2014/1   Preferences for redistribution and social structure
            Erik SCHOKKAERT and Tom TRUYTS

            We model inter-individual differences in preferences for redistribution as a
            function of (a) self-interest; (b) stable ideological traits; (c) subjective perceptions
            of the relative importance of the main determinants of income differences (luck,
            effort, talent). Individuals base the latter on information obtained from their
            reference group. We analyse the consequences for redistributive preferences of
            homophilous reference group formation based on talent. We argue that our
            theoretical results make it possible to understand and integrate some of the main
            insights from the empirical literature. We illustrate with GSS data from 1987 how
            our model may help in structuring empirical work.
            JEL Classification: D30, D63, D70

2014/2   The agricultural invasion and the political economy of agricultural trade policy in
            Belgium, 1875-1900
            Maarten VAN DIJCK and Tom TRUYTS

            After 1875, cheap grain from the United States and Russia flooded the European
            markets. Many countries like Germany, France, and Sweden turned to agricultural
            trade protection, while others, like the UK and Denmark, held on to a free trade
            position. Belgium adopted a middle position, leaving its grain markets open but
            protecting animal husbandry, dairy production, and the processing of foodstuffs.
            The econometric analysis of the votes of Belgian Members of Parliament on four
            proposals to install protectionist measures on agricultural trade seeks to identify
            which economic or political interests explain the Belgian policy option.

2014/3   Constitutions and social networks
            Ana MAULEON, Nils ROEHL and Vincent VANNETELBOSCH

            The objective of the paper is to analyze the formation of social networks where
            individuals are allowed to engage in several groups at the same time. These group
            structures are interpreted here as social networks. Each group is supposed to have
            specific rules or constitutions governing which members may join or leave it.
            Given these constitutions, we consider a social network to be stable if no group is
            modified any more. We provide requirements on constitutions and players'
            preferences under which stable social networks are induced for sure. Furthermore,
            by embedding many-to-many matchings into our setting, we apply our model to
            job markets with labor unions. To some extent the unions may provide job
            guarantees and, therefore, have influence on the stability of the job market.
            JEL Classification: C72, C78, D85
            Keywords: social networks, constitutions, stability, many-to-many matchings.

2014/4   Allocating value among farsighted players in network formation
            Nicolas CARAYOL, Rémy DELILLE and Vincent VANNETELBOSCH

            We propose a concept to study the stability of social and economic networks when
            players are farsighted and allocations are determined endogenously. A set of
            networks is a von Neumann-Morgenstern farsightedly stable set with bargaining if
            there exists an allocation rule and a bargaining threat such that (i) there is no
            farsighted improving path from one network inside the set to another network
            inside the set, (ii) from any network outside the set there is a farsighted improving
            path to some network inside the set, (iii) the value of each network is allocated

among players so that players suffer or benefit equally from being linked to each other compared to the allocation they would obtain at their respective credible bargaining threat. We show that the set of strongly efficient networks is the unique von Neumann-Morgenstern farsightedly stable set with bargaining if the allocation rule is anonymous and component efficient and the value function is top convex. Moreover, the componentwise egalitarian allocation rule emerges endogenously.
JEL Classification: A14, C70, D20
Keywords: farsighted players, stability, equal bargaining power.

2014/5   Convergent subgradient methods for nonsmooth convex minimization
           Yu. NESTEROV and Vladimir SHIKHMAN

In this paper, we develop new subgradient methods for solving nonsmooth convex optimization problems. These methods are the first ones, for which the whole sequence of test points is endowed with the worst-case performance guarantees. The new methods are derived from a relaxed estimating sequences condition, which allows reconstruction of the approximate primal-dual optimal solutions.

Our methods are applicable as efficient real-time stabilization tools for potential systems with infinite horizon. As an example, we consider a model of privacy-respecting taxation, where the center has no information on the utility functions of the agents. Nevertheless, we show that by a proper taxation policy, the agents can be forced to apply in average the socially optimal strategies.
Preliminary numerical experiments confirm a high efficiency of the new methods.
Keywords: convex optimization, nonsmooth optimization, subgradient methods, rate of convergence, primal-dual methods, privacy-respecting tax policy.

2014/6   Modeling of environmental adaptation versus pollution mitigation
           Yuri YATSENKO, Natali HRITONENKO and Thierry BRECHET

The paper combines analytic and numeric tools to investigate a nonlinear optimal control problem relevant to the economics of climate change. The problem describes optimal investments into pollution mitigation and environmental adaptation at a macroeconomic level. The steady-state analysis of this problem focuses on the optimal ratio between adaptation and mitigation. In particular, we analytically prove that the long- term investments into adaptation are profitable only for economies above certain efficiency threshold. Numerical simulation is provided to estimate how the economic efficiency and capital deterioration affect the optimal policy.
JEL Classification: 91B76, 34H05, 49J22, 65R20
Keywords: climate change, environmental adaptation, mitigation, optimal control, steady state analysis.

2014/7   The continuous knapsack set
           Sanjeeb DASH, Oktay GÜNLÜK and Laurence A. WOLSEY

We study the convex hull of the continuous knapsack set which consists of a single inequality constraint with n non-negative integer and m non-negative bounded continuous variables. When $n = 1$, this set is a slight generalization of the single arc flow set studied by Magnanti, Mirchandani, and Vachani (1993). We first show that in any facet-defining inequality, the number of distinct non-zero coefficients of the continuous variables is bounded by $2^n - n$. Our next result is to show that when $n = 2$, this upper bound is actually 1. This implies that when $n = 2$, the coefficients

of the continuous variables in any facet-defining inequality are either 0 or 1 after scaling, and that all the facets can be obtained from facets of continuous knapsack sets with $m = 1$. The convex hull of the sets with $n = 2$ and $m = 1$ is then shown to be given by facets of either two-variable pure-integer knapsack sets or continuous knapsack sets with $n = 2$ and $m = 1$ in which the continuous variable is unbounded. The convex hull of these two sets has been completely described by Agra and Constantino (2006). Finally we show (via an example) that when $n = 3$, the non-zero coefficients of the continuous variables can take different values.
JEL Classification: 90C11, 90C26
Keywords: continuous knapsack set, single arc flow set, convex hull, facet coefficients.

2014/8   Prospects for Paris 2015: do major emitters want the same climate ?
Simon BUCKLE, Mirabelle MUÛLS, Jorge LEIB and Thierry BRECHET

International negotiations have failed to achieve an ambitious outcome to limit climate risks. A Cournot outcome where countries determine their mitigation commitments in the full knowledge of those by others could be an important step. It would avoid a Stackelberg (leader-follower) outcome where one or more major emitters impose a level of climate risk on the rest of the world. This requires these countries to have sufficiently similar preferences over global cumulative emissions. We develop a novel stylised economic growth model to analyse the dynamics of international negotiations. Economies can be classified according to their committed emissions and the initial level of atmospheric CO_2. We define a new metric, the desired mitigation effort, which provides an empirical methodology for comparing and evaluating countries' mitigation commitments. A numerical calibration suggests a degree of convergence between the major emitters that might allow a Cournot-style agreement at the Paris Conference in 2015.
Keywords: climate change, climate damages, economic growth, game theory, international climate negotiations, mitigation.

