

- 2007/1 Easter Island's collapse: A tale of a population race
David DE LA CROIX and Davide DOTTORI

The Easter Island tragedy has become an allegory for ecological catastrophe and a warning for the future. In the economic literature the collapse is usually attributed to irrational or myopic behaviors in the context of a fragile ecosystem. In this paper we propose an alternative story involving non-cooperative bargaining between clans to share the crop. Each clan's bargaining power depends on its threat level when fighting a war. The biggest group has the highest probability of winning. A clan's fertility is determined *ex ante* by each group. In the quest for greater bargaining power, each clan's optimal size depends on that of the other clan, and a population race follows. This race may exhaust the natural resources and lead to the ultimate collapse of the society. In addition to well-known natural factors, the likelihood of a collapse turns out to be greater when the cost of war is low, the probability of succeeding in war is highly responsive to the number of fighters, and the marginal return to labor is not too low. We analyze whether these factors can account for the difference between Easter and Tikopia Islands. The paper also makes a methodological contribution in that it is the first fertility model to include strategic complementarities between groups' fertility decisions.

JEL Classification: J13, O13, J52

Keywords: fertility, war, bargaining power, collapse, natural resources.

- 2007/2 On the equivalence between progressive taxation and inequality reduction
Biung-Ghi JU and Juan D. MORENO-TERNERO

We establish the precise connections between *progressive taxation* and *inequality reduction*, in a setting where the level of tax revenue to be raised is endogenously fixed and tax schemes are balanced. We show that, in contrast with the traditional literature on taxation, the equivalence between *inequality reduction* and the combination of *progressivity* and *income order preservation* does not always hold in this setting. However, we show that, among rules satisfying *consistency* and, either *revenue continuity*, or *revenue monotonicity*, the equivalence remains intact.

JEL Classification: C70, D63, D70, H20

Keywords: progressivity, inequality reduction, income order preservation, consistency, taxation.

- 2007/3 Climate coalitions: a theoretical and computational appraisal
Thierry BRECHET, François GERARD and Henry TULKENS

Using an updated version of the CWS model (introduced by Eyckmans and Tulkens in *Resource and Energy Economics* 2003), this paper intends to evaluate with numbers the respective merits of two competing notions of coalition stability in the standard global public goods model as customarily applied to the climate change problem. After a reminder of the model structure and of the definition of the two game theoretical stability notions involved – namely, core stability and internal-external stability, the former property is shown to hold for the grand coalition in the CWS model only if resource transfers of a specific form between countries are introduced. It is further shown that while the latter property holds neither for the grand coalition nor for most large coalitions,

it is nevertheless verified in a weak sense that involves transfers (dubbed "potential internal stability") for most small coalitions. The reason for this difference is brought to light, namely the differing rationale that inspires the transfers in either case. Finally, it is shown that the stable coalitions that perform best (in terms of carbon concentration and global welfare) always are composed of both industrialized and developing countries. Two sensitivity analyses confirm the robustness of all these results.

JEL Classification: C71, C73, D9, D62, F42, Q2

Keywords: climate change, coalitions, simulation, integrated assessment.

2007/4 Efficient access pricing and endogenous market structure
Kaniska DAM, Axel GAUTIER and Minipushpak MITRA

We analyse a (differentiated good) industry where an incumbent firm owns a network good (essential input) and faces potential competition in the (downstream) retail market. Unlike the traditional approach, we consider a scenario where the decision to compete or not in the downstream segment is endogenous, and this decision depends on the particular mechanism designed by the utilitarian regulator. We assume that the technology of the potential entrant is private information. We derive the efficient (Ramsey) prices and access charge taking the impact of a non-discriminatory mechanism on entry decision into account. We assert that the optimal pricing formula must include a Ramsey term that is inversely related to the "modified" superelasticity of the retail good under consideration. We further show, under unknown cost, that there might be "excess" or "too little" entry compared to the socially optimal level.

JEL Classification: L11, L51, D82

Keywords: non-discriminatory access, endogenous competition, modified superelasticity.

2007/5 A two-sided matching model of monitored finance
Kaniska DAM

We analyse a model of two-sided matching and incentive contracts where expert investors (venture capitalists) with different monitoring capacities are matched with firms with different levels of initial wealth. Firms do not have sufficient start-up capital to cover their project costs and hence, seek external financing. In equilibrium, the matching and the payoffs of the venture capitalists and the firms are determined simultaneously. More effective VCs and higher-wealth firms consume higher payoffs. We also show that, in equilibrium VCs with higher monitoring ability invest in firms with lower initial wealth following a negatively assortative matching pattern.

JEL Classification: C78, D82, E44, G24

Keywords: venture capital, assortative matching, incentive contracts.

2007/6 Uncapacitated lot sizing with backlogging: The convex hull
Simge KÜCÜKYAVUZ and Yves POCHET

An explicit description of the convex hull of solutions to the uncapacitated lot-sizing problem with backlogging, in its natural space of production, setup, inventory and backlogging variables, has been an open question for many years. In this paper, we identify valid inequalities that subsume all previously known valid inequalities for this

problem. We show that these inequalities are enough to describe the convex hull of solutions. We give polynomial separation algorithms for some special cases. Finally, we report a summary of computational experiments with our inequalities that illustrates their effectiveness.

Keywords: lot sizing backlogging convex hull separation algorithms computation.

- 2007/7 Quasi-variational inequality formulation of the mixed equilibrium in multiclass routing games
Laura SCRIMALI

In the modeling of competition on networks it is usually assumed that users either behave following the Wardrop equilibrium or the Nash equilibrium concept. Nevertheless, in several equilibrium situations, for instance in urban traffic flows, intercity freight flows and telecommunication networks, a mixed behavior is observed. This paper presents a time-dependent network model shared by two types of users: group users (Nash players) and individual users (Wardrop players). A group user has a significant impact on the load of the network, whereas an individual user has a negligible impact. Both classes of users choose the paths to ship their jobs so as to minimize their costs, but they apply different optimization criteria. The source of interaction of users is represented by the travel demand, which is assumed to be elastic with respect to the equilibrium solution. Thus, the equilibrium distribution is proved to be equivalent to the solution of an appropriate time-dependent quasi-variational inequality problem. A result on the existence of solutions is discussed as well as a numerical example.

Keywords: Nash equilibrium, Wardrop equilibrium, routing, quasi-variational inequality.

- 2007/8 The problem of non-renewable energy resources in the production of physical capital
Agustin PEREZ-BARAHONA

This paper studies the possibilities of technical progress to deal with the growth limit problem imposed by the usage of non-renewable energy resources, when physical capital production is relatively more energy-intensive than consumption. In particular, this work presents the conditions under which energy-saving technologies can sustain long-run growth, although energy is produced by means of non-renewable energy resources. The mechanism behind that is energy efficiency.

JEL Classification: O30, O41, Q30, Q43

Keywords: nonrenewable resources, energy-saving technical progress, economic growth.

- 2007/9 Capital accumulation and non-renewable energy resources: a special functions case
Agustin PEREZ-BARAHONA

In this paper, we study the implications of assuming different technologies for physical capital accumulation and consumption. More precisely, we assume that physical capital accumulation is relatively more energy-intensive than consumption. We conclude that this hypothesis, together with the possibility of technical progress (in particular, energy-saving technical progress), has important implications on economic growth. This model entails some technical difficulties. However, we provide a full analytical characterization of both short and long-run dynamics using Gauss Hypergeometric functions.

JEL Classification: C68, O30, O41, Q30, Q43

Keywords: non-renewable resources, energy-saving technical progress, special functions.

- 2007/10 Market games and successive oligopolies
Jean J. GABSZEWICZ, Didier LAUSSEL, Tanguy VAN YPERSELE and Skerdilajda ZANAJ

This paper first introduces an approach relying on market games to examine how successive oligopolies do operate between downstream and upstream markets. This approach is then compared with the traditional analysis of oligopolistic interaction in successive markets. The market outcomes resulting from the two approaches are analysed under different technological regimes, decreasing vs constant returns.

JEL Classification: D43, L1, L13, L22

Keywords: successive oligopolies, market games, entry, double marginalization.

- 2007/11 Impacts of emission reduction policies in a multi-regional multi-sectoral small open economy with endogenous growth
Raouf BOUCEKKINE and Marc GERMAIN

The burden sharing of pollution abatement costs raises the issue of how to share the costs between entities (country, region or industry) and how the pollution permits should be distributed between the parties involved. This paper explores this issue in the framework of a dynamic endogenous growth 2 sectors – 2 regions – 2 inputs Heckscher-Ohlin model of a small open multi-regional economy with an international tradable permits market. Given an "emission-based grand-fathering" sharing rule, capital accumulation is more negatively affected by the environmental policy in the energy intensive sector. We show that such a property does not necessarily hold with a "production-based grand-fathering" sharing rule. We also show that the impact on capital is likely to translate into the sectoral added value level after some time, specially if the economy is submitted to an increasingly constraining environmental policy driving up the ratio price of permits to price of energy. Finally, we show that the impact of environmental policy at the regional level depends crucially on the specialization of the region along the baseline.

JEL Classification: D58, H21, E22, O40

Keywords: pollution permits, grand-fathering, sectoral spillovers, multi-regional economy, endogenous growth.

- 2007/12 Industry reallocations in a globalizing economy
Kristian BEHRENS, Gianmarco I.P. OTTAVIANO and Giordano MION

We distill the main insights from recent trade models on firms' responses to globalization. Our primary aim is to assess the economic impact and the welfare implications of the resulting reallocation of resources across firms and countries. In so doing, we bring theory into life through the numerical implementation of a theoretical framework calibrated on European data, which encompasses aspects of economic geography, firm heterogeneity, and firms' organizational choices. Our final purpose is to provide a comprehensive background for empirical investigations and to stimulate further theoretical research.

JEL Classification: F12**Keywords:** international integration, resource reallocation, economic geography, firm heterogeneity, multinationals.

- 2007/13 Income taxation of couples and the tax unit choice
Helmuth CREMER, Jean-Marie LOZACHMEUR and Pierre PESTIEAU

This paper studies the optimal non linear income tax of couples. We build a general unitary model of labor supply and allow multidimensional heterogeneity in a discrete type framework. We concentrate our analysis on the resulting intra-family labor allocation of labor supplies and show that this analysis is strongly related to the choice of the tax unit (individual versus joint taxation). We give a necessary condition to have fully joint taxation in this framework and discuss some examples.

