés Universitaires St Louis, Bruxelles and Facultés Universitaires Notre-Dame de la Paix, Namur

Cl. d'ASPREMONT and L. GEVERS (organizers),

F. FORGES, J.-P. LAMBERT, D. WILDASIN

Conference on "Sequential Equilibria and Structural Stability", Centre International de Rencontres Mathématiques, Luminy

Cl. d'ASPREMONT (organizer),

F. FORGES

7ème Congrès des Economistes Belges de Langue Française, Charleroi

L. GEVERS (co-organizer),

V. GINSBURGH, P. PESTIEAU.

Conference on the Interface between Marketing and Industrial Organization, Bruxelles

V. GINSBURGH (co-organizer).

Winter Meeting of the Econometric Society, Sandjberg (Denmark)

J.-P. LAMBERT.

February, 1987 :

Séminaire Malinvaud, Paris

D. DEPRINS, L. SIMAR.

Second Conference on Mathematical Economics, New Delhi

H. TULKENS.

March, 1987 :

Conference on Demographic Change in Europe and its Socio-Economic Consequences, Corsendork

P. PESTIEAU.

April, 1987 :

The 1987 Busted Memorial Lecture, University College, Cork

R. BOADWAY.

May, 1987 :

Fiscal Systems Conference, Paris

R. BOADWAY

Third International Meeting on Bayesian Statistics, Altea

D. DEPRINS, L. SIMAR

Journées de Statistique, Lausanne

D. DEPRINS, L. SIMAR

Research Workshop at Facultés Saint-Louis in Brussels on "Productivity and Efficiency in Belgian Urban Transit Firms".

H. TULKENS (organizer).

Conference on the Political Economy of Social Security, Göteborg,

D. WILDASIN.

June, 1987 :

Belgian Public Finance Economists Contact Group, Facultés Universitaires St Louis, Bruxelles

R. BOADWAY

Workshop on Increasing Returns, Louvain-la-Neuve

B. CORNET and J. DREZE (organizers),

J.-M. BONNISSEAU, K. KAMIYA, Ph. SCHOLTES, D. WILDASIN.

International Conference on Game Theory, Columbus (Ohio)

B. CORNET, Cl. d'ASPREMONT, F. FORGES, J.-F. MERTENS

NATO School on Incomplete Information and Bounded Rationality, Capri

F. FORGES, J.-F. MERTENS

Economics of Taxation, GECQ, Paris

L. GEVERS

4èmes Journées de Microéconomie Appliquée, Louvain-la-Neuve

L. GEVERS, V. GINSBURGH, P. PESTIEAU.

Imperfect Competition and International Trade, Aix-en-Provence

J. JASKOLD GABSZEWICZ.

Journée du Groupe Combinatoire de l'AFCEC, Paris,

M. LABBE.

Fourth International Symposium on Locational Decisions, Namur

M. LABBE and J. THISSE (co-organizers).

Unemployment in Europe, Louvain-la-Neuve,

J.-P. LAMBERT.

International Conference on Macroeconometric Disequilibrium Models with Several Markets, Paris

J.-P. LAMBERT, B. MULKAY.

International Meeting on Bayesian Statistics, Valencia,

M. MOUCHART, H. ROCHE, H. VAN DIJK.

Pack Meeting "Poverty Indicators", Luxembourg,

P. PESTIEAU.

Conference on "Equita ed Efficienza nella Teoria Economica e nelle Politiche Pubbliche", Formez, Napoli.

H. TULKENS.

9. INSTITUTIONAL ASPECTS

9.1. Management

Officers elected for the period September 1986 - August 1988 are :

President : J. JASKOLD GABSZEWICZ
Research Director : B. CORNET
Co-directors : M. MARCHAND
Y. SMEERS.

9.2. External Support

Part of CORE's research activities continue to be supported by external sources :

A. The Belgian government supports projects on

- (i) modelling of the energy systems,
 - (a) tariffs and demand systems, supervised by M. MARCHAND and M. MOUCHART. ✓
 - (b) structure of long term gas contracts and energy/environment studies, supervised by Y. SMEERS.
- (ii) development of a statistical data bank on Belgian public utilities, supervised by M. MARCHAND and H. TULKENS.

B. The Commission of the European Community supports projects on :

- (i) rise and persistence of unemployment in Europe, supervised by J. DREZE
- (ii) investment in disequilibrium macro-models, supervised by J.-P. LAMBERT ✓
- (iii) expansion of energy modeling systems; studies on international trade of natural gas, supervised by Y. SMEERS; ✓
- (iv) participation to multinational case studies on energy/environment, supervised by Y. SMEERS. ✓