2014/9   Social security and economic integration
Lionel ARTIGE, Antoine DEDRY and Pierre PESTIEU

The purpose of this letter is to analyze the impact of economic integration on capital accumulation and capital flows when countries differ in their social security systems, especially as regards the degree of funding of pensions and the regulation of the retirement age. Funding and early retirement both foster capital accumulation relative to pay-as-you-go pensions with flexible retirement. In the case of economic integration, both imply capital outflow possibly resulting in utility losses.
JEL Classification: H2, F42, J26
Keywords: economic union, pension, retirement age, social security.

2014/10   Equilibria in secure strategies in the Tullock contest
Mikhail ISKAKOV, Alexey ISKAKOV and Alexey ZAKHAROV

It is well known that a pure-strategy Nash equilibrium does not exist for a two-player rent-seeking contest when the contest success function parameter is greater than two. We analyze the contest using the concept of equilibrium in secure strategies, which is a generalization of the Nash equilibrium. It is defined by two conditions: (i) no player can make a profitable deviation that decreases the payoff

of another player and (ii), for any profitable deviation there is a subsequent deviation by another player, that is profitable for the second deviator and worse than the status quo for the first deviator. We show that such equilibrium always exists in the Tullock contest. Moreover, when the success function parameter is greater than two, this equilibrium is unique up to a permutation of players, and has a lower rent dissipation than in a mixed-strategy Nash equilibrium.
JEL Classification: D72, D03, L12, C72
Keywords: rent-seeking, Tullock contest, equilibrium in secure strategies, rent dissipation, non-cooperative games.

2014/11   Means-tested long term care and family transfers
           Helmuth CREMER and Pierre PESTIEAU

One of the pervasive problems with means-tested public long term care (LTC) programs is their inability to prevent individuals who could afford private long term services from taking advantage of public care. They often manage to elude the means-test net through "strategic impoverishment". We show in a simple model how this problem comes about, how it affects welfare and how it can be mitigated.
JEL Classification: H2, H5
Keywords: long term care, means-testing, strategic impoverishment, opting out, public insurance, altruism.

2014/12   Estimation and empirical performance of non-scalar dynamic conditional
           correlation models
           Luc BAUWENS, Lyudmila GRIGORYEVA and Juan-Pablo ORTEGA

This paper presents a method capable of estimating richly parametrized versions of the dynamic conditional correlation (DCC) model that go beyond the standard scalar case. The algorithm is based on the maximization of a Gaussian quasi-likelihood using a Bregman-proximal trust-region method to handle the various non-linear stationarity and positivity constraints that arise in this context. We consider the general matrix Hadamard DCC model with full rank, rank equal to two and, additionally, two different rank one matrix specifications. In the last mentioned case, the elements of the vectors that determine the rank one parameter matrices are either arbitrary or parsimoniously defined using the Almon lag function. We use actual stock returns data in dimensions up to thirty in order to carry out performance comparisons according to several in- and out-of-sample criteria. Our empirical results show that the use of richly parametrized models adds value with respect to the conventional scalar case.
JEL Classification: C13, C32, G17
Keywords: multivariate volatility modeling, dynamic conditional correlations (DCC), non-scalar DCC models, constrained optimization, Bregman divergences, Bregman-proximal trust-region method.

2014/13   A note on the Tobit model in the presence of a duration variable
           Christian M. HAFNER and Arie PREMINGER

The Tobit model (censored regression model) is an important basic model appearing in many applications in economics. In this paper we consider a duration Tobit model in which a duration variable which counts the number of times the data is being censored is included as a covariate. We show that in this case, the dependent variable eventually becomes degenerate, which makes the asymptotic Fisher information matrix singular, rendering the standard methods of asymptotic

inference inapplicable. We provide a simulation study and an empirical application to support our results.
JEL Classification: C24, J64
Keywords: limited dependence, censoring, duration, labor supply.

2014/14   Specific Markov-switching behaviour for ARMA parameters
            Jean-François CARPANTIER and Arnaud DUFAYS

We propose an estimation method that circumvents the path dependence problem existing in Change-Point (CP) and Markov Switching (MS) ARMA models. Our model embeds a sticky infinite hidden Markov-switching structure (sticky IHMM), which makes possible a self-determination of the number of regimes as well as of the specification : CP or MS. Furthermore, CP and MS frameworks usually assume that all the model parameters vary from one regime to another. We relax this restrictive assumption. As illustrated by simulations on moderate samples (300 observations), the sticky IHMM-ARMA algorithm detects which model parameters change over time. Applications to the U.S. GDP growth and the DJIA realized volatility highlight the relevance of estimating different structural breaks for the mean and variance parameters.
JEL Classification: C11, C15, C22, C58
Keywords: Bayesian inference, Markov-switching model, ARMA model, infinite hidden Markov model, Dirichlet Process.

2014/15   Strategic stability of equilibria: the missing paragraph
            Federico GRIGIS DE STEFANO

This paper introduces two set valued Nash equilibrium refinements that are a natural generalization of the concept of stable set of equilibria introduced in Kohlberg and Mertens (1986) and satisfy all the properties defined in Mertens (1989). It also establishes a connection between Nash equilibrium refinements and stochastic games as a tool to define a stable set of equilibria.
JEL Classification: A23, C72
Keywords: game theory, equilibrium refinements, strategic stability, stochastic games.

2014/16   Efficient approximation algorithms for the economic lot-sizing in continuous time
            Claudio TELHA and Mathieu VAN VYVE

We consider a continuous-time variant of the classical Economic Lot-Sizing (ELS) problem. In this model, the setup cost is a continuous function with lower bound $K_{min} > 0$, the demand and holding costs are integrable functions of time and the replenishment decisions are not restricted to be multiples of a base period. Starting from the assumption that certain operations involving the setup and holding cost functions can be carried out efficiently, we argue that this variant admits a simple approximation scheme based on dynamic programming: if the optimal cost of an instance is OPT, we can find a solution with cost at most $(1 + \varepsilon)OPT$ using no more than $O \left({1\over \varepsilon^2} {OPT \over K_{min}} \log {OPT \over K_{min}}\right)$ of these operations. We argue, however, that this algorithm could be improved on instances where the setup costs are "generally" very large compared with K_{min}. This leads us to introduce a notion of input-size σ that is significantly smaller than OPT/K_{min} on instances of this type, and then to define an approximation scheme that executes $O({1\over \varepsilon^2}\sigma^2 ({OPT \over}$

K_min}))$ operations. Besides dynamic programming, this second approximation scheme builds on a novel algorithmic approach for Economic Lot Sizing problems.

