

**ABSTRACT OF PAPERS PRESENTED TO THE VI CONGRESS OF THE
SPANISH-PORTUGUESE ASSOCIATION OF RESOURCE AND
ENVIRONMENTAL ECONOMICS (2014)**

Universitat de Girona
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This book contains the abstracts of papers presented at the VI Congress of the Spanish-Portuguese Association of Resource and Environmental Economics (AERNA) in collaboration with the Spanish Association for Energy Economics (AEEE) held in the University of Girona, from September 4th to September 6th, 2014.

The abstracts are arranged as they appear in the program. In addition to the paper title and abstract, the session (number, name and time) in which the paper was presented, the presenting author's institutional affiliation and paper's co-authors, if any, are provided. The information, regarding presenting authors, co-authors, title and abstract, are presented in the book in the form submitted by the authors.

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Thursday 4 September 2014

PLENARY SESSION I

Chairperson: **Renan Goetz**

Speaker: **Ujjayant Chakravorty**, Tufts University
Title: **Drilling in the Drought? The Industrial Organization of Groundwater**

China and India together produce about half the world's rice and a third of the world's wheat, but production in both countries is heavily dependent on depleting groundwater resources. A large proportion of farmers buy and sell groundwater - the trading facilitated by small farm sizes and fragments land holdings. The economics of groundwater, when farm sizes are small, is little understood. This paper develops a simple, spatial model of the industrial organization of groundwater markets appropriate for smallholder agriculture. We show that if water is abundant, then equilibrium with free entry results in Bertrand competition, with water sellers charging higher prices to buyers located closer to them. However, when not enough water is available, we find that there may actually be a boom in well-drilling, contrary to what one may expect. Optimal policy may involve taxing well-drilling and subsidizing energy inputs such as electricity and diesel.

Friday 5 September 2014

PLENARY SESSION II

Chairperson: **Montserrat Viladrich**

Speaker: **Nick Hanley**, University of St Andrews, UK
Title: **Testing Genuine Savings as an indicator of future sustainability**

Genuine Savings (also referred to as Comprehensive Investment, or Adjusted net Savings) has emerged as the main economic indicator of sustainable development. In this paper, we use long-term data stretching back to 1870 to undertake empirical tests of the relationship between Genuine Savings (GS) and future well-being for three countries: Britain, the USA and Germany. Our tests are based on an underlying theoretical relationship between GS and changes in the present value of future consumption. Based on both single country and panel results, we find evidence supporting the existence of a cointegrating (long run equilibrium) relationship between GS and future well-being, and fail to reject the basic theoretical result on the relationship between these two macroeconomic variables. This provides some support for the GS measure of "weak sustainability" over the long run.

Thursday 4 September 2014

PARALLEL SESSION I-A: Environmental Valuation and Climate Change

Chairperson: **Antoni Riera**

Presenting Author: **Cristina Sarasa**, University of Zaragoza
Co-author(s): Rosa Duarte, University of Zaragoza
Julio Sánchez-Chóliz, University of Zaragoza
Paper Title: **Could a crowd of small actions represent a significant change to reduce emissions? A CGE analysis for Spain**

Reducing greenhouse gases (GHG) and sulphur dioxide (SO₂) emissions is one of the main objectives of European Community Environmental Policy, which sets emission ceilings for each member state (Directive 2001/81/EC). As a consequence, countries organize their contribution to environmental improvement through national strategies to reach the European Union mandates. In Spain, the Energy Saving and Efficiency Plan (2011-2020) aims to reduce the energy consumption by 20% in 2020 pursuant to the methodological recommendations on saving measurement and verification by the European Commission.

In this context, we assess the environmental impact of some measures aimed to the consumers through the Spanish strategy using a dynamic Computable General Equilibrium (CGE) model calibrated on 2009 Spanish data. Our analysis focuses on the impact on greenhouse gases (GHG) and sulphur dioxide (SO₂). Specifically, we generate representative scenarios for certain changes that are designed to involve each consumer consistent with the measures proposed in the Spanish strategies, analyzing the impact of improvements in the electricity savings (for lighting per dwelling and electrical appliances) and the promotion of sustainable means of transport through the transfer of passenger vehicle traffic to collective modes (bus, train and underground).