- 2007/14 Evidence of the contribution of legal insider trading to market efficiency
Nihat AKTAS, Eric DE BODT and Hervé VAN OPPENS

Does legal insider trading contribute to market efficiency? Using the refinement proposed by the recent microstructure literature, we analyze the information content of legal insider trading. Our sample encompasses 2,110 different companies subject to 59,244 aggregated daily insider trades over the period from January 1995 to the end of September 1999. Our main findings are the followings. (i) Consistent with previous literature, financial markets offer a mild response in terms of abnormal returns to insider trading activities. (ii) The univariate analysis of stock prices on insider net purchase and net sale days suggests insiders' market timing ability. (iii) Market liquidity seems to be weaker on insider net purchase days, indicating that net buyer insiders are on average market liquidity consumers. (iv) Market liquidity seems to be higher on insider net sale days, indicating that net seller insiders are on average market liquidity providers. (v) The analysis of the considered information proxy reveals that insiders enhance market efficiency. Insider trading clearly permits faster price discovery on insider trading days.

JEL Classification: G14, G18**Keywords:** legal insider trading, market efficiency, order imbalance.

- 2007/15 Simulation based Bayesian econometric inference: principles and some recent computational advances
Lennart F. HOOGERHEIDE, Herman K. VAN DIJK and Rutger D. VAN OEST

In this paper we discuss several aspects of simulation based Bayesian econometric inference. We start at an elementary level on basic concepts of Bayesian analysis; evaluating integrals by simulation methods is a crucial ingredient in Bayesian inference. Next, the most popular and well-known simulation techniques are discussed, the Metropolis-Hastings algorithm and Gibbs sampling (being the most popular Markov chain Monte Carlo methods) and importance sampling. After that, we discuss two recently developed sampling methods: adaptive radial based direction sampling [ARDS], which makes use of a transformation to radial coordinates, and neural network sampling, which makes use of a neural network approximation to the posterior distribution of interest. Both methods are especially useful in cases where the posterior distribution is

not well-behaved, in the sense of having highly non-elliptical shapes. The simulation techniques are illustrated in several example models, such as a model for the real US GNP and models for binary data of a US recession indicator.

JEL classification: C11, C12, C15, C45, C52

2007/16 Games with complementarities
Filippo CALCIANO

We introduce a class of games with complementarities that has the quasisupermodular games, hence the supermodular games, as a special case. Our games retain the main property of quasisupermodular games: the Nash set is a nonempty complete lattice. We use monotonicity properties on the best reply that are weaker than those in the literature, as well as pretty simple and linked with an intuitive idea of complementarity. The sufficient conditions on the payoffs are weaker than those in quasisupermodular games. We also separate the conditions implying existence of a greatest and a least Nash equilibrium from those, stronger, implying that the Nash set is a complete lattice.

JEL Classification: C60, C70, C72

Keywords: : complementarity, quasisupermodularity, supermodular games, monotone comparative statics, Nash equilibria.

2007/17 Lattice based extended formulations for integer linear equality systems
Karen AARDAL and Laurence A. WOLSEY

We study different extended formulations for the set $X = \{\mathbf{x} \in \mathbb{Z}^n \mid \mathbf{A}\mathbf{x} = \mathbf{A}\mathbf{x}^0\}$ in order to tackle the feasibility problem for the set $X_+ = X \cap \mathbb{Z}_+^n$. Here the goal is not to find an improved polyhedral relaxation of $\text{conv}(X_+)$, but rather to reformulate in such a way that the new variables introduced provide good branching directions, and in certain circumstances permit one to deduce rapidly that the instance is infeasible. For the case that \mathbf{A} has one row \mathbf{a} we analyze the reformulations in more detail. In particular, we determine the integer width of the extended formulations in the direction of the last coordinate, and derive a lower bound on the Frobenius number of \mathbf{a} . We also suggest how a decomposition of the vector \mathbf{a} can be obtained that will provide a useful extended formulation. Our theoretical results are accompanied by a small computational study.

Keywords: integer programming feasibility, integer width, branching directions, reduced lattice bases, Frobenius number.

2007/18 Indirect estimation of elliptical stable distributions
Marco LOMBARDI and David VEREDAS

We present an indirect estimation approach for elliptical stable distributions which relies on the use of a multivariate t distribution as auxiliary model. This distribution is also elliptical and we show that its parameters have a one-to-one relationship with those of the elliptical stable, therefore making the proposed indirect approach especially suitable. Standard asymptotic properties are also shown and we analyze the finite sample behavior of the estimators via a comprehensive Monte Carlo study. An application to 27 emerging markets stock indexes concludes the paper.

JEL Classification: C13, C15, G11

Keywords: stable, elliptical, high dimension, multivariate, indirect inference.

2007/19 A component GARCH model with time varying weights
Luc BAUWENS and Giuseppe STORTI

We present a novel GARCH model that accounts for time varying, state dependent, persistence in the volatility dynamics. The proposed model generalizes the component GARCH model of Ding and Granger (1996). The volatility is modeled as a convex combination of unobserved GARCH components where the combination weights are time varying as a function of appropriately chosen state variables. In order to make inference on the model parameters, we develop a Gibbs sampling algorithm. Adopting a fully Bayesian approach allows to easily obtain medium and long term predictions of relevant risk measures such as value at risk and expected shortfall. Finally we discuss the results of an application to a series of daily returns on the S&P500.

JEL Classification: C11, C15, C22

Keywords: GARCH, persistence, volatility components, value-at-risk, expected shortfall.

2007/20 Ever closer Union or Babylonian discord? The official-language problem in the European Union
Jan FIDRMUC, Victor GINSBURGH and Shlomo WEBER

The policy of official multilingualism is one of the most important and fundamental principles of the Union. However, a large number of official languages imposes substantial financial, communication and legal costs. We address the merits of extensive multilingualism and formulate an analytical framework to determine the optimal number of official languages in the EU. First, we derive the sequence of optimal sets of languages which identifies the sets of languages that minimize aggregate linguistic disenfranchisement of the Union's citizens for any given number of languages. We then proceed by discussing the political-economy framework and feasibility of a potential linguistic reform in the EU under various voting rules, including the Nice Treaty, the proposed European Constitution and the Penrose law. We argue that a six-language regime would be a reasonable intermediate choice: a lower number of official languages results in excessive linguistic disenfranchisement whereas adding further languages increases the costs but brings only modest benefits. We also show that even though a linguistic reform reducing the number of official languages to six is unlikely to gain sufficient support at the present, this may change in the future since young people tend to be more proficient at speaking foreign languages.

JEL Classification: D70, O52, Z13

Keywords: languages, disenfranchisement, European Union, linguistic standardization.

2007/21 Returns to foreign languages of native workers in the EU
Victor GINSBURGH and Juan PRIETO-RODRIGUEZ

Most papers on returns to languages are concerned with immigrants. We use the European Community Household Panel Survey (ECHP) to infer returns on non-native languages by non-immigrants in nine countries of the European Union. We differ from the few other studies that deal with the same problem in three respects. First, we correct

for time-dependent measurement errors in self-reporting as suggested by Dustmann and Van Soest and find that the resulting IV estimates are much larger than those obtained by OLS. We also suggest that there is little room for time-persistent errors and heterogeneity, and that therefore our estimates should not suffer from the other usual biases. Secondly, instead of using a dummy for each language, we use the ratio of the population that is not proficient in a language in each country considered. Finally, we estimate instrumental variable quantile regressions to illustrate how returns to languages vary at different points of the distribution of earnings.

2007/22 Pricing of scientific journal and market power
Mathias DEWATRIPONT, Victor GINSBURGH, Patrick LEGROS and Alexis WALCKIERS

We analyze the empirical relationship between journal prices, their quality measured by their citation counts, their age, as well as conduct of publishers. The database covers 22 scientific fields and over 2600 among the most highly reputed and cited journals in 2003. We show that (a) for-profit journals charge roughly 3 times more than journals run by scientific societies; (b) the number of citations has a positive impact on prices; (c) there are large differences in prices across fields that vary from 1 and 6; these are highly (and positively) correlated with the degree of concentration in the industry.

2007/23 Corporate serial acquisitions: an empirical test of the learning hypothesis
Nihat AKTAS, Eric DE BODT and Richard ROLL

Recent empirical papers report a declining trend in the cumulative abnormal return (CAR) of acquirers during an M&A program. Does this necessarily imply that acquiring CEOs are infected by hubris and are not learning from previous mistakes? We first confirm the existence of this declining trend on average. However, we find a positive CAR trend for CEOs likely to be infected by hubris, which is significantly different from the negative trend found for CEOs who are more likely to be rational. We also explore the time between successive deals and find empirical evidence to suggest that many CEOs learn substantially during acquisition programs.

2007/24 Coefficient strengthening: a tool for formulating mixed integer programs
Kent ANDERSEN and Yves POCHET

Providing a good formulation is an important part of solving a mixed integer program. We suggest to measure the quality of a formulation by whether it is possible to strengthen the coefficients of the formulation. Sequentially strengthening coefficients can then be used as a tool for improving formulations. We believe this method could be useful for analyzing and producing tight formulations of problems that arise in practice. We illustrate the use of the approach on a problem in production scheduling. We also prove that coefficient strengthening leads to formulations with a desirable property: if no coefficient can be strengthened, then no constraint can be replaced by an inequality that dominates it. The effect of coefficient strengthening is tested on a number of problems in a computational experiment. The strengthened formulations are compared to

reformulations obtained by the preprocessor of a commercial software package. For several test problems, the formulations obtained by coefficient strengthening are substantially stronger than the formulations obtained by the preprocessor. In particular, we use coefficient strengthening to solve two difficult problems to optimality that have only recently been solved.

Keywords: mixed integer programming, cutting plane, coefficient strengthening.

- 2007/25 Global dynamics and imbalance effects in the Lucas-Uzawa model: further results
Raouf BOUCEKKINE, Blanca MARTINEZ and Jose R. RUIZ-TAMARIT

In this paper we use a new analytical approach to the Lucas-Uzawa model (Boucekkine and Ruiz Tamarit, 2007) to extend the existing results on the dynamics, and notably on the imbalance effects arising in the model. The approach does not only allow to extend the traditional analysis to **any** initial conditions and for **all** variables in **level**, but it also permits a more general investigation of imbalance effects.