2014/17   Testing constancy of the error covariance matrix in vector models against parametric alternatives using a spectral decomposition
Yukai YANG

I consider multivariate (vector) time series models in which the error covariance matrix may be time-varying. I derive a test of constancy of the error covariance matrix against the alternative that the covariance matrix changes over time. I design a new family of Lagrange-multiplier tests against the alternative hypothesis that the innovations are time-varying according to several parametric specifications. I investigate the size and power properties of these tests and find that the test with smooth transition specification has satisfactory size properties. The tests are informative and may suggest to consider multivariate volatility modelling.
JEL Classification: C32, C52
Keywords: covariance constancy, error covariance structure, Lagrange multiplier test, spectral decomposition, auxiliary regression, model misspecification, Monte Carlo simulation.

2014/18   Inequality, income, and well-being
Koen DECANCQ, Marc FLEURBAEY and Erik SCHOKKAERT

Individual well-being depends not only on income but also on other dimensions of life, such as health, the quality of social relations and of the environment, employment, and job satisfaction. In this paper we survey the economic literature on how to construct such overall measures of well-being. We distinguish three approaches: the capability (and functionings) approach, the use of subjective life satisfaction measures and the calculation of equivalent incomes. We discuss the normative assumptions underlying these three approaches, focusing on two issues: the degree to which individual preferences are respected and where in each approach the boundaries of individual responsibility are drawn. We compare the measurement of inequality in well-being with the use of multidimensional inequality measures. We illustrate the general theoretical issues in three domains of application: measuring the effects of household size and composition in the literature on equivalence scales, valuing publicly provided goods and services, and making international comparisons of well-being involving international PPP comparisons.

2014/19   Digital piracy: an update
Paul BELLEFLAMME and Martin PEITZ

This note summarizes and updates our previous survey of the economics of digital piracy (Belleflamme and Peitz, 2012).
JEL Classification: L11, L82, L86
Keywords: information good, piracy, copyright, IP protection, internet, peer-to-peer, software, music.

2014/20   Licensing to vertically related markets
           Eva-Maria SCHOLZ

We analyse the problem of a non-producing patentee who licenses an essential process innovation to a vertical Cournot oligopoly. The vertical oligopoly is composed of an upstream and a downstream sector which may differ in their efficiency or, in other words, in the benefit they derive from the innovation. In this framework we characterise the optimal licensing contract in terms of the licensing revenue maximising policy (fixed-fee or per-unit royalty) and sector (upstream and/or downstream sector). First, it is shown that under a fixed-fee contract licensing to the less efficient industry sector may be the patentee's licensing revenue maximising strategy. Here, licensing to a less efficient downstream market is all the time optimal in terms of consumer surplus and aggregate economic welfare. Conversely, licensing to a less or equally efficient upstream industry is potentially inefficient. Second, our findings reveal that the optimal licensing policy is sector dependent. A per-unit royalty contract may dominate a fixed-fee policy on the downstream market in terms of licensing revenues, while offering a per-unit royalty contract to the upstream industry is never optimal. As a third and final point we address the case of licensing to both industry sectors. Here we also identify conditions under which two-sector licensing of both sectors is less profitable than one-sector licensing of a single industry (and vice versa).
JEL Classification: D43, L13, O31, O34
Keywords: licensing contracts, fixed-fee, royalties, vertical Cournot oligopoly.

2014/21   Optimal energy transition and taxation of non-renewable resources
           N. Baris VARDAR

This paper investigates the optimal taxation path of a non-renewable resource in the presence of an imperfect substitute renewable resource. We present an optimal growth model and characterize the social optimum and the decentralized equilibrium. We show that the economy gradually reduces the share of non-renewable resource and converges to a steady state in which it uses only the renewable resource. The decentralized economy converges to the same steady state as the social optimum in terms of capital stock and consumption whether there is a regulator intervention or not. What matters for welfare, however, is the speed at which the economy approaches the clean state - the energy transition, which determines the level of environmental damages. We obtain the optimal taxation rule and show that its time profile can be either always increasing, decreasing or U-shaped depending on the initial state of the economy. Finally we provide some simulation results to illustrate these theoretical findings.
JEL Classification: Q43, Q38, Q30, Q20
Keywords: energy, optimal taxation, non-renewable resource, renewable resource, imperfect substitution, simultaneous resource use.

2014/22   Income poverty measures with relative poverty lines
           Benoît DECERF

I derive poverty indices taking into account both the absolute and relative aspects of income well-being. The trade-off made by the social planner between those two aspects is captured at individual level by a well-being ordering. This ordering evaluates the well-being of an agent based on her income and a reference statistic on the income distribution, typically the mean. A family of poverty indices respecting the judgements held in the ordering is axiomatically characterized.

Then, I study the consequences of requiring the poverty indices to grant a minimal precedence to the absolute over the relative aspect of income well-being. This compelling requirement has strong implications. In particular, the Poverty Gap Ratio is the only index in the popular Foster-Greer-Thorbecke family to satisfy it.
Keywords: relative poverty, absolute poverty, income poverty, poverty gap ratio.

2014/23   Aging, social security design and capital accumulation
             Antoine DEDRY, Harun ONDER and Pierre PESTIEAU

This paper analyzes the impact of aging on capital accumulation and welfare in a country with a sizable unfunded social security system. Using a two-period overlapping-generation model with endogenous retirement decisions, we show that both the type of aging and the type of unfunded social security system are important in understanding this impact. We consider two demographic changes, declining fertility and increasing longevity, and three types of pensions, defined contributions, defined benefits and defined annuities, to investigate the differences in implications of aging.
JEL Classification: H2, F42, H8
Keywords: aging, public finance sustainability, social security.

2014/24   Fair allocation of disputed properties
             Biung-Ghi JU and Juan D. MORENO-TERNERO

We model problems of allocating disputed properties as generalized exchange economies in which agents have preferences and claims over multiple goods, and the social endowment of each good may not be sufficient to satisfy all individual claims. In this context, we investigate procedural and end-state principles of fairness, their implications and relations. To do so, we explore "procedural" allocation rules represented by a composition of a rights-assignment mechanism (to assign each profile of claims individual property rights over the endowment) and Walrasian, or other individually rational, exchange rule. Using variants of fairness based on no-envy as end-state principles, we provide axiomatic characterizations of the three focal egalitarian mechanisms, known in the literature on rationing problems as constrained equal awards, constrained equal losses, and proportional mechanisms. Our results are connected to focal contributions in political philosophy, and also provide rationale for market-based environ- mental policy instruments (such as cap-and-trade schemes and personal carbon trading) and moral foundation for the three proposals to allocate GHG emission rights known as the equal per capita sharing, the polluter pays principle and the equal burden sharing (the victims pay principle).
JEL Classification: D63, D71
Keywords: fairness, claims, no-envy, individual rationality, egalitarianism, efficiency, Walrasian exchange.