Results aims to provide guidelines for public deciders to consider the profitability of the alternative strategies and shed light on the influence of household consumption patterns and their sensitivity to environmental initiatives.

Presenting Author: **Dimitris Andreopoulos**, Free University of Bolzano
Co-author(s): Dimitris Damigos, National Technical University of Athens
Francesco Comiti, Free University of Bolzano
Christian Fischer, Free University of Bolzano
Paper Title: **Estimating the Economic Value of Adaptation to Climate Change with Choice Experiments: An application to the Aaos River basin in Greece**

Climate projection models as applied by IPCC for the Southern Mediterranean basin indicate a strong drought trend. This pattern is anticipated to affect a range of services derived from river

ecosystems. This paper aims to examine local residents' preferences for adapting to climate change for a specific Aaos river basin in Epirus, Greece. The preferences are approached by a Choice Experiment in order to extrapolate econometric simulation of the choices towards adaptation of four prominent services of the Aaos system namely: irrigation, rafting period, hydropower production and ecological state. The econometric analysis is conducted by means of Conditional Logit and Nested Logit calibration models. Both models produce positive and significant estimates for all river-specific attributes. Nevertheless, the Nested Logit performs considerably better describing robustly that people are willing to move away from the 'do nothing situation' attaching significant economic values on adaptation strategies. This may also have implications about the use of Nested Logit model in unlabelled Choice Experiments, in cases that the IIA hypothesis is not satisfied by the choice empirical data.

Presenting Author: **Marta Escapa**, University of the Basque Country
Co-author(s): Maria Federica Di Nola, University of the Basque Country
Paper Title: **Policy scenario analysis of waste management using system dynamics: the case of Campania (Italy)**

The waste crisis in Campania is a clear example of a complex system since it involves multiple dimensions that affect each other in a dynamic manner and cannot be described from an isolated and static perspective. This paper is focused on the waste crisis in Campania taking into account all the factors involved, including demographic, technological, social, environmental and economic issues. A system dynamics model, developed in Di Nola (2012), is used as a policy laboratory to simulate the behaviour of the waste management system under alternative scenarios and evaluate the effects of each of them. Four different policy scenarios are tested: the Business as Usual (BAU) scenario is compared to the Emergency Waste Plan (EWP) approved by the national government, the Regional Waste Plan (RWP) approved by the regional government and a Recycling Implementation Plan (RIP). The scenario analysis developed is a useful tool for policy makers to evaluate the effectiveness of different waste policy scenarios in achieving the target established under different criteria, i.e. economic, social and environmental. The analysis points out that none of the waste policies analysed is capable of addressing all aspects of the waste crisis in Campania. Some of them enable a reduction of environmental and social impacts of the crisis, some others a reduction of the economic impacts. Most importantly, some policies may generate unintended effects that would eventually worsen the crisis rather than resolve it. The total costs of waste management are also evaluated as well as the CO₂ emissions and their relative damage costs.

Presenting Author: **Catalina M. Torres Figuerola**, Universitat de les Illes
Balears

Co-author(s): Michela Faccioli, University of the Balearic Islands
Antoni Riera, Universitat de les Illes Balears

Paper Title: **Valuing the social benefits of wetland adaptation to
climate change: a trade-off between species'
abundance and diversity.**

According to experts, climate change will further exacerbate wetland deterioration, especially in the Mediterranean region. On the one side, it will accelerate population declines in bird species. On the other one, it will also promote biotic homogenization, as a result of a loss in species' diversity. In this context, different adaptation policies can be designed: those orientated to recovering species' abundance and those aimed at restoring biological diversity. Aware that knowledge about their social acceptance is crucial to better inform the planning of wetlands and secure their public use and conservation, this paper assesses the social benefits of different adaptation options through a choice experiment study carried out in S'Albufera wetland (Mallorca). Results show that visitors display positive preferences for an increase in both species' abundance and diversity, although they assign a higher value to the latter, thus suggesting a higher social acceptability of policies pursuing wetlands' differentiation. This finding acquires special relevance not only for wetland adaptation but also for tourism planning, given the growing competition among wetlands to attract visitors and the increasing tourists' demand for high environmental quality and unique experiences. Therefore, promoting wetlands' differentiation policies could be a good destination strategy to gain competitive advantage.