JEL classification: E20, O40, C60

Keywords: Lucas-Uzawa, hypergeometric functions, imbalance effects, global dynamics.

- 2007/26 A tighter continuous time formulation for the cyclic scheduling of a mixed plant
Yves POCHET and François WARICHET

In this paper, based on the cyclic scheduling formulation of Schilling and Pantelides [22], we propose a continuous time mixed integer linear programming (MILP) formulation for the cyclic scheduling of a mixed plant, i.e. a plant composed of batch and continuous tasks. The cycle duration is a variable of the model and the objective is to maximize productivity. By using strengthening techniques and the analysis of small polytopes related to the problem formulation, we strengthen the initial formulation by tightening some initial constraints and by adding valid inequalities. We show that this strengthened formulation is able to solve moderate size problems quicker than the initial one. However, for real size cases, it remains difficult to obtain the optimal solution of the scheduling problem quickly. Therefore, we introduce MILP-based heuristic methods in order to solve these larger instances, and show that they can provide quite good feasible solutions quickly.

Keywords: cyclic scheduling, continuous time formulation, mixed integer programming heuristics, strengthening.

- 2007/27 The race for polluting permits
Thierry BRECHET and Susana PERALTA

International markets for tradable emission permits (TEP) co-exist with national energy taxation. A firm trading emission permits in the international market also pays energy taxes in its host country, thus creating an interaction between the international TEP-market and national energy taxes. In this paper we model that interaction in a framework of a perfectly competitive international TEP-market, where heterogeneous firms trade their TEP endowments. National governments set energy taxes non-cooperatively so as to

maximize fiscal revenue from energy and profit taxes. We identify the driving forces behind Nash equilibrium taxes. We show how they depend on the total amount of TEPs in the market, on firms' TEP-endowment and on the number of participating countries. We also show how energy taxation varies with the introduction of the market on a previously unregulated world. Finally, we highlight the fact that the TEP-market does not achieve abatement cost efficiency, despite its being perfectly competitive.

JEL Classification: Q48, Q52, H23, H73

Keywords: tradable permits, fiscal competition, Kyoto protocol.

2007/28 The economic advantage of "being the voice of the majority"
Joana RESENDE

In this paper, we analyze the static interaction in prices between two newspapers that compete with each other in the circulation and in the advertising markets. We exploit the two-sided nature of the newspaper industry to analyze a demand-side effect that generates an endogenous mechanism of concentration in the press industry: "the circulation spiral" effect.

2007/29 Opportunity analysis of newborn screening programs
Carmen HERRERO and Juan D. MORENO-TERNERO

There exist congenital diseases that reduce newborns' potential opportunities. This reduction is sometimes alleviated if the congenital disease is early detected thanks to a newborn screening program. We propose an outcome measurement of newborn screening programs based on the opportunity gains they offer. We show that, under plausible assumptions, the ranking of the available screening programs for a particular disease, according to this new outcome measurement, do not depend on the metric of opportunity. We also apply our model to the current debate about choosing between a selective or a universal newborn hearing screening program to detect congenital hearing impairment.

JEL Classification: D61, D63, I12, I18

Keywords: opportunities, potential success, screening programs.

2007/30 Equality preference in the claims problem:
A questionnaire study of cuts in earnings and pensions
Kristof BOSMANS and Erik SCHOKKAERT

Many distributional conflicts are characterized by the presence of acquired rights. The basic structure of these conflicts is that of the so-called claims problem, in which an amount of money has to be divided among individuals with differing claims and the total amount available falls short of the sum of the claims. We describe the results of a questionnaire in which Belgian and German students were confronted with nine claims problems. In the "Firm" version, respondents had to divide revenue among the owners of a firm who contribute to the activities of the firm in different degrees. In the "Pensions" version, they had to divide tax money among pensioners who have paid different contributions during their active career. Responses in the Pensions version were more egalitarian than in the Firm version. For both versions, the proportional rule performs very well in describing the choices of the respondents. Other prominent rules - in

particular the constrained equal awards and constrained equal losses rules - fail to capture some basic intuitions. A substantial part of the respondents tend to become more progressive as the amount to be distributed decreases other things equal, and tend to become more progressive as the inequality in the distribution of claims becomes more unequal other things equal. All of these conclusions are robust with respect to the difference in home-country of the respondents.

JEL Classification: D63

Keywords: claims problem, acquired rights, proportional rule, constrained equal awards rule, constrained equal losses rule, inequality.

- 2007/31 The political economy of health care finance
Juan D. MORENO-TERNERO and John E. ROEMER

We present a model of political competition, in a multi-dimensional policy space and with policy-oriented candidates, to analyze the problem of health care finance. In our model, health care is either financed publicly (by means of general taxation) or privately (by means of a copayment). The extent of these two components (as well as the overall tax schedule) is the outcome of the process of political competition. Our results highlight, from a political-economy perspective, the key role of technological change in explaining the widely observed phenomenon, in advanced democracies, of a rising share of total economic resources spent on health.

JEL Classification: D72, H51, I18

Keywords: political competition, health care finance, ideological equilibrium, technology.

- 2007/32 Fear of ruin and longevity enhancing investment
Louis EECKHOUDT and Pierre PESTIEAU

Rectangularization of the survival probability seems to be an ongoing process. It results from a higher concentration of the ages at death; but it can be reversed by a continuous increase in the limit of life time. In this paper, we assume that these two factors are endogenous and we show that risk averse decision makers exhibit a bias towards rectangularization. More specifically, the importance of the bias depends upon the intensity of the "fear of ruin" which is another measure of the degree of absolute risk aversion.

JEL Classification: D81

Keywords: longevity, fear of ruin.

- 2007/33 Disentangling the demographic determinants of the English take-off: 1530-1860
Rouf BOUCEKKINE, David DE LA CROIX and Dominique PEETERS

We propose a model with some of the main demographic, economic and institutional factors usually considered to matter in the transition to modern growth. We apply our theory to England over the period 1530-1860. We use the model to measure the impact of mortality, population density and technological progress on school foundations, literacy and growth through a set of experiments. We find that one third of the rise in literacy over the period 1530-1860 can be directly related to the rise in population density, while one

sixth is linked to higher longevity and one half to exogenous total factor productivity growth. Moreover, the timing of the effect of population density in the model is consistent with the available evidence for England, where it is shown that schools were established at a high rate over the period 1540-1620.

JEL Classification: O41, I21, R12, J11

- 2007/34 Commodity tax competition and industry location under the destination- and the origin-principle
Kristian BEHRENS, Jonathan H. HAMILTON, Gianmarco I.P. OTTAVIANO and Jacques-François THISSE

We develop a model of commodity tax competition with monopolistically competitive internationally mobile firms, transport costs, and asymmetric country sizes. We investigate the impacts of non-cooperative tax setting, as well as of tax harmonization and changes in the tax principle, in both the short and the long run. The origin principle, when compared to the destination principle, is shown to exacerbate tax competition and to erode tax revenues, yet leads to a more equal spatial distribution of economic activity. This suggests that federations which care about spatial inequality, like the European Union, face a non-trivial choice for their tax principle that goes beyond the standard considerations of tax revenue redistribution.

JEL Classification: F12, H22, H87, R12

Keywords: commodity tax competition, origin principle, destination principle, tax harmonization, industry location.

- 2007/35 Optimal redistribution with unobservable disability: welfarist versus non-welfarist social objectives
Pierre PESTIEAU and Maria RACIONERO

This paper examines the optimal non linear income and commodity tax when the same labor disutility can receive two alternative interpretations, taste for leisure and disability, but the disability is not readily observable. We compare the optimal policy under alternative social objectives, welfarist and non-welfarist, and conclude that the non-welfarist objective, in which the planner gives a higher weight to the disutility of labour of the disabled individuals, is the only reasonable specification. It has some foundation in the theory of responsibility; further, unlike the other specifications it yields an optimal solution that may involve a lower labour supply requirement from disabled individuals.

JEL Classification: H21, H41

Keywords: optimal non-linear taxation, quasi-linear preferences, asymmetric information, responsibility.

- 2007/36 Allocating cost reducing investments over competing divisions
Antonio TESORIERE

This paper examines a three-stage model of divisionalization where, first, two parent firms create independent units, second, the parent firms allocate cost reduction levels over these units, and third, the resulting units compete in a Cournot market given their current costs of production. The introduction of the cost reduction phase is shown to reduce the

incentives toward divisionalization severely, relative to other existing models. Namely, the scope for divisionalization in equilibrium reduces as the marginal cost of the cost reducing investment decreases, and eventually vanishes. A second-best welfare analysis shows that, for any given market structure, the equilibrium investment decisions of the parent firms are socially optimal. In addition, to no divisionalization outcome is sustainable in equilibrium only if it is socially optimal.

JEL Classification: L11, L13, L22

Keywords: divisionalization, horizontal mergers, research joint ventures.

2007/37 A theory of dynamics and inequalities under epidemics
Raouf BOUCEKKINE and Jean-Pierre LAFFARGUE

We develop a tractable general theory for the study of the economic and demographic impact of epidemics. In particular, we analytically characterize the short and medium term consequences of epidemics for population size, age pyramid, economic performance and income distribution. To this end, we develop a three-period overlapping generations where altruistic parents choose optimal health expenditures for their children and themselves. The survival probability of (junior) adults and children depend on such investments. Agents can be skilled or unskilled. The model emphasizes the role of orphans. Orphans are not only penalized in front of death, they are also penalized in the access to education. Epidemics are modeled as one period exogenous shocks to the survival rates. We identify three kinds of epidemics depending on how the epidemic shock alters the marginal efficiency of health expenditures. We first study the demographic dynamics, and prove that while a one-period epidemic shock has no permanent effect on income distribution, it can perfectly alter it in the short and medium run. We then study the impact of the three kinds of epidemics when they hit children and/or junior adults. We prove that while the three epidemics have significantly different demographic implications in the medium run, they all imply a worsening in the short and medium run of economic performance and income distribution. In particular, the distributional implications of the model mainly rely on orphans: if orphans are more penalized in the access to a high level of education than in front of death, they will necessarily lead to the medium-term increase in the proportion of the unskilled, triggering the impoverishment of the economy at that time horizon.