2014/25   From agriculture to manufacture: how does geography matter ?
             Nguyen Thang DAO

This paper shows that the development from an agricultural regime through industrialization to a manufacturing regime occurs simultaneously to the demographic transition and the change in labor structure towards an increasing fraction of skilled labor due to technological progress. The manufacturing sector is economically viable when the technological level is sufficiently high. During the

industrialization, the technological progress makes technology become more complementary to skilled labor than to unskilled labor, so that individuals tend to decrease the number of unskilled offspring in order to increase the number of skilled ones. This paper also shows that a geographical advantage for agriculture helps an economy to be more prosperous in the agricultural regime, but delays the timing of industrialization and the timing of demographic transition. Hence, an economy with more geographical advantage for agriculture may be overtaken in the development process by another with less geographical advantage for agriculture when the level of technology is high enough.

JEL Classification: J11, J13, O11, O41

Keywords: agricultural sector, manufacturing sector, technological level, technological progress, geographical advantage for agriculture.

2014/26   From Bertrand to Cournot via Kreps and Scheinkman: a hazardous journey
Xavier Y. WAUTHY

The mininal core of strategic decisions a firm has to make is three-fold: What to produce? At which scale? At what price? A full-fledged theory of oligopolistic competition should be able to embrace these three dimensions jointly. Starting from the Cournot-Bertrand dispute and the stream of research it gave birth to, this survey shows that we are far from having such a theory at our disposal today. Many papers cover two dimensions out of three and display insightful results but no paper satisfactorily addresses the complete picture. I discuss the limitations of the different approaches that have been undertaken. This discussion sets a clear agenda for further theoretical research on the oligopoly front.

JEL Classification: L13

Keywords: Bertrand, Cournot, Edgeworth, product differentiation, capacity constraints.

2014/27   The axiomatic approach to the problem of sharing the revenue from bundled pricing
Gustavo BERGANTINOS and Juan D. MORENO-TERNERO

We explore in this paper the axiomatic approach to the problem of sharing the revenue from bundled pricing. We formalize two models for this problem on the grounds of two different informational bases. In both models, we provide axiomatic rationale for natural rules to solve the problem. We, nonetheless, obtain drastic differences under each scenario, which highlights the importance of setting the appropriate informational basis of the problem.

JEL Classification: D63, C71

Keywords: resource allocation, bundled pricing, museum passes, proportional, axioms.

2014/28   International tax leadership among asymmetric countries
Jean HINDRIKS and Yukihiro NISHIMURA

Multinational companies can shift profit and income between branches in order to reduce the overall tax liabilities of the company. The result is a tax competition between countries. In this paper we consider the sequential choice of tax rates to illustrate the potential effects of tax leadership. We use a profit shifting model with multinational firms that operate in two countries, large and small. Governments compete by setting source-based corporate income taxes. We show that: (i) the

sequential tax equilibria always Pareto dominate the simultaneous tax equilibrium. (ii) Each country prefers to follow than to lead the tax game. (iii) The tax leadership by the large country risk-dominates the tax leadership by the small country. Therefore our analysis provides a plausible explanation for the endogenous emergence of the tax leader- ship by the large countries. The results are contrasting with previous results in the literature.
JEL Classification: C72, F23, F68, H25, H87
Keywords: profit shifting, tax competition, endogenous timing, second-mover advantage, risk-dominance.

2014/29   A note on equilibrium leadership in tax competition models
           Jean HINDRIKS and Yukihiro NISHIMURA

           This paper reexamines the work of Kempf and Rota-Graziosi (J. Pub. Econ. 94: 768-776, 2010), which shows that leadership by the small region is the risk dominant equilibrium under the endogenous timing game. They obtain this result in a model where the asymmetry among countries translates into different gradients of the demand for capital but identical vertical intercept. In this note, we simply reverse the form of asymmetry by considering different vertical intercepts but identical gradient. The reason is that market power is typically related to the intercept and not to the slope of the demand function. We then show that the large region tax leadership becomes the risk dominant equilibrium and can even become Pareto superior.
           JEL Classification: H30, H87, C72
           Keywords: endogenous timing, tax competition, reaction function.

2014/30   Auctions with prestige motives
           Olivier BOS and Tom TRUYTS

           Social status, or prestige, is an important motive for buying art or collectibles and for participation in charity auctions. We study a symmetric private value auction with prestige motives, in which the auction outcome is used by an outside observer to infer the bidders' types. We elicit conditions under which an essentially unique D1 equilibrium bidding function exists in four auction formats: first-price, second-price, all-pay and the English auction. We obtain a strict ranking in terms of expected revenues: the first-price and all-pay auctions are dominating the English auction but are dominated by the second-price auction. Expected revenue equivalence is restored asymptotically for the number of bidders going to infinity.
           JEL Classification: D44, D82
           Keywords: costly signaling, D1 criterion, social status, art auctions, charity auctions.

2014/31   Normative foundations for equity-sensitive population health evaluation functions
           Juan D. MORENO-TERNERO and Lars P. OSTERDAL

           Standard models for the evaluation of population health, such as the so-called models of aggregate Quality Adjusted Life Years (QALYs), or aggregate Healthy Years Equivalent (HYEs), are usually criticized on equity grounds. We provide in this paper normative justifications for alternative equity-sensitive models, such as the so-called models of multiplicative QALYs, multiplicative HYEs, and generalizations of the two. Our axiomatic approach assumes social preferences over distributions of individual health states experienced in a given period of time.

It conveys informational simplicity, as it does not require information about individual preferences on health.
JEL Classification: D63, I10
Keywords: population health, equity, HYEs, QALYs, axioms.

2014/32   Stability of networks under level-K farsightedness
           P. Jean-Jacques HERINGS, Ana MAULEON and Vincent VANNETELBOSCH

We provide a tractable concept that can be used to study the influence of the degree of farsightedness on network stability. A set of networks G_K is a level-K farsightedly stable set if three conditions are satisfied. First, external deviations should be deterred. Second, from any network outside of G_K there is a sequence of farsighted improving paths of length smaller than or equal to K leading to some network in G_K. Third, there is no proper subset of G_K satisfying the first two conditions.
We show that a level-K farsightedly stable set always exists and we provide a sufficient condition for the uniqueness of a level-K farsightedly stable set. There is a unique level-1 farsightedly stable set G_1 consisting of all networks that belong to closed cycles. Level-K farsighted stability leads to a refinement of G_1 for generic allocation rules. We then provide easy to verify conditions for a set to be level-K farsightedly stable and we consider the relationship between level-K farsighted stability and efficiency of networks. We show the tractability of the concept by applying it to a model of criminal networks.
JEL Classification: A14, C70, D20
Keywords: farsightedness, stability, networks.