Thursday 4 September 2014

PARALLEL SESSION I-B: Optimality and Regulation

Chairperson: **Guiomar Martín-Herrán**

Presenting Author: **Francisco Cabo**, Universidad de Valladolid
Co-author(s): Carmen Arguedas, Universidad Autónoma de Madrid
Guiomar Martín-Herrán, Universidad de Valladolid
Paper Title: **Optimal Pollution Standards and Noncompliance in a Dynamic Framework**

In this paper we present a Stackelberg differential game to study the dynamic interaction between a firm which combines capital and emissions to produce a consumption good, and a regulator who sets pollution limits overtime. At each time, the firm faces a dilemma between investing in capital, which reduces emissions, and paying a fine for non-compliance. We show that the optimal effective pollution limit path, which is the pollution level above which the fine is truly imposed, decreases overtime, inducing a rise in capital stock and a decrease in both emissions and the level of noncompliance overtime. If the effective pollution limit coincides with the pollution limit set by the regulator, we generally find an interior value of the severity of the fine that maximizes social welfare. In a second scenario where the effective pollution limit is larger due to fine discounts in exchange for the firm's capital investment, a more severe fine always rises social welfare. In the limiting scenario with a sufficiently large severity, emissions coincide with the effective pollution limit and no penalties are levied, since the firm shows adequate adaptation progress through capital investment.

Presenting Author: **María-José Gutiérrez**, University of the Basque Country
Co-author(s): José-María Da-Rocha, Universidade de Vigo
Rafael Trelles, Universidad de Santiago de Compostela
Paper Title: **Property Rights, Conservation Markets and Optimality of Natural Resources Management**

The aim of this article is to analyse the effects of privatising a renewable resource in a simple general equilibrium dynamic model where property rights can be allocated either to families or to firms. We show that allocating ownership rights is not a sufficient condition for the implementation of self-sustaining competitive equilibria. Competitive allocations can only be sustained in combination with other mechanisms such as access constraints, enforcement and subsidies. In this framework, setting up a conservation market in which the part of the resource not depleted in each period can be negotiated enables the markets to be completed. Allocating ownership rights to families in a system of complete markets enables the Pareto optimal allocation to be sustained without access constraints or subsidies.

Presenting Author: **Francisco Javier Casado-Izaga**, Universidad del País Vasco

Co-author(s): Juan Bárcena-Ruiz, University of the Basque Country

Paper Title: **Regulation of waste management under spatial competition**

We consider a regulator with different sensibilities with regard to consumers' or producers' surplus. This regulator has a say with respect to (i) the location of a waste collection point, (ii) whether firms locate simultaneously or sequentially and (iii) who pays the waste transportation costs to the collection point. We find that the optimal decisions have an impact on firms' competition and welfare and depend on the regulator's profile and on the relationship between waste and product transportation costs. When waste transportation costs are paid by firms the optimal location of the collection point is in the middle of the city, regardless of whether firms' locations are chosen simultaneously or sequentially. This increases firms competition. When the cost is paid by consumers and firms locate sequentially the collection point is located out of the middle of the city.

Presenting Authors: **Francisco André**, Universidad Complutense de Madrid
Luis de Castro, Universidad Complutense de Madrid

Paper Title: **Incentives for Price Manipulation in Emission Permit Markets with Stackelberg Competition**

It has been shown in prior research that cost effectiveness in the competitive emissions permit market could be affected by tacit collusion or price manipulation when the corresponding polluting product market is oligopolistic. We analyze these cross market links using a model ala Stackelberg to show that under reasonable assumptions, there are no incentives to collude for lobbying prices up. Tacit collusion to manipulate prices down exists if the permit price is low enough. These results are in contrast with closely related works that used other oligopolistic market structures like Cournot or leader- fringe.