JEL Classification: O1, D9, I1, I2

Keywords: epidemics, orphans, income distribution, endogenous survival, medium-term dynamics.

2007/38 Learning differences in mixed common value auctions
Johanna GOERTZ

I examine the behavior of subjects in common value auctions with both experienced and inexperienced bidders in the same market. Subjects know that they are competing against both experienced and inexperienced subjects and can observe bidding behavior of their opponents after an auction round. The existence and common knowledge of mixed experience levels in the same auction market affects the bidding behavior of inexperienced bidders, and gender plays an important role: Inexperienced males bid more aggressively in auction market with mixed bidders compared to markets with only

inexperienced bidders, but inexperienced females bid less aggressively. The mixed markets only have an effect on inexperienced bidders. Experienced bidders (males and females) do not react significantly different in mixed auction markets than in markets with only experienced bidders.

JEL Classification: D44, C91

Keywords: common value auction, auction experiments, learning, gender.

- 2007/39 Negative intra-group externalities in two-sided markets
Paul BELLEFLAMME and Eric TOULEMONDE

Two types of agents interact on a pre-existing free platform. Agents value positively the presence of agents of the other type but may value negatively the presence of agents of their own type. We ask whether a new platform can find fees and subsidies so as to divert agents from the existing platform and make a profit. We show that this might be impossible if intra-group negative externalities are sufficiently (but not too) strong with respect to positive inter-group externalities.

JEL Classification: L11, L13, L23

Keywords: two-sided markets, naked exclusion, divide and conquer.

- 2007/40 The spenders-hoarders theory of capital accumulation, wealth distribution and fiscal policy
Pierre PESTIEAU and Emmanuel THIBAUT

This paper proposes a simple OLG model which is consistent with the essential facts about consumer behavior, capital accumulation and wealth distribution, and yields some new and surprising conclusions about fiscal policy. By considering a society in which individuals are distinguished according to two characteristics, altruism and wealth preference, we show that those who in the long run hold the bulk of private capital are not so much motivated by dynastic altruism as by preference for wealth. Two types of social segmentation can result with different wealth distribution. To a large extent our results seem to fit reality better than those obtained with standard optimal growth models in which dynastic altruism (or rate of impatience) is the only source of heterogeneity: overaccumulation can appear, public debt and unfunded pensions are not neutral, estate taxation can improve the welfare of the top wealthy.

JEL Classification: D64, H55, H63

Keywords: altruism, preference for wealth, capital accumulation, wealth distribution, Ricardian equivalence.

- 2007/41 Intensity of competition and market structure in the Italian banking industry
Caterina GIANNETTI

The aim of this paper is to test the predictions of Sutton's model of independent submarkets for the Italian retail banking industry. This industry, in fact, can be viewed as made of a large number of local markets corresponding to different geographical locations. In order to do that, I first develop a model of endogenous mergers that shows how the number of firms is determined by the initial number of firms, by the intensity of competition, and by the degree of product differentiation, and how this in turn affects the

one-firm concentration index. Then, in the second part, the number of banks in each submarket is estimated using a truncated model and a Poisson model. The size of the submarkets turned out to be at most provincial. Finally, the one-firm concentration ratio of each province is regressed on the number of banks, also in interaction with market size variables. As argued by Sutton for industries with exogenous sunk costs, a stronger and negative relationship is found as the market becomes larger.

JEL Classification: C24, D43, L11, L89

Keywords: exogenous sunk costs, intensity of competition, concentration, truncated and Poisson models.

2007/42 Ranking universities: how to take better account of diversity
Henry TULKENS

In order to rank universities, rather than aggregating the indicators used by the *Times Higher Education Supplement* (THES) – using weightings which, though reasonable, are at the same time arbitrary and inflexible – one can compare universities in terms of dominance and hence deduce various partial or complete rankings. The resultant **dominance ranking method** is presented in this note. Data are recalled in Appendix 1. Appendix 2 provides full details of the dominance analysis for each university. From this analysis two listings are derived: (i) a **front runners list** consisting of 34 “non-dominated” universities, (Table 4) and (ii) a (new) **ranking of the 200 universities** surveyed by the THES, based on their respective ‘active-passive dominance’ scores (Table 6). Tables 6 and 7 contain a complete comparison of the two ranking methods. Concluding remarks bear on some limits of the data and of the exercise.

2007/43 Income growth in the 21st century: forecasts with an overlapping generations model
David DE LA CROIX, Frédéric DOCQUIER and Philippe LIEGEOIS

We forecast income growth over the period 2000-2050 in the US, Canada, and France. To ground the forecasts on relationships that are as robust as possible to changes in the environment, we use a quantitative theoretical approach which consists in calibrating and simulating a general equilibrium model. Compared to existing studies, we allow for life uncertainty and migrations, use generational accounting studies to link taxes and public expenditures to demographic changes, and take into account the interaction between education and work experience. Forecasts show that growth will be weaker over the period 2010-2040. The gap between the US and the two other countries is increasing over time. France will catch-up and overtake Canada in 2020. Investigating alternative policy scenarios, we show that increasing the effective retirement age to 63 would be most profitable for France, reducing its gap with the US by one third. A decrease in social security benefits would slightly stimulate growth but would have no real impact on the gap between the countries.

JEL Classification: D58, E6, H55, J11, O40

Keywords: aging, forecast, computable general equilibrium, education, experience.

2007/44 Growth and distribution in an AK-model with endogenous impatience
Kirill BORISSOV and Stéphane LAMBRECHT

This paper combines two strands of the literature on inequality and distribution issues: the classical approach, which insists on the division of society into classes characterized by different saving propensities, and the social conflict approach, which considers that inequality inflicts direct and indirect costs to economic development. An endogenous-growth model is studied. We assume that each consumer's subjective discount factor is determined endogenously and depends on economic inequality through the following two channels. On the one hand, it is positively related to the individual consumer's relative wealth. On the other hand, it is negatively affected by a simple aggregate measure of social conflict. We show that, unlike models with exogenously given discount rates, steady state equilibria in our model is indeterminate and that the set of all equilibria is a continuum which can be parameterized by a simple index of income inequality. The growth rate is ambiguously related to the inequality index. However, under some reasonable assumptions, the growth rate dependence on this index has an inverted U-shaped form.

JEL Classification: D31, D90, O10

Keywords: wealth distribution, intertemporal choice, growth, development.

- 2007/45 The price of silence: tradeable noise permits and airports
Thierry BRECHET and Pierre M. PICARD

This paper presents a market design for the management of noise disturbance created by aircraft traffic around large airports. A market for tradable noise permits allows noise generators to compensate harmed residents. We show that the noise permit markets allow the achievement of the planner's optimal allocation of flights provided that she/he does not over-weight the benefit of economic activity compared to the disutility of noise disturbances. The fact that zones are likely to be strategic players does not fundamentally alter this finding. Because of the market auctioneer's information constraints, noise permits are likely to redistribute windfall gains to residents located in non-critical zones. This entices landlords to increase their land/house rents there and to design smaller houses in the long run.

- 2007/46 Home market effect versus multinationals
Eric TOULEMONDE

We develop a model with two asymmetric countries. Firms choose the number and the location of plants that they operate. The production of each firm increases when trade costs fall. The fall also induces multinationals to repatriate their production into a single country, which is likely to be the large country because of the home market effect. The net effect on total output is favorable in the large country and ambiguous in the small country. We extend the model to endogenize country sizes and we show that in an equilibrium with multinationals only, a rent can be taxed by governments.

JEL Classification: F12, F15, F23, R12, R30

Keywords: globalization, economic geography, trade costs, multinational firms, home market effect.

- 2007/47 "Almost" subsidy-free spatial pricing in a multi-dimensional setting
Jacques DREZE, Michel LE BRETON, Alexei SAVVATEEV and Shlomo WEBER

Consider a population of citizens uniformly spread over the entire plane, that faces a problem of locating public facilities to be used by its members. The cost of every facility is financed by its users, who also face an idiosyncratic private access cost to the facility. We assume that the facilities' cost is independent of location and access costs are linear with respect to the Euclidean distance. We show that an external intervention that covers 0.19% of the facility cost is sufficient to guarantee *secession-proofness* or *no cross-subsidization*, where no group of individuals is charged more than its stand alone cost incurred if it had acted on its own. Moreover, we demonstrate that in this case the Rawlsian access pricing is the only secession-proof allocation.

JEL Classification: D70, H20, H73

Keywords: secession-proofness, optimal jurisdictions, Rawlsian allocation, hexagonal partition, cross-subsidization.

2007/48 Single item lot-sizing with non-decreasing capacities
Yves POCHET and Laurence WOLSEY

We consider the single item lot-sizing problem with capacities that are non-decreasing over time. When the cost function is i) non-speculative or Wagner-Whitin (for instance, constant unit production costs and non-negative unit holding costs), and ii) the production set-up costs are non-increasing over time, it is known that the minimum cost lot-sizing problem is polynomially solvable using dynamic programming.

When the capacities are non-decreasing, we derive a compact mixed integer programming reformulation whose linear programming relaxation solves the lot-sizing problem to optimality when the objective function satisfies i) and ii). The formulation is based on mixing set relaxations and reduces to the (known) convex hull of solutions when the capacities are constant over time.

We illustrate the use and effectiveness of this improved LP formulation on a new test instances, including instances with and without Wagner-Whitin costs, and with both non-decreasing and arbitrary capacities over time.

Keywords: lot-sizing, mixing set relaxation, compact reformulation, production planning, mixed integer programming.

2007/49 Exact methods for the single-item multi-plant capacitated lot sizing problem coupled with transportation
Ayse AKBALIK and Bernard PENZ

In this paper we study the integration of production, transportation and storage decisions in a multi plant-distribution center supply chain structure. Multiple plants produce one type of item, each of them with different production capacity and costs, and send finished goods to the distribution center (DC) using capacitated vehicles. Customer demand is known at DC level and has to be satisfied without backlogging. This problem contains classical capacitated lot sizing problem as a subpart, which, in the general case, is NP-hard. We propose an exact pseudo-polynomial dynamic programming algorithm and show that the problem is NP-hard in the ordinary sense. We then compare the computational time of this dynamic program to that of a mixed integer linear program (MILP) which is selected among 4 different MILP formulations based on its lower

computational time.