2014/33   The macroeconomics of PAYG pension schemes in an aging society
           Lionel ARTIGE, Laurent CAVENAILE and Pierre PESTIEAU

This paper analyzes and compares the macroeconomic performance of defined-benefit and defined-contribution pay-as-you-go pension systems when population ages. When the fertility rate decreases or longevity rises, it is shown that a shift from defined benefit (defined total benefit or defined annuities) to defined contribution always results in higher per-capita income and life-cycle welfare at the steady state. All results are derived with general production and utility functions.
JEL Classification: E13, H55, J13, J26
Keywords: aging, defined benefit, defined contribution, fertility, longevity, PAYG pension.

2014/34   A conic optimization approach for SKU rationalization
           Tanguy KEGELART and Mathieu VAN VYVE

Expanding variety and the number of offered products is attractive for a firm to fit customer needs. Nevertheless, the greater complexity and the proliferation of stock-keeping units (SKUs) without substantial differentiation may not substantially improve customer satisfaction while raising costs. Based on the principle that the product-line size involves operational implications and particularly manufacturing and holding costs, this paper develops a mixed-integer nonlinear mathematical program (MINLP) to support efficient product portfolio reductions. Basically, the fixed costs elimination and the risk-pooling effects must balance the demand contraction due to customer dissatisfaction. Off-theshelve Mixed-Integer Quadratic Problem (MIQP) solver provides optimal solution to the proposed conic quadratic reformulation, and a real-life industrial case illustrates the

program and the algorithm efficiency. Findings show that our mathematical programming subject to various assumptions and estimations is efficient to rationalize portfolios up to at least 400 SKUs.
JEL Classification: C61, M11
Keywords: supply chain management, efficient portfolio reduction, joint product portfolio-inventory model, conic quadratic mixed-integer program.

2014/35   Transferable and non transferable utility implementations of coalitional stability in integrated assessments models
Ulrike KORNEK, Kai LESSMANN and Henry TULKENS

To study the stability of coalitions in the standard game theoretic model of international environmental agreements, two alternative concepts are used: potential internal stability and core stability. Both concepts make use of the possibility of reallocating payoffs within a coalition through transfers, formulated in terms of transferable utility among the players. For international applications where players are countries, such as done in the growing literature on integrated assessment models, nontransferable utility games would be economically better suited. In this note, we provide a framework for comparing the treatment of coalitions in five game theoretically minded integrated assessment models, from that point of view. Under way, we extend the definition of the two stability concepts to games without transferable utility, assuming instead the transferability of some physical good. We also show that potential internal stability and blocking power of coalitions can be tested by solving a simple optimization problem.

2014/36   Endogenizing long-term contracts in gas market models
Ibrahim ABADA, Andreas EHRENMANN and Yves SMEERS

Up to now, the European natural gas trade was dominated by bilateral long-term upstream agreementsbetween producers and midstreamers that fixed a minimum volume to be exchanged (Take Or Pay) and a price formula that was usually indexed on oil products prices. These arrangements were believed to allow: i) market risk sharing between the producer (who takes the price risk) and the midstreamer (who takes the volume risk) as well as ii) risk hedging since oil is considered as a trusted commodity by investors. The fall of the European demand combined with the increase of the oil price favored the emergence of a gas volume bubble that caused net losses for most of the European midstreamers who were bound by long-term agreements. As a result, some energy economists brought forward the idea of indexing contracts on gas spot prices. In this paper, we present an equilibrium model that endogenously captures the contracting behavior of both the producer and the midstreamer who strive to hedge their profit-related risk. The players choose between gas forward and oil-indexed contracts. Using the model we show that i) contracting can reduce the trade risk of both the producer and midstreamer, ii) oilindexed contracts should be signed only when oil and gas spot prices are well correlated, otherwise, these contracts hold less interest for risk mitigation, iii) contracts are more needed when the upstream cost structure is CAPEX driven and iv) a too risk-averse behavior of the midstreamer might deprive upstream investments and the downstream consumer surplus.

2014/37   Output externalities on total factor productivity
            Julio DAVILA

            The impact that output has on future total factor productivity —i.e. the dynamic
            complementarities shown to be empirically relevant in Cooper and Johri (1997)—
            is not internalized by competitive agents. As a result, the allocation that a planner
            would choose cannot be reached as a competitive equilibrium outcome (neither for
            infinitely-lived agents nor for overlapping generations): the market return to
            savings and wage rate are too low. The planner's allocation can nonetheless be
            implemented by a fiscal policy subsidizing as needed the returns to savings and the
            wage rate. The exact policy differs depending on whether just past investment or
            total output influences productivity: in the first case only capital returns need to be
            subsidized, while in the second case labor income needs to be subsidized too. The
            policy is balanced period-by-period by means of a lump-sum tax.

2014/38   Systemic risk and the solvency-liquidity nexus of banks
            Diane PIERRET

            This paper highlights the empirical interaction between solvency and liquidity risks
            of banks that make them particularly vulnerable to an aggregate crisis. I find that
            banks lose their access to short-term funding when markets expect they will be
            insolvent in a crisis. Conversely, the expected amount of capital a bank should
            raise to remain solvent in a crisis (its capital shortfall) increases when the bank
            holds more short-term debt (has a larger exposure to funding liquidity risk). This
            solvency-liquidity nexus is found to be strong under many robustness checks and to
            contain useful information for forecasting the short-term balance sheet of banks.
            The results suggest that the solvency-liquidity interaction should be accounted for
            when designing liquidity and capital requirements, in contrast to Basel III
            regulation where solvency and liquidity risks are treated separately.
            JEL Classification: G01, G21, G28
            Keywords: capital shortfall, funding liquidityrisk, short-term funding

2014/39   An economic appraisal of MOOC platforms: business models and impacts on
            higher education
            Paul BELLEFLAMME and Julien JACQMIN

            We start by using various economic and pedagogical concepts to understand the
            specificities of MOOC (Massive Online Open Courses) platforms. We then discuss
            how the private provision of MOOCs, seen as pure public goods, can be sustained.
            Based on the theory of multisided platforms, we analyse five ways to monetize the
            MOOC business. Our conclusion is that the most sustainable approach is what we
            call the 'subcontractor model', flavored by touches of the other four models. We
            then claim that MOOC platforms can play a key transformative role in the higher
            education sector by making teaching practices evolve, rather than by replacing
            incumbent institutions. Finally, we derive a number of directions for public policy:
            governments should act to foster the cooperation between MOOC platforms and
            other higher education institutions, so as to improve the benefits that can arise from
            these technological innovations; a particular focus should also be given to
            professors in order to encourage them to innovate in their teaching practices.
            JEL Classification: I23, I21, L31, L86
            Keywords: higher education, distance learning, multisided platforms

2014/40   Longévité différentielle et redistribution: enjeux théoriques et empiriques
            Marie-Louise LEROUX, Pierre PESTIEAU and Grégory PONTHIERE