Thursday 4 September 2014

PARALLEL SESSION I-C: Water Management

Chairperson: **Sébastien Foudi**

Presenting Author: **David Nortes**, Universidad Complutense de Madrid

Paper Title: **Structural change in Tagus River basin. Discussing the "Eighties Effect"**

This paper aims to discuss the existence of the so-called "Eighty effect". This phenomenon refers to the general decline in river flows in the Spanish headwaters until the 1980's.

We chose the Tagus River Basin as a case study for several important reasons: it is subject to certain increasing demands as well as environmental objectives; it is under the constraints imposed by the Albufeira International Agreement, and it is the origin of water transfers to other basins, ensuring water supply for urban, agricultural and ecological purposes.

In the context of multiple demands and potentially decreasing levels, a clear understanding of existing water supply is essential to ensure its proper management. To promote this crucial understanding, we use recognized statistical methods in economics and hydrology, such as time series analysis, intervention analysis and structural change contrasts.

Presenting Author: **Ana Serrano**, Universidad de Zaragoza

Co-author(s): Rosa Duarte, University of Zaragoza

Dabo Guan, University of Leeds

Vicente Pinilla, University of Zaragoza

Paper Title: **Disaggregating agricultural water flows in the world**

Water resources are growingly transferred embodied in products internationally traded. These water displacements often involve global inequalities that need to be addressed by setting consumption and production responsibilities. Although Multi-Regional Input Output models are powerful tools to assess the interrelations among countries and sectors in global supply chains, the lack of sufficiently disaggregated sectorial data in the empirical applications may entail a notable drawback for assessing some regional problems. This is particularly important when studying water resources, since agriculture accounts for 70% of water consumption all over the world. Therefore, in this paper we will try to join bilateral trade data on agricultural products with WIOD multiregional tables. This will allow us to analyze water consumption trends and to deepen into different productive specializations that could be triggering the increasing global water consumption happened from 1995 to 2009. Although this process was more intense in developed countries in the past, emerging areas cannot be neglected since their development entails a growing pressure on water resources. By applying a Structural Decomposition Analysis that will divide the sample into groups depending on the level of income of countries, we aim to explain water consumption trajectories on the basis of water intensities variations, changes on domestic or imported technologies and trends in demand patterns. Preliminary results seem to indicate an increase in virtual water trade chiefly due to the great boost of demand during these years. Changes in water intensities would be

responsible for a partial moderation of water consumption increase in both high and low income countries. Finally, technological changes in low income nations would boost water consumption.

Presenting Author: **Tharayil Shereef Amjath Babu**, ZALF, Germany
Co-author(s): Renan Goetz, University of Girona
Angels Xabadia, University of Girona
Harald Kaechele, ZALF, Germany
Ernst-August Nuppenau, JLU Giessen
Paper Title: **Can we avoid tragedy of open access? Assigning optimal community user fee by farmers' sharing a groundwater aquifer**

Groundwater irrigation systems are prone to overexploitation due to their common pool resource characteristics. These characteristics are also linked to their property right regime, which is generally "open access". Nevertheless assigning communal proprietorship on groundwater withdrawal may present a possible solution. In this paper, we are discussing whether a user fee charged by the community sharing an aquifer could achieve the goal of attaining socially desirable extraction path of groundwater mirrored by the underlying groundwater table. The level of user fee required for optimising (social) groundwater use among farmers, given the multitude of farming decisions determining the extraction path, cannot be determined a priori and we need a numerical model taking into the complexities into account. The model that we describe here is utilized to simulate the effects of user fees on farmer behaviour characterised by a set of farming decisions that may achieve the socially optimal extraction path.

Presenting Author: **Sébastien Foudi**, Basque Centre for Climate Change BC3
Paper Title: **Social-Ecological Resilience and Sustainability: a test from an urban water management**

This paper illustrates how the Resilience Thinking approach can be framed in descriptive and normative purposes in order to test ex-post whether resilience drivers are compatible with sustainability. This test is based on the resilience to water scarcity of an urban water system in the Basque Autonomous Country, Spain. Resilience enhancing drivers are classified between social-ecological resilience and engineering resilience concepts. Cross-scales dynamic between drivers is analysed to understand how policies might enclose the system in unsustainable regimes. Results show that both concepts of resilience are complementary more particularly in a climate change context and that a resilience policies should be implemented also with sustainability objectives.