Keywords: multi-plant production, transportation, single-item capacitated lot sizing problem, dynamic program.

- 2007/50 Environmental innovation under Cournot competition
Maria Eugenia SANIN and Skerdilajda ZANAJ

In this paper, we address the incentives to invest in environmental innovation of enterprises that exercise market power in the output market and also buy and sell pollution permits. Differently from the existing literature, using a market approach we explicitly model the interaction between the output market, where firms play *à la* Cournot, and the permits market. We find that, in the new equilibrium firms behave symmetrically, that is, they either both innovate to protect their market share in the output market or they both choose not to innovate. Whether the innovation equilibrium arises or not depends on the output demand and on the productivity enhancement and not on the distribution of permits among firms. Finally, we show that, under this market configuration, collusion can be welfare enhancing.

JEL Classification: D43, L13, Q55

Keywords: environmental innovation, tradable permits, interaction *à la* Cournot.

- 2007/51 Integral Farkas type lemmas for systems with equalities and inequalities
Kent ANDERSEN, Quentin LOUVEAUX and Robert WEISMANTEL

A central result in the theory of integer optimization states that a system of linear Diophantine equations $Ax = b$ has no integral solution if and only if there exists a vector in the dual lattice, $y^T A$ integral such that $y^T b$ is fractional. We extend this result to systems that both have equations and inequalities $\{Ax = b, Cx \leq d\}$. We show that a certificate of integral infeasibility is a linear system with rank (C) variables containing no integral point.

- 2007/52 Currency areas and international assistance
Pierre M. PICARD and Tim WORRALL

This paper considers a simple stochastic model of international trade with three countries. Two of the three countries are in an economic union. Comparisons are made between equilibrium welfare for these two countries under fixed and flexible exchange rate regimes. Within the model it is shown that flexible exchange rate regimes generate greater welfare. However, we then consider comparisons of welfare when the two countries also engage in some international assistance in order to share risk. Such risk-sharing is limited by enforcement constraints of cross border assistance. It is shown that taking into account limited commitment risk-sharing fixed exchange rates or currency areas can dominate flexible exchange rate regimes reversing the previous result.

JEL Classification: F12, F15, F31, F33

Keywords: monetary union, currency areas, fiscal federalism, limited commitment, mutual insurance.

- 2007/53 Efficient importance sampling for ML estimation of SCD models
Luc BAUWENS and Fausto GALLI

The evaluation of the likelihood function of the stochastic conditional duration model requires to compute an integral that has the dimension of the sample size. We apply the efficient importance sampling method for computing this integral. We compare EIS-based ML estimation with QML estimation based on the Kalman filter. We find that EIS-ML estimation is more precise statistically, at a cost of an acceptable loss of quickness of computations. We illustrate this with simulated and real data. We show also that the EIS-ML method is easy to apply to extensions of the SCD model.

JEL Classification: C13, C15, C41.

Keywords: stochastic conditional duration, importance sampling.

- 2007/54 Semiparametric multivariate density estimation for positive data using copulas
Taoufik BOUEZMARNI and Jeroen V.K. ROMBOUTS

In this paper we estimate density functions for positive multivariate data. We propose a semiparametric approach. The estimator combines gamma kernels or local linear kernels, also called boundary kernels, for the estimation of the marginal densities with semiparametric copulas to model the dependence. This semiparametric approach is robust both to the well known boundary bias problem and the curse of dimensionality problem. We derive the mean integrated squared error properties, including the rate of convergence, the uniform strong consistency and the asymptotic normality. A simulation study investigates the finite sample performance of the estimator. We find that univariate least squares cross validation, to choose the bandwidth for the estimation of the marginal densities, works well and that the estimator we propose performs very well also for data with unbounded support. Applications in the field of finance are provided.

Keywords: asymptotic properties, asymmetric kernels, boundary bias, copula, curse of dimension, least squares cross validation.

- 2007/55 Theory and inference for a Markov switching GARCH model
Luc BAUWENS, Arie PREMINGER and Jeroen V.K. ROMBOUTS

We develop a Markov-switching GARCH model (MS-GARCH) wherein the conditional mean and variance switch in time from one GARCH process to another. The switching is governed by a hidden Markov chain. We provide sufficient conditions for geometric ergodicity and existence of moments of the process. Because of path dependence, maximum likelihood estimation is not feasible. By enlarging the parameter space to include the state variables, Bayesian estimation using a Gibbs sampling algorithm is feasible. We illustrate the model on SP500 daily returns.

JEL Classification: C11, C22, C52

Keywords: GARCH, Markov-switching, Bayesian inference.

- 2007/56 Human capital, aggregation, and growth
Jakub GROWIEC

The famous Mincer equation regressing log earnings on years of schooling is derived

from a linear human capital accumulation equation at the individual level. Even if the cross-sectional Mincer equation holds at the level of individuals, it does not hold at the macro level of countries because aggregation of human capital has to take into account its vintage structure: human capital is embodied in people of different generations whose lifespan is finite. Finiteness of people's lives imposes also a limit on the potential of human capital accumulation to drive aggregate economic growth. Aggregate human capital accumulation may however become an engine of growth thanks to human capital externalities (knowledge spillovers). We use these findings to revisit the assumptions of the well-known Uzawa--Lucas growth model from an aggregation perspective.

JEL Classification: I20, J24, O40

Keywords: human capital accumulation, Mincer equation, aggregation, vintage structure, balanced growth.

2007/57 Technological opportunity, long-run growth, and convergence
Jakub GROWIEC and Ingmar SCHUMACHER

We derive an R&D-based semi-endogenous growth model where technological progress depends on the available amount of technological opportunity. Incremental innovations provide direct increases in the knowledge stock but they reduce technological opportunity and thus the potential for further improvements. Technological opportunity can be renewed only by radical innovations (which have no direct impact on factor productivity).

Investigating the model for its implications on economic growth leads to two basic observations. One, in the long-run, a balanced growth path with a constant and semi-endogenous long-run economic growth rate exists only in a specific knife-edge case which implies that technological opportunity and knowledge grow at equal rates. Two, the transition need not be monotonic. Specifically, we show under which conditions our model generates endogenous business cycles via complex dynamics without uncertainty.

JEL Classification: E32, O30, O41

Keywords: Technological opportunity, incremental innovation, radical innovation, endogenous business cycles, balanced growth, Andronov-Hopf bifurcation, complex dynamics.

2007/58 Green consumerism and collective action
Parkash CHANDER and Subhashini MUTHUKRISHNAN

We analyze the effect of collective action vs green/environmentally aware consumers on ambient environmental quality and market equilibrium. We consider a model with two types of consumers who differ in their willingness-to-pay for a good available in two different environmental qualities, and two competing firms: one selling the good of high environmental quality and the other of low environmental quality. We show that collective action by green consumers reduces competition and leads to higher prices for the good of both qualities. Though it improves the ambient environmental quality, it may reduce the welfare of both types of consumers.

JEL Classification: H23, Q20, L13

Keywords: green consumers, collective action, environmental quality, differentiated duopoly, firm profitability.

- 2007/59 'Dual' gravity: using spatial econometrics to control for multilateral resistance
Kristian BEHRENS, Cem ERTUR and Wilfried KOCH

We propose a quantity-based 'dual' version of the gravity equation that yields an estimating equation with both cross-sectional interdependence and spatially lagged error terms. Such an equation can be concisely estimated using spatial econometric techniques. We illustrate this methodology by applying it to the Canada-U.S. data set used previously, among others, by Anderson and van Wincoop (2003) and Feenstra (2002, 2004). Our key result is to show that controlling directly for spatial interdependence across trade flows, as suggested by theory, significantly reduces border effects because it captures 'multilateral resistance'. Using a spatial autoregressive moving average specification, we find that border effects between the U.S. and Canada are smaller than in previous studies: about 8 for Canadian provinces and about 1.3 for U.S. states. Yet, heterogeneous coefficient estimations reveal that there is much variation across provinces and states.

JEL Classification: C31, F12, R12

Keywords: gravity equations, multi-region general equilibrium trade models; spatial econometrics, border effects.

- 2007/60 Productivity and firm selection: intra- vs international trade
Gregory CORCOS, Massimo DEL GATTO, Giordano MION and Gianmarco I.P. OTTAVIANO

Recent theoretical models predict gains from international trade coming from intra-industry reallocations, due to a firm selection effect. In this paper we answer two related questions. First, what is the magnitude of this selection effect, and how does it compare to that of intra-national trade? Second, would the removal of 'behind-the-border' trade frictions between integrated EU countries lead to large productivity gains? To answer these questions, we extend and calibrate the Melitz and Ottaviano (2007) model on productivity and trade data for European economies in 2000, and simulate counterfactual trade liberalization scenarios. We consider 11 EU countries and a total of 31 economies, including 21 French regions. Our first result is that, in the French case, international trade has a sizeable impact on aggregate productivity, but smaller than that of intra-national trade. Second, substantial productivity gains (around 20%) can be expected from 'behind-the-border' integration. In both experiments, we predict the corresponding variations in average prices, markups, quantities and profits. We show that the model fits sales and exports data reasonably well, and we perform a number of robustness checks. We also suggest some explanations for the substantial cross-economy and cross-industry variations in our estimates of productivity gains, highlighting the importance of accessibility and competitiveness.

JEL Classification: F12, R13

Keywords: European integration, intra-national trade, firm-level data, firm selection, gains from trade, total factor productivity.

- 2007/61 Dynamic recontracting processes with multiple indivisible goods
Olivier BOCHET, Bettina KLAUS and Markus WALZL

We consider multiple-type housing markets. To capture the dynamic aspect of trade in such markets, we study a dynamic recontracting process similar to the one introduced by Serrano and Volij (2005). First, we analyze the set of recurrent classes of this process as a (non-empty) solution concept. We show that each core allocation always constitutes a singleton recurrent class and provide examples of non-singleton recurrent classes consisting of blocking-cycles of individually rational allocations. For multiple-type housing markets stochastic stability *never* serves as a selection device among recurrent classes.