            Dans cet article, nous étudions l'impact des différences de longévité sur la
            conception des politiques publiques, en particulier celles liées au départ à la
            retraite. Nous montrons premièrement qu'alors meme que l'espérance de vie a
            augmenté de manière très importante tout au long du siècle dernier, il subsiste
            encore de fortes disparités. Deuxièmement, nous étudions d'un point de vue
            normatif comment les différences de longévité sont généralement prises en compte
            dans les modèles de cycle de vie et montrons que certaines hypothèses peuvent
            avoir des implications fortes en terme de redistribution intra-générationnelle. Nous
            identifions au moins trois arguments en faveur d'une redistribution vers les agents
            à faible longévité: l'aversion à l'inégalité intertemporelle, l'aversion au risque de
            mortalité et la compensation pour des caractéristiques dont les agents ne sont pas
            responsables. Nous étendons ensuite notre analyse de manière à tenir compte du
            fait que les individus puissent être en partie responsables de leur longévité.
            Finalement, nous lions ces résultats aux débats actuels sur la réforme des systèmes
            de retraite. Nous montrons qu'en général, parce que les pensions de retraite sont
            conditionnelles à la survie des bénéficiaires, les systèmes de retraite publics vont
            redistribuer des ressources des agents dont la durée de vie est courte vers ceux dont
            la durée de vie est longue. Nous fournissons des pistes de réformes qui viseraient à
            mieux prendre en compte ces différences de longévité et en particulier, celles
            relatives à la création d'une "rente longévité" telle que souhaitée par le Comité
            d'Amours et au développement de l'assurance autonomie, qu'elle soit privée ou
            publique.
            JEL Classification: H31, H53, I31
            Keywords: systèmes de retraite, mortalité différentielle

2014/41   Long term care and capital accumulation: the impact of the State, the market and
            the family
            Chiara CANTA, Pierre PESTIEAU and Emmanuel THIBAULT

            The rising level of long-term care (LTC) expenditures and their financing sources
            are likely to impact savings and capital accumulation and henceforth the pattern of
            growth. This paper studies how the joint interaction of the family, the market and
            the State influences capital accumulation in a society in which the assistance the
            children give to dependent parents is triggered by a family norm. We find that, with
            a family norm in place, the dynamics of capital accumulation differ from the ones
            of a standard Diamond (1965) model with dependence. For instance, if the family
            help is sizeably more productive than the other LTC financing sources, a pay-as-
            you-go social insurance might be a complement to private insurance and foster
            capital accumulation.

2014/42   Whom are you talking with? An experiment on credibility and communication
            structure
            Gilles GRANDJEAN, Marco MANTOVANI, Ana MAULEON and Vincent
            VANNETELBOSCH

            The paper analyzes the role of the structure of communication - i.e. who is talking
            with whom - on the choice of messages, on their credibility and on actual play. We
            run an experiment in a three-player coordination game with Pareto ranke equilibria,
            where a pair of agents has a profitable joint deviation from the Pareto-dominance
            equilibrium. According to our analysis of credibility, the subjects should

communicate and play the Pareto optimal equilibrium only when communication is public. When pair of agents exchange messages privately, the players should play the Pareto dominated equilibrium and disregard communication. The experimental data conform to our predictions: the agents reach the Pareto-dominant equilibrium only when announcing to play it is credible. When private communication is allowed, lying is prevalent, and players converge to the Pareto-dominated equilibrium. Nevertheless, at the individual level, players' beliefs and choices tend to react to messages even when these are noncredible.

2014/43　The rationality of expectations formation
Julio DAVILA

Rational expectations do not require beliefs to be consistent with history and with what agents can conclude from it. Actually, at a rational expectations equilibrium agents may hold beliefs that explain poorly the history they observe, even when restricted to only those rationalizing their choices. This paper shows that if agents hold rationally formed expectations instead —in the sense of following from beliefs that explain history better than any other beliefs justifying their choices— then additional allocations unsupported by rational expectations can be shown to be equilibrium outcomes. By means of this result, it is established too that adding common knowledge of the rationality of the formation of expectations —on top of that of rationality of choices and market clearing— does not suffice either to guarantee rational expectations. Interestingly, the rationally formed expectations equilibria produced in this paper exhibit a sunspot-like volatility that do not rely on an explicit sunspot mechanism.
JEL Classification: D84, D5, E3
Keywords: rationality, expectations, overlapping generations

2014/44　The cleansing effect of minimum wages. Minimum wages, firm dynamics and aggregate productivity in China
Florian MAYNERIS, Sandra PONCET and Tao ZHANG

We here consider how Chinese firms adjust to higher minimum wages and how these affect aggregate productivity, exploiting the 2004 minimum-wage reform in China. We find that higher city-level minimum wages reduced the survival probability of firms which were the most exposed to the reform. For the surviving firms, thanks to significant productivity gains, wage costs rose without any negative employment effect. At the city-level, our results show that higher minimum wages affected aggregate productivity growth via both productivity growth in incumbent firms and the net entry of more productive firms. Hence, in a fast-growing economy like China, there is a cleansing effect of labormarket standards.
JEL Classification: 014, J38, 047
Keywords: minimum wages, firm-level performance, aggregate TFP, China

2014/45　Domestic environmental policy and international cooperation for global commons
Thierry BRECHET, Natali HRITONENKO and Yuri YATSENKO

The paper analyzes the strategic behavior of several countries engaged in capital accumulation, pollution mitigation, and environmental adaptation in the context of an environmental common good. Both cooperative and non-cooperative strategies are discussed. The non-cooperative strategy is a dynamic game in which each

country makes its own environmental decision following the open-loop Nash equilibrium. The cooperative social planner problem assumes an international environmental agreement in force. The non-cooperative and cooperative solutions are compared in the symmetric case of two countries and extended to several identical countries. It is shown that the non- cooperative strategy in multi-country world leads to over-production, over-consumption, over-pollution, and over-adaptation.
Keywords: climate policy, adaptation, mitigation, dynamic general equilibrium

2014/46   Toward a theory of monopolistic competition
           Mathieu PARENTI, Philip USHCHEV and Jacques-François THISSE

           We propose a general model of monopolistic competition, which encompasses existing models while being flexible enough to take into account new demand and competition features. The basic tool we use to study the market outcome is the elasticity of substitution at a symmetric consumption pattern, which depends on both the per capita consumption and the total mass of varieties. We impose intuitive conditions on this function to guarantee the existence and uniqueness of a free-entry equilibrium. Comparative statics with respect to population size, GDP per capita and productivity shock are characterized through necessary and sufficient conditions. Finally, we show how our approach can be generalized to the case of a multisector economy and extended to cope with heterogeneous firms and consumers.
           JEL Classification: D43, L11, L13
           Keywords: monopolistic competition, general equilibrium, additive preferences, homothetic preferences

2014/47   Does technological progress affect the location of economic activity
           Takatoshi TABUCHI, Jacques-François THISSE and Xiwei ZHU