Friday 5 September 2014

PARALLEL SESSION II-A: International Issues

Chairperson: **Maria Pilar Martinez-Garcia**

Presenting Author: **Monica Meireles**, ISCTE-IUL

Co-author(s): Isabel Soares, Universidade do Porto
Oscar Afonso, Universidade do Porto

Paper Title: **Technological-Knowledge Diffusion between different environmental endowed Countries**

Using an endogenous Schumpeterian R&D growth model, this paper intends to analyse how international trade of intermediate goods can affect the structure and diffusion of technological knowledge between ecological and dirty countries. Each country is assumed to have got different environmental quality levels and different available technological knowledge and to be able of conducting R&D activities (innovative in ecological-country and imitative in dirty-country). We concluded that under international trade, there is a higher probability of successful imitation that improves the Dirty-country ability to benefit from Ecological-country innovations. This induces an efficient allocation of production in the Dirty-country, where marginal cost is lower, and increases the ecological goods production. Furthermore, subsidies, by promoting technological knowledge progress, lead to a permanent increase in the world steady-state growth rate.

Presenting Author: **Carlos Aller**, Universitat de Girona

Co-author(s): Lorenzo Ductor, Massey University
Maria Jesus Herrerias, University of Birmingham

Paper Title: **Import Trading Network and Environment**

The objective of this paper is twofold. First, we use bi-lateral imports for a large group of developed and developing countries to identify the world import trading network. In doing so, we obtain indicators of the extent of connectedness of a country into such network. Second, we investigate how import trading network affects carbon dioxide emissions by incorporating these measures of interdependence into a gravity model framework, once other country's characteristics have been controlling for. Compared with previous work, the novel aspect of this paper is the use of a rich dataset disaggregated at product/sectorial level that allow us to estimate the weighted network and its effects on the environment. Besides, we introduce into the model the scale, technique and composition effects as potential candidates of improving environmental quality through international trade.

Presenting Author: **Juan Bárcena-Ruiz**, University of the Basque Country
Co-author(s): Begona Garzon, Universidad de Pais Vasco
Paper Title: **North-South Trade, FDI and Environmental Policy**

In this paper we consider two countries: the North and the South. There is one firm in each country and production costs are lower in the South. To sell to foreign consumers both firms may export or engage in FDI. Only the North sets up an environmental tax but both countries set up tariffs on imported goods. We find that both firms engage in FDI only if the difference in costs between the two countries is low enough; otherwise only the North engages in FDI. The North obtains always greater welfare than the South. If the two countries set environmental taxes, both countries always engage in FDI and the South obtains greater welfare than the North. Then, environmental policies from the South encourage FDI by domestic firms. Moreover, the South would increase its welfare by taking measures to protect its environment.

Presenting Author: **Maria Pilar Martinez-Garcia**, Universidad de Murcia
Co-author(s): Jose Rodolfo Morales, Universidad de Murcia
Paper Title: **An Economic Geography Model with Natural Resources**

In this paper we present a dynamic model of trade between two regions which are endowed with natural resources (used for consumption and/or production). It is an economic geography model because it is based on the interaction of economies of scale with transportation costs as in Krugman (1991). However, it is not a static model, growth is driven by product innovations. Workers can move from one economy to other. A positive shock in the resource sector in one of the regions will attract workers from abroad because of a higher real wage, but it also enlarges the share of labor devoted to the extraction of the resource. The effect on the long-run growth rate will be ambiguous.