Next, we propose a method to compute the limit invariant distribution of the dynamic recontracting process. The limit invariant distribution exploits the interplay of coalitional stability *and* accessibility that determines a probability distribution over final allocations. We provide various examples to demonstrate how the limit invariant distribution discriminates among stochastically stable allocations: surprisingly, some core allocations are less likely to be final allocations of the dynamic process than cycles composed of non-core allocations.

JEL Classification: D63, D70

Keywords: core, indivisible goods, limit invariant distribution, stochastic stability.

2007/62 Economics of literary translation. A simple theory and evidence
Victor GINSBURGH, Shlomo WEBER and Sheila WEYERS

Books are an important factor of cultural transmission, but need, in most cases, to be translated. According to some authors, this may lead to a form of cultural domination, in particular of English, on other languages. All these papers ignore that the population speaking English as a first language is, with the exception of Mandarin, the largest in the world. It is therefore not surprising that English produces more fiction (and much more scientific literature, as scientists from all countries write more and more in English) than any other language. We develop a theoretical model of translation, which is estimated on the basis of UNESCO translation data. We show that translations from English are dominated by translations from other languages, including Scandinavian ones and French.

JEL Classification: L82, Z11

Keywords: languages, translations, cultural and linguistic distances.

2007/63 City size and the Henry George theorem under monopolistic competition
Kristian BEHRENS and Yasusada MURATA

We analyze the equilibrium and the optimal resource allocations in a monocentric city under monopolistic competition. Unlike the constant elasticity of substitution (CES) case, where the equilibrium markups are independent of the city size, we present a variable elasticity of substitution (VES) case where the equilibrium markups fall with the city size. We then show that, due to excess entry triggered by such pro-competitive effects, the 'golden rule' of local public finance, i.e., the Henry George theorem (HGT), does not hold in the second best. We finally prove, within our framework, that the HGT holds in the second best if and only if: (i) the second-best allocation is first-best efficient, which turns out to be equivalent to the CES case; or (ii) a marginal change in the city size has no impact on equilibrium product diversity at the second best.

JEL Classification: D43, R12, R13

Keywords: city size, Henry George theorem, monopolistic competition, first-best and second-best allocations, variable elasticity.

2007/64 Antidumping protection and productivity of domestic firms: a firm-level analysis
Jozef KONINGS and Hylke VANDENBUSSCHE

We analyze the relationship between Antidumping (AD) Protection and the productivity of EU domestic firms in import-competing industries. For this purpose we identify a panel of domestic firms between 1993 and 2003 that at some point during this period are affected by AD initiations. Using a difference-in-difference approach, we find that AD measures result in improvements of measured productivity for domestic firms. Total Factor Productivity (TFP) of protected firms increases by 2% in the short-run and by 5% to 13% in the long-run. However, there is substantial heterogeneity across firms. The effect of protection depends on the initial “distance-to-the-frontier firm” in the industry. While protection raises TFP of “laggard” domestic firms, it lowers TFP for “efficient” firms that operate close to the efficiency frontier. These results are consistent with recent theoretical work supporting the view that trade policy, under certain conditions, can induce technological catching-up. While this paper evaluates the effectiveness of AD policy it does not engage in a welfare analysis.

JEL Classification: F13, L41, O30, C2

Keywords: total factor productivity, antidumping protection, technological catching-up.

2007/65 Nonparametric density estimation for multivariate bounded data
Taoufik BOUEZMARNI and Jeroen V.K. ROMBOOTS

We propose a new nonparametric estimator for the density function of multivariate bounded data. As frequently observed in practice, the variable may be partially bounded (e.g., nonnegative) or completely bounded (e.g., in the unit interval). In addition, the variables may have a point mass. We reduce the conditions on the underlying density to a minimum by proposing a nonparametric approach. By using a gamma, a beta, or a local linear kernel (also called boundary kernels), in a product kernel, the suggested estimator becomes simple in implementation and robust to the well known boundary bias problem. We investigate the mean integrated squared error properties, including the rate of convergence, uniform strong consistency and asymptotic normality. We establish consistency of the least squares cross-validation method to select optimal bandwidth parameters; A detailed simulation study investigates the performance of the estimators. Applications using lottery and corporate finance data are provided.

Keywords: asymmetric kernels, multivariate boundary bias, nonparametric multivariate density estimation, asymptotic properties, bandwidth selection, least squares cross-validation.

2007/66 What explains the proliferation of antidumping laws?
Hylke VANDENBUSSCHE and Mauricio ZANARDI

A recent phenomenon is the rapid spread of Antidumping (AD) laws mainly amongst developing countries (i.e. China, India, Mexico). Between 1980 and 2003 the number of countries in the world with an AD law more than doubled going from 36 to 97 countries.

This proliferation of trade protection laws amongst developing countries is likely to have substantial implications for trade as recently shown by Vandebussche and Zanardi (2007). The purpose of this paper is to use a duration analysis to investigate the determinants leading a country to adopt an AD law. We also analyze the related question of what explains the heterogeneity between countries that can be observed in terms of the time between adoption and their first use of the AD law. We find strong evidence that retaliatory motives are at the heart of the proliferation decision as countries that were targeted by AD actions of traditional users in the past (i.e., US, EU) are much more likely to adopt an AD law. Also, our evidence suggests that past trade liberalization substantially increases the probability of a country to adopt an AD law. In addition, we find that the size of the chemicals sector and the extent of steel imports are positively correlated with the probability to adopt. The amount of inward FDI on the other hand has a clear negative effect on the probability to adopt. While short term macroeconomic factors like GDP growth and exchange rate volatility seem to matter less for adoption, asymmetric regional shocks and the development level of a country seem to raise the probability of starting to use an AD law. Our results are robust to several specifications of duration models.

JEL Classification: F13, F14

Keywords: antidumping, trade liberalization, GATT/WTO.

- 2007/67 Legal insider trading and stock market reaction: evidence from the Netherlands
Nihat AKTAS, Eric DE BODT, Ilham RIACHI and Jan DE SMEDT

This paper provides an analysis of legal insider trading on the Euronext Amsterdam stock exchange by using data published in the register held by the AFM, the dutch financial markets authority. The sample includes 822 transactions executed by corporate insiders between the beginning of January 1999 and the end of September 2005. Our analysis shows that the financial markets' response is not significant for purchases, and that the abnormal returns associated with the sales do not have the expected sign. However, over a longer time horizon, the average cumulative abnormal returns are positive for the stocks purchased, and negative for stocks sold by insiders. This result suggests either that insiders use long-term information for their trading activities or that they are able to time the market.

- 2007/68 Learning, hubris and corporate serial acquisitions
Nihat AKTAS, Eric DE BODT and Richard ROLL

Recent empirical research has shown that, from deal to deal, serial acquirers' cumulative abnormal returns (CAR) are declining. This has been most often attributed to CEOs hubris. We question this interpretation. Our theoretical analysis shows that (i) a declining CAR from deal to deal is *not sufficient* to reveal the presence of hubris, (ii) if CEOs are learning, economically motivated and rational, a declining CAR from deal to deal *should* be observed, (iii) predictions can be derived about the impact of learning and hubris on the time between successive deals and, finally, (iv) predictions about the CAR and about the time between successive deal trends lead to testable empirical hypotheses.

- 2007/69 Longevity and environmental quality in an OLG model

Pierre-André JOUVET, Pierre PESTIEAU and Gregory PONTIERE

Whereas existing OLG models with endogenous longevity neglect the impact of environmental quality on mortality, this paper studies the design of the optimal public intervention in a two-period OLG model where longevity is influenced positively by health expenditures, but negatively by pollution due to production. It is shown that if individuals, when choosing how much to spend on health, do not internalize the impact of their decision on environmental quality (i.e. the space available for each person), the decentralization of the social optimum requires a tax not only on capital income, but also, on health expenditures. The sensitivity of the optimal second-best public intervention is also explored numerically.

JEL Classification: E13, E21, I18, Q56

Keywords: longevity, health care, natural environment, pollution.

2007/70 The mixed strategy Nash equilibrium of the television news scheduling game
Jean GABSZEWICZ, Didier LAUSSEL and Michel LE BRETON

We characterize the unique mixed-strategy equilibrium of an extension of the "television news scheduling game" of Cancian, Bergström and Bills (1995) where viewers want to watch the first newscast broadcast after they return home. A fraction of the viewers record randomly one of the newscast to watch them in case they are too late. At equilibrium, neither of the two stations broadcasts its evening news in the first part of the evening and the density function is strictly decreasing.

2007/71 An interior-point method for the single-facility location problem with mixed norms using a conic formulation
Robert CHARES and François GLINEUR

We consider the single-facility location problem with mixed norms, i.e. the problem of minimizing the sum of the distances from a point to a set of fixed points in \mathbf{R}^n , where each distance can be measured according to a different p -norm.

We show how this problem can be expressed into a structured conic format by decomposing the nonlinear components of the objective into a series of constraints involving three-dimensional cones.

Using the availability of a self-concordant barrier for these cones, we present a polynomial-time algorithm (a long-step path-following interior-point scheme) to solve the problem up to a given accuracy.

Finally, we report computational results for this algorithm and compare with standard nonlinear optimization solvers applied to this problem.

Keywords: nonsymmetric conic optimization, conic reformulation, convex optimization, sum of norm minimization, single-facility location problems, interior-point methods.

2007/72 'The child is father of the man': implications for the demographic transition
David DE LA CROIX and Omar LICANDRO

We propose a new theory of the demographic transition based on the evidence that body development during childhood is an important predictor of adult life expectancy. Fertility, childhood development, longevity, education and income growth all result from individual decisions. Parents face a trade-off between the number of children they have and the spending they can afford on each of them in childhood. These childhood development spending will determine children longevity when adults. It is in this sense that we refer to Wordsworth's aphorism that "The Child is Father of the Man". Parents face a second trade-off in allocating their time between increasing their own human capital and rearing children. The model displays different regimes. In a Malthusian regime with no education fertility increases with adult life expectancy. In the modern growth regime, life expectancy and fertility move in opposite directions. The dynamics display the key features of the demographic transition, including the hump in both population growth and fertility, and replicate the observed rise in educational attainment, adult life expectancy and economic growth. Consistent with the empirical evidence, a distinctive implication of our theory is that improvements in childhood development precede the increase in education.

JEL Classification: J11, I12, N30, I20, J24

Keywords: life expectancy, height, human capital, fertility, mortality.