           We show that how technological innovations and migration costs interact to shape the space-economy. Regardless of the level of transport costs, rising labor productivity fosters the agglomeration of activities, whereas falling transport costs do not affect the location of activities. When labor is heterogeneous, the number of workers residing in the more productive region increases by decreasing order of productive efficiency when labor productivity rises. This process affects in opposite directions the welfare of those who have a lower productivity.
           JEL Classification: J61, R12
           Keywords: new economic geography, technological progress, labor productivity, migration costs, labor heterogeneity

2014/48   Colonial legacy, linguistic disenfranchisement and the civil conflict in Sri Lanka
           Paul CASTANEDA DOWER, Victor GINSBURGH and Shlomo WEBER

           Polarization measures, that are used in examining the empirical relationship between ethnic divisions and violent conflict, heavily rely on mechanisms of group identification and often use somewhat arbitrary divisions of a society into ethnic groups. In this paper we construct two new measures of polarization, one that accounts for differences in linguistic policies across localities during the colonial era and one that accounts for the differences over time and across localities in the experience of violence throughout the conflict episode. By examining the protracted war in Sri Lanka and applying these indices (and their combination) to a

data set describing victims of the civil conflict by district and year, we are able to better identify the effect of ethnolinguistic polarization on the civil conflict in the country. We find that, for each of our polarization indices, there is a positive effect on the conflict. The historical underpinnings of our indices allow us to demonstrate in a quantitative and concrete way the relevance of historical processes for understanding episodes of civil conflict.
JEL Classification: O15, D74, F54
Keywords: conflict, polarization, Sri Lanka, colonial legacy, linguistic disenfranchisement

2014/49   Foreign language learning: an econometric analysis
            Victor GINSBURGH, Jacques MELITZ and Farid TOUBAL

            The paper is devoted to an econometric analysis of learning foreign languages in all parts of the world. Our sample covers 193 countries and 13 important languages. Four factors significantly explain learning. All four affect the broad decision to learn but the last two also point to the choice of the particular language to learn. Literacy promotes learning in general while the world population of speakers of the native language discourages it. Trade with speakers of a specific language prompts learning of that specific language while the linguistic distance between the home and the foreign language discourages learning of that specific language. Trade may well deserve more emphasis than the other three factors (literacy rate, linguistic distance, and world population of native speakers), not only for its high significance, but also because its direction can change faster and by a larger order of magnitude. Controlling for individual acquired languages, including English, is of no particular importance.
            JEL Classification: F10, F20, Z00, J00
            Keywords: language learning, language and trade, English as a global language

2014/50   Does the choice of well-being measure matter empirically? An illustration with German data
            Koen DECANCQ and Dirk NEUMANN

            We discuss and compare five measures of individual well-being, namely income, an objective composite well-being index, a measure of subjective well-being, equivalent income, and a well-being measure based on the von Neumann-Morgenstern utilities of the individuals. After examining the information requirements of these measures, we illustrate their implementation using data from the German Socio-Economic Panel (SOEP) for 2010. We find sizeable differences in the characteristics of the individuals identified as worst off according to the different well-being measures. Less than 1% of the individuals belong to the bottom decile according to all five measures. Moreover, the measures lead to considerably different well-being rankings of the individuals. These findings highlight the importance of the choice of well-being measure for policy making.
            JEL Classification: D31, D63, I30
            Keywords: income, composite well-being index, life satisfaction, equivalent income, von Neumann-Morgenstern utility function, worst off, Germany.

2014/51   Social ordering functions
             François MANIQUET

We present the Fair Social Ordering approach to policy assessment. In an economic model, a Social Ordering Function (SOF) associates each economy in the domain with a complete ranking of the allocations. We describe the main achievements of the SOF theory. We present two applications, which show how SOF's can be used to evaluate policies. The first application concerns labor income taxation. The second application concerns the measurement of poverty. Finally, we discuss the relationship between the SOF approach and some other approaches to the construction of criteria to evaluate policies;

2014/52   Optimal pits and optimal transportation
             Ivar EKELAND and Maurice QUEYRANNE

In open pit mining, one must dig a pit, that is, excavate the upper layers of ground before reaching the ore. The walls of the pit must satisfy some geomechanical constraints, in order not to collapse. The question then arises how to mine the ore optimally, that is, how to find the optimal pit. We set up the problem in a continuous (as opposed to discrete) framework, and we show, under weak assumptions, the existence of an optimum pit. For this, we formulate an optimal transportation problem, where the criterion is lower semi-continuous and is allowed to take the value $+\infty$. We show that this transportation problem is a strong dual to the optimum pit problem, and also yields optimality (complementarity slackness) conditions.

2014/53   Forecasting comparison of long term component dynamic models for realized covariance matrices
             Luc BAUWENS, Manuela BRAIONE and Giuseppe STORTI

Novel model specifications that include a time-varying long run component in the dynamics of realized covariance matrices are proposed. The adopted modeling framework allows the secular component to enter the model structure either in an additive fashion or as a multiplicative factor, and to be specified parametrically, using a MIDAS filter, or non-parametrically. Estimation is performed by maximizing a Wishart quasi-likelihood function. The one-step ahead forecasting performance of the models is assessed by means of three approaches: the Model Confidence Set, (global) minimum variance portfolios and Value-at-Risk. The results provide evidence in favour of the hypothesis that the proposed models outperform benchmarks incorporating a constant long run component, both in and out-of sample.
JEL Classification: C13, C32, C58
Keywords: Realized covariance, component dynamic models, MIDAS, minimum variance portfolio, Model Confidence Set, Value-at-Risk.

2014/54   Judgment aggregation theory can entail new social choice results
             François MANIQUET and Philippe MONGIN

Judgment (or logical) aggregation theory is logically more powerful than social choice theory and has been put to use to recover some classic results of this field. Whether it could also enrich it with genuinely new results is still controversial. To support a positive answer, we prove a social choice theorem by using the advanced nonbinary form of judgment aggregation theory developed by Dokow and Holzman (2010c). This application involves aggregating classifications (specifically assignments) instead of preferences, and this focus justifies shifting away from the binary framework of standard judgement aggregation theory to a more general one.
JEL Classification: C65, D71
Keywords: social choice, judgment aggregation, logical aggregation, aggregation of classifications, assignments, nonbinary evaluations

2014/55   Single-period cutting planes for inventory routing problems
             Pasquale AVELLA, Maurizio BOCCIA and Laurence A. WOLSEY

IRP involves the distribution of one or more products from a supplier to a set of clients over a discrete planning horizon. Each client has a known demand to be met in each period and can only hold a limited amount of stock. The product is shipped through a distribution network by one or more vehicles of limited capacity. The objective is to find replenishment decisions minimizing the sum of the storage and distribution costs. In this paper we present reformulations of IRP, under the Maximum Level replenishment policy, derived from a single-period substructure. We define a generic family of valid inequalities, and then introduce two specific subclasses for which the separation problem of generating violated inequalities can be solved effectively. A basic Branch-and-Cut algorithm has been implemented to demonstrate the strength of the single-period reformulations. Computational results are presented for the benchmark instances with 50 clients and three periods and 30 clients and six periods.
Mathematics Subject Classification: 90C11, 90C26
Keywords: inventory routing, valid inequalities, cutting planes