Friday 5 September 2014

PARALLEL SESSION II-B: Forestry

Chairperson: Ana Faria Lopes

Presenting Author: **Elena Górriz**, CTFC – EFIMED

Co-author(s): Elsa Varela, CTFC – EFIMED

M.Piqué, EFIMED

I. Prokofieva, EFIMED

Paper Title: **Setting scenarios for costs of ecosystem services provision in Mediterranean forests: the case of Aleppo pine forests in Catalonia (Northeastern Spain)**

Payments for Environmental Services are gaining visibility in the last years. A main characteristic is the targeted financing of natural resources management actions towards meeting the demand of ecosystem services (ES) by externals to the management decision making process. To establish the amount needed to be transferred from “ES buyers” to “ES providers” a negotiation process discusses between the willingness to pay from ES beneficiaries and the costs the land manager incurs to change his management.

Therefore this paper aims at: 1) proposing forest management itineraries for the supply of ES; 2) estimating the costs of provision of those scenarios, 3) contrasting them analysing the cost of changing from one to another, and 5) discuss their adequacy, the economic incentives for promoting those management behaviour changes and conclude.

Findings show that all scenarios result in a negative Net Present Value (NPV) and Soil Expectation Value (SEV), in line with the low traditional profitability of Mediterranean forests. However, when contrasting the costs of changing from one scenario to another, we found that they lead to positive outcomes for the landowner in some cases: passing from the status quo or the timber-oriented to a mushroom improvement scenario. On the contrary, increasing biodiversity or reducing the fire risk means a more negative scenario for the inactive manager, while the result is different if the forest owner already manages for timber.

Presenting Author: **Paola Ovando Pol**, CSIC

Co-author(s): Pablo Campos, CSIC

Jose L. Oviedo, CSIC

Alejandro Caparrós, CSIC

Paper Title: **Private and public incomes in multiple use dehesas and forests**

This research presents the results of a technical and economic study of 15 public forest and 24 private dehesa agroforestry farms in Andalusia (Spain). This research applies an agroforestry accounting framework (AAS) to estimate single and aggregated total social (hicksian) income accrued from multiple private and public agroforestry products in year 2010. This estimation integrates net operating incomes and capital gains borne from variations of environmental and manufactured assets over the accounting period. The analysis focuses on the factors that

contribute to private and social incomes in dehesas and forests case studies. Results show that growing cork and the consumption of private amenities are the main factors that contribute to a positive private income from agroforestry uses in dehesas. Forestry activity, especially growing timber, is the main source of private income in public forests. The public ownership constrains an active consumption of private amenities. This potential use is however internalized into the land market price, which variation over the accounting year affects income estimates of public forests. Private dehesas and public forests hold different management aims and strategies. In public forest, social and environmental targets prevail over the demand of commercial profitability from agroforestry private uses, implying in some cases that public landowner is willing to transfer the potential environmental and manufactured incomes from agroforestry uses to other economic agents. In private dehesas livestock and game activities generate private income losses that landowners are willing to accept in some cases against the enjoyment of private amenities attached to land tenure and management. Both, dehesas and forests ecosystems provide diverse public non-market products that display higher values in the areas where public forests are located. Although in both cases, those products are fundamental to explain the total social income that those agroforestry farms provide to society.

Presenting Author: **Jesus Barreal**, Universidade de Santiago de Compostela
Co-author(s): **Maria Loureiro**, Universidade de Santiago de Compostela
Paper Title: **The production of forest ecosystem services with insurance**

The production of forest ecosystem services is very important for the society. Wildfires are in many countries the main risks that forest production faces, so that when wildfires occur private and public losses (due to the loss of ecosystem services) are generated. We analyse the role of forest insurance as an incentive to produce ecosystem services. In our setting, forest insurance can be subsidized by the social planner to increase ecosystem services provision. We find that forest insurance policies can create the right incentives for producing forest ecosystem services. We simulate the impact of forest insurance in a special case of production of *Pinus pinaster* Ait. in Galicia, Spain. In this simulation, an economic incentive to link the landowner and public interest is included through the insurance policy. To summarize, this paper highlights the importance of forest insurance as a mechanism to guarantee the flow of production of forest ecosystem services.