2007/73 Thematic clubs and the supremacy of network externalities
Jean GABSZEWICZ and Joana RESENDE

We raise the problem of the minorities' survival in the presence of positive network externalities. We rely on the example of thematic clubs to illustrate why and in which circumstances such survival problems might appear, first considering the case of simple network externalities and then the case of cross network externalities.

JEL Classification: F13, L41, O30, C2

Keywords: thematic clubs, network externalities, cross network externalities.

2007/74 A note on successive oligopolies and vertical mergers
Jean J. GABSZEWICZ and Skerdilajda ZANAJ

In this paper we analyze how the technology used by downstream firms can influence input and output market prices. We show via an example that both these prices increase under a decreasing returns technology while the contrary holds when the technology is constant.

JEL Classification: D43, L1, L22, L42

Keywords: successive oligopolies, vertical integration, technology, foreclosure.

2007/75 Kinky perceived demand curves and Keynes-Negishi equilibria
Jacques H. DREZE and P. Jean-Jacques HERINGS

The label "Keynes-Negishi equilibria" is attached here to equilibria in a monetary economy with imperfectly competitive product and labor markets where business firms and labor unions hold demand perceptions with kinks - as posited in Negishi's 1979 book *Microeconomic Foundations of Keynesian Macroeconomics*. Such equilibria are defined in a general equilibrium model, and shown to exist. Methodological implications are briefly

discussed in a concluding section.

JEL Classification: D50, E12, J51

Keywords equilibrium, imperfect competition, perceived demands, kinky demand, pricing rules, union wage model, union objectives, cash-in-advance.

2007/76 Gradient methods for minimizing composite objective function
Yu. NESTEROV

In this paper we analyze several new methods for solving optimization problems with the objective function formed as a sum of two convex terms: one is smooth and given by a black-box oracle, and another is general but simple and its structure is known. Despite to the bad properties of the sum, such problems, both in convex and nonconvex cases, can be solved with efficiency typical for the good part of the objective. For convex problems of the above structure, we consider primal and dual variants of the gradient method (converge as $O(1/k)$), and an accelerated multistep version with convergence rate $O(1/k^2)$, where k is the iteration counter. For all methods, we suggest some efficient "line search" procedures and show that the additional computational work necessary for estimating the unknown problem class parameters can only multiply the complexity of each iteration by a small constant factor. We present also the results of preliminary computational experiments, which confirm the superiority of the accelerated scheme.

Keywords: local optimization, convex optimization, nonsmooth optimization, complexity theory, black-box model, optimal methods, structural optimization, l_1 -regularization.

2007/77 A fair solution to the compensation problem
Giacomo VALLETTA

We study equity in economies where agents are endowed with different, non transferable, personal talents. To compensate them for such differences a given amount of money needs to be shared among them. We axiomatize a family of social orderings over allocations based on efficiency, fairness and robustness properties. Taking into account incentive constraints we derive the optimal policy: individuals with the same talent need to be equally compensated and only people whose level of talent is below a certain threshold should receive a positive compensation.

JEL Classification: D63, D71

Keywords: compensation, talents, fairness, axioms, social orderings, incentive-compatibility.

2007/78 Hawks and doves in segmented markets: a formal approach to competitive aggressiveness
Claude D'ASPREMONT, Rodolphe DOS SANTOS FERREIRA and Jacques THEPOT

Competitive aggressiveness is analyzed in a simple spatial oligopolistic competition model, where each one of two firms supplies two connected market segments, one captive the other contested. To begin with, firms are simply assumed to maximize profit subject to two constraints, one related to competitiveness, the other to market feasibility. The competitive aggressiveness of each firm, measured by the relative implicit price of the former constraint, is then endogenous and may be taken as a parameter to characterize the

set of equilibria. A further step consists in supposing that competitive aggressiveness is controlled by each firm through its manager hiring decision, in a preliminary stage of a delegation game. When competition is exogenously intensified, through higher product substitutability or through larger relative size of the contested market segment, competitive aggressiveness is decreased at the subgame perfect equilibrium. This decrease partially compensates for the negative effect on profitability of more intense competition.

- 2007/79 Imperfect competition and the trade cycle: guidelines from the late thirties
Claude D'ASPROMONT, Rodolphe DOS SANTOS FERREIRA and Louis-André GERARD-VARET

It is the study of the trade cycle during the thirties that made imperfectly competitive output markets a major theme in macroeconomics, principally under the lead of Harrod. Both him and Keynes were referring at the same time to a supposed feature of business cycles, namely the countercyclicality of real wages, which was however going to be very soon contested. Empirical evidence, as well as other more speculative considerations, induced an important flow of theoretical arguments developed by several authors during a very short period, at the eve of the second World War. We propose to examine these aborted guidelines already exhibiting the main ingredients of the *New Keynesian* research programme only developed one half century later: imperfectly competitive goods markets (with costly price adjustment, economies of scale and cyclical behaviour of markups), imperfectly competitive labour markets (with wage negotiations, implicit contracts and efficiency wages), and finally coordination failures.

- 2007/80 Testing fiscal sustainability in Poland: a Bayesian analysis of cointegration
Andrea SILVESTRINI

Fiscal sustainability is a central topic for most of the transition economies of Eastern Europe. This paper focuses on a particular country: Poland. The main purpose is to investigate, empirically, whether the post-transition fiscal policy is consistent with the intertemporal budget constraint, used as a formal theoretical framework. To test debt stabilization, the empirical analysis is made in two steps in which different inferential approaches are adopted. In the *first* step we perform the preliminary unit roots analysis and the selection of the cointegration rank using parametric and bootstrap procedures. In the *second* step we apply Bayesian inference to the estimation of the cointegrating vector and of the adjustment parameters. In this way, we experiment the usefulness of Bayesian inference in precisely assessing the magnitude of the cointegrating vector. Moreover, we show to what extent the likelihood of the data is important in revising the available prior information, relying on numerical integration techniques.

JEL Classification: C11, C32, E62

Keywords: Bayesian inference, fiscal sustainability, cointegration, bootstrap.

- 2007/81 Does inequality make us rebel? A renewed theoretical model applied to South Mexico
Jean-François MAYSTADT

Since Collier and Hoeffler (1998, 2004), it has been supported that inequality, measured

at national level, does not affect the risk of conflict. Based on a renewed theoretical framework, the purpose of the paper is to explore the role of inequality in localized conflicts. We argue that previous findings might be biased by the myopic nature of cross-country analysis. Consistently with the model, Probit estimations indicate that income inequality measured at municipal level was significant in motivating people to support the rebellion in South Mexico. At this geographical level, we also find an increase in income per capita could exacerbate the risk of conflict in a situation where the rebel leader would have greater incentives to loot the local production compared to the opportunity cost associated with fighting for the worker.

JEL Classification: O18, O54, C35

Keywords: rebellion, inequality, income, Mexico.

2007/82 Shareholder-efficient production plans in a multi-period economy
Jacques H. DREZE, Oussama LACHIRI and Enrico MINELLI

We propose an objective for the firm in a general model of production economies extending over time under uncertainty and with incomplete markets. Trading in commodities and shares of stock occurs sequentially on spot markets at all date-events. We derive the objective of the firm from the assumption of initial-shareholders efficiency. Each shareholder is assumed to communicate to the firm her marginal valuation of profits at all date events (expressed in terms of initial resources). In defining her own marginal valuation of the firm's profits, a shareholder will take two elements into consideration. To evaluate the direct impact of a change in dividends the shareholder uses her own vector of marginal rates of substitution for revenue across date-events. In addition, the shareholder will take into account the impact of future dividends on the firm's stock price when she trades shares. To predict the effect on the stock price, she uses a (possibly different) state price process, her price theory. The only restriction that we impose on consumers' price theories is that they should be compatible with the observed equilibrium: given the equilibrium prices and production plans, a price theory must satisfy a no-arbitrage condition. The firm computes its own shadow prices for profits at all date-events by simply adding up the marginal valuations of all its initial shareholders. We prove existence of an equilibrium.

2007/83 A unified approach to solve ill-posed inverse problems in econometrics
Jan JOHANNES, Sébastien VAN BELLEGEM and Anne VANHEMS

We consider the general issue of estimating a nonparametric function φ from the inverse problem $r = T\varphi$ given estimates of the function r and of the linear transform T . Two typical examples include the estimation of a probability density function from data contaminated by a noise whose distribution is unknown (blind deconvolution) and the nonparametric instrumental regression. We provide a unified framework based on Hilbert scales that synthesizes most of existing results in the econometric literature and also covers new relevant structural models. Results are given on the rate of convergence of the estimator of φ as well as of its derivatives.

JEL Classification: primary C14, secondary C30

Keywords: inverse problem, Hilbert scale, deconvolution, instrumental variable, nonparametric regression.

- 2007/84 Dialogue or issue divergence in the political campaign?
Pablo AMOROS and M. Soccoro PUY

We incorporate the media priming effects to explain how politicians can affect voters' preferences on issues during the political campaign. We adapt well-known terms of international trade, such as absolute advantage and comparative advantage, to the context of parties' competition in political issues. We show that when either each party has an absolute advantage on a different issue or when parties have "high" comparative advantage on a different issue, the political campaign will consist of issue-emphasis divergence. However, when a party has an absolute advantage on both issues but the parties' comparative advantage is not "high enough", the political campaign will consist of issue engagement or dialogue. Our results conciliate two separated theories concerning whether there must be dialogue or issue-emphasis divergence in the political campaign.

JEL Classification: D72, C70

Keywords: political campaign, media priming, political issues, spatial model.

- 2007/85 Identification and estimation by penalization in nonparametric instrumental regression
Jean-Pierre FLORENS, Jan JOHANNES and Sébastien VAN BELLEGEM

The nonparametric estimation of a regression function φ from conditional moment restrictions involving instrumental variables is considered. The rate of convergence of penalized estimators is studied in the case where φ is not identified from the conditional moment restriction. We also study the gain of modifying the penalty in the estimation, considering for instance a Sobolev-type of penalty. We analyze the effect of this modification on the rate of convergence of the estimator and on the identification of the regression function φ .

JEL Classification: F13, L41, O30, C2

Keywords: total factor productivity, antidumping protection, technological catching-up.