2014/56   Instrumental variables estimation in functional linear models
             Jean-Pierre FLORENS and Sébastien. VAN BELLEGEM

In an increasing number of empirical studies, the dimensionality measured e.g. as the size of the parameter space of interest, can be very large. Two instances of large dimensional models are the linear regression with a large number of covariates and the estimation of a regression function with many instrumental variables. An appropriate setting to analyze high dimensional problems is provided by a functional linear model, in which the covariates belong to Hilbert spaces. This paper considers the case where covariates are endogenous and assumes the existence of instrumental variables (that are functional as well). The paper shows that estimating the regression function is a linear ill-posed inverse problem, with a known but data-dependent operator. The first contribution is t analyze the rate of convergence of the penalized least squares estimator. Based on the result, we discuss the notion of "instrument strength" in the high dimensional setting. We also discuss a generalized version of the estimator, when the problem is premultiplied by an instrument-dependent operator. This extends the technology of Generalized Method of Moments to high dimensional, functional data. A central limit theorem

is also established on the inner product of the estimator. The studied estimators are easy and fast to implement, and the finite-sample performance is discussed through simulations and an application to the impact of age-specific fertility rate curves on yearly economic growth in the United Kingdom.
JEL Classification: C26, C14
Keywords: high dimensional model, penalized least squares, instrumental variable, functional data, fertility rate, growth

2014/57   Securely solving classical network flow problems
             Abdelrahaman ALY and Mathieu. VAN VYVE

We investigate how to solve several classical network flow problems using secure multi-party computation. We consider the shortest path problem, the Minimum Mean Cycle problem and the Minimum CostFlow problem. To the best of our knowledge, this is the first time the two last problems have been addressed in a general multi-party computation setting. Furthermore, our study highlights the complexity gaps between traditional and secure implementations of the solutions, to later test its implementation. It also explores various trade-offs between per-formance and security. Additionally it provides protocols that can be used as building blocks to solve complex problems. Applications of our work can be found in: communication networks, routing data from rival company hubs; benchmarking, comparing several IT appliances configurations of rival companies; distribution problems, retailer/supplier selection in multi-level supply chains that want to share routes without disclosing sensible information; amongst others.
JEL Classification: C61, C65
Keywords: network flows, multi-party computation, secure collaboration

2014/58   Internal vs. core coalitional stability in the environmental externality game: a
             reconciliation
             Henry TULKENS

In a game with positive externalities, such as e.g. the standard environmental externality game, the set of imputations having the property of internal stability, when such a set exists, is a subset of the γ-core, that is, the set of imputations with the property of γ-core stability. The key argument that drives the result rests on the concept, introduced here, of "acceptability" by a coalition of ensuring its members their free rider payoff, and on linking it with the notion of "blocking" in the theory of the core. It is first presented graphically, then analytically. The hierarchy thus presented between core stability and internal stability triggers some concluding thoughts on efficiency, coalitional stability, and the possible sources of cooperation in international environmental issues.
JEL Classification: C7, H4, H87, Q5
Keywords: environmental externalities, game theory, coalitions, core, internal Stability

2014/59   Construction of value-at-risk forecasts under different distributional assumptions
             within a BEKK framework
             Manuela BRAIONE and Nicolas K. SCHOLTES

Financial asset returns are known to be conditionally heteroskedastic and generallynon-normally distributed, fat-tailed and often skewed. In order to account for both theskewness and the excess kurtosis in returns, we combine the BEKK

model from the multivariate GARCH literature with different multivariate densities for the returns. The set of distributions we consider comprises the normal, Student, Multivariate Exponential Power and their skewed counterparts. Applying this framework to a sample of ten assets from the Dow Jones Industrial Average Index, we compare the performance of equally-weighted portfolios derived from the symmetric and skewed distributions in forecasting out-of-sample Value-at-Risk. The accuracy of the VaR forecasts is assessed by implementing standard statistical backtesting procedures. The results unanimously show that the inclusion of fat-tailed densities into the model specification yields more accurate VaR forecasts, while the further addition of skewness does not lead to significant improvements.
JEL Classification: C01, C22, C52, C58
Keywords: DOW Jones industrial average, BEKK model, maximum likelihood, value-at-risk.

2014/60   A simple model for now-casting volatility series
            Jörg BREITUNG and Christian M. HAFNER

            Nowcasting volatility of financial time series appears difficult with classical volatility models. This paper proposes a simple model, based on an ARMA representation of the log-transformed squared returns, that allows to estimate current volatility, given past and current returns, in a very simple way. The model can be viewed as a degenerate case of the stochastic volatility model with perfect correlation between the two error terms. It is shown that the volatility nowcasts do not depend on this correlation, so that both models provide the same nowcasts for given parameter values. A simulation study suggests that the ARMA and SV models have a similar performance, but that in cases of moderate persistence the ARMA model is preferable. An extension of the ARMA model is proposed that takes into account the so-called leverage effect. Finally, the alternative models are applied to a long series of daily S&P 500 returns.
            JEL Classification: C22, C58
            Keywords: EGARCH, stochastic volatility, ARMA, realized volatility, leverage

2014/61   Linearity and misspecification tests for vector smooth transition regression models
            Timo TERASVIRTA and Yukai YANG

            In this paper, we derive Lagrange multiplier and Lagrange multiplier type specification and misspecification tests for vector smooth transition models. We report results from simulation studies in which the size and power properties of the proposed tests in small samples are considered. The results show that these asymptotic tests generally suffer from size distortion. We find that Wilks's Λ and Rao's F statistic both have satisfactory size properties and can be recommended for empirical use. Bootstrapping the standard asymptotic LM statistic offers another solution to the problem.
            JEL Classification: C12, C32, C52
            Keywords: Vector STAR models, linearity test, misspecification test, vector nonlinear time series, serial correlation, parameter constancy, residual nonlinearity test

2014/62   Specification, estimation and evaluation of vector smooth transition autoregressive models with applications
Timo TERASVIRTA and Yukai YANG

We consider a nonlinear vector model called the logistic vector smooth transition autoregressive model. The bivariate single-transition vector smooth transition regression model of Camacho (2004) is generalised to a multivariate and multitransition one. A modelling strategy consisting of specification, including testing linearity, estimation and evaluation of these models is constructed. Nonlinear least squares estimation of the parameters of the model is discussed. Evaluation by misspecification tests is carried out using tests derived in a companion paper. The use of the modelling strategy is illustrated by two applications. In the first one, the dynamic relationship between the US gasoline price and consumption is studied and possible asymmetries in it considered. The second application consists of modelling two well known Icelandic riverflow series, previously considered by many hydrologists and time series analysts.
JEL Classification: C32, C51, C52
Keywords: Vector STAR models, modelling nonlinearity, vector autoregression, generalized impulse response, asymmetry, oil price, river flow