Presenting Author: **Ana Faria Lopes**

Co-author(s): Maria Cunha-e-Sá, Universidade Nova de Lisboa

Paper Title: **The Economic Value of Portuguese Forests – The Effect of Tree Species on Valuation of Forest Ecosystems**

This paper estimates the total economic value for the Portuguese forest ecosystems depending on tree species considering market services (timber and non-timber forest products) and non-market services (recreation, landscape, carbon sequestration, watershed protection, protection of soil erosion and biodiversity). According to the results obtained, at least half of the economic value of forest ecosystems is due to non-market ecosystem services. The results suggest that Portuguese forests are non-optimally managed for some species and that forest ecosystem valuation has a large potential for assessment of policy making.

Friday 5 September 2014

PARALLEL SESSION II-C: Game Theory and Strategic Behavior

Chairperson: **Santiago Rubio**

Presenting Author: **Alejandro Caparros**, Spanish National Research Council (CSIC)

Co-author(s): Michael Finus, University of Bath

Paper Title: **Coalition Formation to Provide Public Goods under Weakest-link Technology**

We analyze the canonical coalition formation model of international environmental agreements (IEAs) under a weakest-link technology and compare it with the well-known summation technology. That is, benefits from the provision of a public good do not depend on the sum but on the minimum of individual contributions, an assumption appropriate for many regional and global public goods, like ...fighting a fire which threatens several communities, compliance with minimum standards in marine law, protecting species whose habitat cover several countries, ...convergence in a monetary union and curbing the spread of an epidemic. Compared to the summation technology, we demonstrate that many more general results can be obtained and under much more general assumptions. We show, for the standard assumption of symmetric players, that policy coordination is not necessary. For asymmetric players, without transfers, though all coalitions are Pareto-optimal, no coalition with a provision level above the non-cooperative equilibrium is stable. However, if an optimal transfer is used, an effective non-trivial coalition exists. We show how various forms of asymmetry relate to stability and the welfare gains from cooperation. We ...find a paradox: asymmetries which are conducive to stability of coalitions imply low welfare gains from cooperation and vice versa.

Presenting Author: **Jesus Marin-Solano**, Universitat de Barcelona

Paper Title: **On the sustainability of cooperation in a common property natural resource game with heterogeneous agents**

Consider a problem with N asymmetric players. Players are asymmetric in the sense that they have different discount rates of time preference and (maybe) different utility functions. If the agents decide to cooperate by maximizing the sum of their intertemporal utilities, the solution provided by standard optimal control theory is time-inconsistent. As in hyperbolic discounting, time preferences of the whole coalition change along time.

Most of the literature on the topic assumes the existence of binding agreements in order to solve the time-inconsistency problem (Munro, 1979).

In Marin-Solano and Shevkoplyas (Automatica 2011), de-Paz et al (2013) and Breton and Keoula (2014) time-consistent cooperative solutions have been studied. However, due to the changing time preferences, cooperation is partial, in the sense that agents cooperate to form

the whole coalition at every instant of time, but coalitions at different times do not cooperate among them. There is intragenerational cooperation, but not intergenerational cooperation. An alternative way to solve the problem is to look for bargaining solutions with changing bargaining weights. Sorger (2006) proposes a recursive Nash bargaining solution that describes the outcome of repeated negotiations between two rational agents. Marin-Solano (2014) introduces general time-consistent equilibria with non-constant weights.

In this paper the issue of sustainability of cooperation in the exploitation / harvesting of a common property renewable resource is addressed. Time consistent equilibria with partial cooperation are studied. Non-constant weights guaranteeing the existence of linear strategies are derived for the cases of nonrenewable resources and a renewable resource with constant gross rate of return.

The extension of these results by introducing the production function studied in Benchekroun (2003) is explored. This production function can solve the problem of nonexistence of linear strategies in problems with several decision makers (Gaudet and Lohoues, 2008).