- 2007/86 A benchmark value for relative prudence
Louis EECKHOUDT, Johanna ETNER and Fred SCHROYEN

In this paper we propose benchmark values for the coefficients of relative risk aversion and relative prudence on the basis of a binary choice model where the decision maker chooses between aggregating or disaggregating multiplicative risks. We relate our results to the decision maker's willingness to trade-off the second with the first and the third (central) moment of his wealth distribution.

JEL Classification: D81

Keywords: relative risk aversion, relative prudence.

- 2007/87 Valid inequalities for the single-item capacitated lot sizing problem with step-wise costs
Ayse AKBALIK and Yves POCHE

This paper presents a new class of valid inequalities for the single-item capacitated lot sizing problem with step-wise production costs (LS-SW). We first provide a survey of

different optimization methods proposed to solve LS-SW. Then, *flow cover* and *flow cover inequalities* derived from the single node flow set are described in order to generate the new class of valid inequalities. The single node flow set can be seen as a generalization of some valid relaxations of LS-SW. A new class of valid inequalities we call *mixed flow cover*, is derived from the integer flow cover inequalities by a lifting procedure. The lifting coefficients are sequence independent when the batch sizes (V) and the production capacities (P) are constant and if V divides P . When the restriction of the divisibility is removed, the lifting coefficients are shown to be sequence independent. We identify some cases where the mixed flow cover inequalities are facet defining. A cutting plane algorithm is proposed for these three classes of valid inequalities. The exact separation algorithm proposed for the constant capacitated case runs in polynomial time. Finally, some computational results are given to compare the performance of the different optimization methods including the new class of valid inequalities.

Keywords: single-item capacitated lot sizing problem, flow cover inequalities, cutting plane algorithm.

2007/88 On the intensity of downside risk aversion
David CRAINICH and Louis EECKHOUDT

The degree of downside risk aversion (or equivalently prudence) is so far usually measured by $\frac{-U''''}{U''}$. We propose here another measure, $\frac{U''''}{U'}$, which has interesting properties, different from those related to $\frac{-U''''}{U''}$. It also appears that the two measures are not mutually exclusive. Instead, they seem to be rather complementary as shown through an economic application.

JEL Classification: D81

Keywords: downside risk aversion, prudence, local and global properties.

2007/89 On the role of retaliation in trade agreements
Alberto MARTIN and Wouter VERGOTE

This paper analyzes the role of retaliation in trade agreements. It shows that, in the presence of private information, retaliation can always be used to increase the welfare derived from such agreements by the participating governments. In particular, it is shown that retaliation is a necessary feature of any efficient equilibrium.

We argue that retaliation would not be necessary if governments could resort to international transfers or export subsidies to compensate for terms-of-trade externalities. Within the current world trading system, though, in which transfers are seldom observed whereas export subsidies are prohibited, the use of the remaining trade instruments in a retaliatory fashion might be optimal. The model is used to interpret the retaliatory use of antidumping observed in the last decades, and the proliferation of these measures relative to other trade remedies.

JEL Classification: C72, D82, F13

Keywords: cooperation, retaliation, private information, tariffs, trade agreements

- 2007/90 Unfair inequalities in health and health care
Marc FLEURBAEY and Erik SCHOKKAERT

Inequalities in health and health care are caused by different factors. Measuring "unfair" inequalities implies that a distinction is introduced between causal variables leading to ethically legitimate inequalities and causal variables leading to ethically illegitimate inequalities. An example of the former could be life-style choices, an example of the latter is social background. We show how to derive measures of unfair inequalities in health and in health care delivery from a structural model of health care and health production: "direct unfairness", linked to the variations in medical expenditures and health in the hypothetical distribution in which all legitimate sources of variation are kept constant; "fairness gap", linked to the differences between the actual distribution and the hypothetical distribution in which all illegitimate sources of variation have been removed. These two approaches are related to the theory of fair allocation. In general they lead to different results. We propose to analyse the resulting distributions with the traditional apparatus of Lorenz curves and inequality measures. We compare our proposal to the more common approach using concentration curves and analyse the relationship with the methods of direct and indirect standardization. We discuss how inequalities in health care can be integrated in an overall evaluation of social inequality.

JEL Classification: D63, I10

Keywords: equity in health care delivery, health inequality, social welfare.

- 2007/91 A partitioning algorithm for the network loading problem
Frédéric BABONNEAU and Jean-Philippe VIAL

This paper proposes a Benders-like partitioning algorithm to solve the network loading problem. The effort of computing integer solutions is entirely left to a pure integer programming solver while valid inequalities are generated by solving standard nonlinear multicommodity flow problems. The method is compared to alternative approaches proposed in the literature and appears to be efficient.

Keywords: network loading problem, Benders partitioning, ACCPM.

- 2007/92 The resistible decline of European science
Luc BAUWENS, Giordano MION and Jacques-François THISSE

Using a data set of highly cited researchers in all fields of science, we show that the gap in scientific performance between Europe, especially continental Europe, and the USA is large. We model the number of highly cited researchers in a sample of countries as a function of physical and human capital and a country-specific, factor-augmenting Hicks-neutral productivity term. We find that differences in productivity between Anglo-Saxon countries and other countries are not solely due to differences in the levels of inputs. Not surprisingly, our results reveal the importance of English proficiency. However, they also show that the governance and design of research institutions that characterize Anglo-Saxon countries, as well as a few other countries that have similar institutions, is another critical factor for research output.

JEL Classification: I23, C25

Keywords: research performance, citations, knowledge economies, university

governance.

- 2007/93 A characterization of inefficiency in stochastic overlapping generations economies
Gaetano BLOISE and Filippo L. CALCIANO

In this paper, we provide a characterization of *interim* inefficiency in stochastic economies of overlapping generations under possibly sequentially incomplete markets. With respect to the established body of results in the literature, we remove the hypothesis of two-period horizons, by considering longer, though uniformly bounded, horizons for generations. The characterization exploits a suitably Modified Cass Criterion, grounded on the long-run behavior of compounded safe interest rates and independent of the length of horizons of generations. Thus, the hypothesis of two-period horizons is purely heuristic in establishing a criterion for inefficiency. In addition, for sequentially incomplete markets, we adopt a suitable notion of *unambiguous* inefficiency, separating the inefficient intertemporal allocation of resources from incomplete risk-sharing. Unambiguous inefficiency reduces to inefficiency when markets are sequentially complete.

JEL Classification: D52, D61

Keywords: stochastic overlapping generations economies, inefficiency, competitive prices, cass criterion, social security, incomplete markets.

- 2007/94 Shapley compensation scheme
Pierre DEHEZ

We study a particular class of cost sharing games – "data games" – covering situations where some players own data which are useful for a project pursued by the set of all players. The problem is to set up compensations between players. Data games are subadditive but generally not concave, and have a nonempty core. We characterize the core and compute the compensation scheme derived from the Shapley value. We then compare it to the nucleolus. Although we use the term "data" our analysis actually applies to any good characterized by non rivalry and excludability.

JEL Classification: C71, D46, M41

Keywords: cost sharing, Shapley value, nucleolus.

- 2007/95 Unequal wages for equal utilities
Helmuth CREMER, Pierre PESTIEAU and Maria RACIONERO

When educational policy is supplemented by a redistributive income tax, and when individuals differ in their ability to benefit from education, the optimal policy is typically rather regressive. Resources are concentrated on the most able individuals in order to get a "cake" as big as possible to share among individuals through income taxation. In this paper we put forward another reason to push for regressive education. It is not linked to heterogeneity in innate ability to benefit from education but to pervasive non-convexities that arise in the optimal income tax problem when individual productivities are endogenous. For simplicity we assume a linear education technology and a given total education budget. To give the equal wage outcome the best chance to emerge, we also assume that individuals have identical learning abilities. Nevertheless, it turns out that in

the first-best wage inequality is always preferable to wage equality. Even more surprisingly, this conclusion remains valid in the second-best (unless ad hoc restriction on the feasible degree of a wage differentiation are imposed). This is in spite of the fact that wage equalization would eliminate any need for distortionary income taxation.

JEL Classification: H20, I20, D63

Keywords: education policy, optimal income taxation, equal opportunity.

2007/96 Collective annuities and redistribution

Helmuth CREMER, Jean-Marie LOZACHMEUR and Pierre PESTIEAU

In a number of countries one observes a steady decline in defined benefits pensions schemes, public or private, funded or unfunded, and a simultaneous expansion of defined contributions plans. One of the consequences of this trend is to deprive individuals at the time of their retirement from the benefit of collective annuitization. Collective annuities can be distinguished from individual ones in two ways. First, they tend to be cheaper because of their scale and because of inefficiencies in private annuity markets. Second they redistribute resources from short-lived to long-lived individuals. Our paper studies the role of collective annuities. Both their redistributive incidence and efficiency aspects are accounted for. We assume that lifetime is uncertain and that there is a positive correlation between longevity and earnings. Collective annuitization (in part or in total) can be imposed on private savings or it can be "bundled" with a redistributive pension scheme. We show that the case for applying collective annuitization to private savings is weak. The case is stronger when collective annuities are associated with redistributive pensions. However, even in that case, collective annuitization may mitigate the redistributive benefits associated with the pension system.

JEL Classification: G23, H55, J18

Keywords: annuities, public pensions, differential longevity.

2007/97 Mixed exponential power asymmetric conditional heteroskedasticity

Mohammed BOUADDI and Jeroen V.K. ROMBOUTS

To match the stylized facts of high frequency financial time series precisely and parsimoniously, this paper presents a finite mixture of conditional exponential power distributions where each component exhibits asymmetric conditional heteroskedasticity. We provide stationarity conditions and unconditional moments to the fourth order. We apply this new class to Dow Jones index returns. We find that a two-component mixed exponential power distribution dominates mixed normal distributions with more components, and more parameters, both in-sample and out-of-sample. In contrast to mixed normal distributions, all the conditional variance processes become stationary. This happens because the mixed exponential power distribution allows for component-specific shape parameters so that it can better capture the tail behaviour. Therefore, the more general new class has attractive features over mixed normal distributions in our application: Less components are necessary and the conditional variances in the components are stationary processes. Results on NASDAQ index returns are similar.

JEL Classification: : C11, C22, C52

Keywords: finite mixtures, exponential power distributions, conditional heteroskedasticity, asymmetry, heavy tails, value at risk.