Presenting Author: **Pedro Pintassilgo**, University of Algarve
Co-author(s): Michael Finus, University of Bath
Alistair Ulph, University of Mancheste
Paper Title: **International Environmental Agreements with
Uncertainty, Learning and Risk Aversion**

This paper analyses the formation of international environmental agreements (IEAs) under uncertainty, focusing on the role of learning and risk aversion. It bridges two strands of literature: one focused on the role learning for the success of IEA formation when countries are risk neutral and another that explores the implications of uncertainty and risk aversion on IEA formation under no learning. Combining learning and risk aversion seems appropriate as the uncertainties surrounding many international environmental problems are still large, those uncertainties are often highly correlated as for instance in climate change and hence pooling risks may be limited, but those uncertainties are gradually reduced over time through learning. It is shown that the negative conclusion with respect to the role of learning derived for risk neutrality has to be qualified: below a threshold level of risk aversion learning can impact positively on the success of IEAs, above the threshold the opposite is true. Moreover, in a world without full learning (i.e. partial and no learning), risk aversion can lead to better outcomes, but only if risk aversion is sufficiently high.

Presenting Author: **Santiago Rubio**, University of Valencia
Co-author(s): Abeer El-Sayed, Al-Azhar University
Paper Title: **Sharing R&D Investments in Cleaner Technologies to Mitigate Climate Change**

This paper examines international cooperation on technological development as an alternative to international cooperation on GHG emission reductions. It is assumed that when countries cooperate they coordinate their investments so as to minimize the agreement costs of controlling emissions. Further it is assumed that in such cases they also pool their R&D efforts so as to fully internalize the spillover effects of their investments in R&D. In order to analyze the scope of cooperation, an agreement formation game is solved in three stages. First, countries decide whether or not to sign the agreement. Then, in the second stage, signatories (playing together) and non-signatories (playing individually) select their investment in R&D. Finally, in the third stage, each country decides on its level of emissions non-cooperatively. For linear environmental damages and quadratic investment costs, our findings show that the maximum participation in a R&D agreement consists of six countries and that participation decreases as spillover effects increase until a minimum participation consisting of three countries is reached. We also find that the grand coalition is stable if the countries sign an international research joint venture but in this case the effectiveness of the agreement is very low.

Friday 5 September 2014

PARALLEL SESSION II-D: Choice Experiments

Chairperson: **Carmelo León**

Presenting Author: **David Hoyos**, University of the Basque Country
Co-author(s): Petr Mariel, University of the Basque Country
Stephane Hess, University of Leeds
Paper Title: **An exploration on the influence of the awareness of consequences scale on stated choices**

Environmental economists are increasingly interested in better understanding how people cognitively organise their beliefs and attitudes towards an environmental change in order to identify key motives and barriers that stimulate or prevent action. In this paper, we explore the utility of a commonly used psychometric scale, the awareness of consequences scale, in order to better understand stated choices. Contrary to previous studies, environmental attitudes are not directly incorporated as explanatory variables but as latent variables using a hybrid choice model. This novel approach is applied to data from a survey conducted in the Basque Country (Spain) in 2008 aimed at valuing land-use policies in a Natura 2000 Network site. The results are policy relevant because choice models able to accommodate underlying environmental attitudes may help designing more effective environmental policies.

Presenting Author: **Djamal Rahmani**, Universidade de Santiago de Compostela
Co-author(s): Maria Loureiro, Universidade de Santiago de Compostela
Paper Title: **Why don't you want to drive a hybrid car?**

Understanding the motives for individuals' decisions to avoid hybrid cars and prefer conventional ones (status quo) seems relevant for policy makers and car manufacturers in order to adopt appropriate and effective possible future strategies to promote this clean technology. To understand these types of preferences, we conducted a labeled discrete choice experiment included in an online survey. Various potential determinants of a status-quo effect have been analyzed, including: loss aversion, regret avoidance, social image, environmental awareness, product knowledge, as well as socio-economic variables. A nested logit model was estimated in order to relax the IIA assumption. Results showed that participants' WTP to change from a conventional car to a hybrid car (ceteris paribus) was €1830.52. We find that older participants, people who experience loss aversion, and those who avoid suffering regret or deception, are more likely to remain at the status quo and less willing to change to hybrid cars. These results can be used by policy makers, who may be able to develop more efficient strategies that make use of hybrid car.

Presenting Author: **Amaia de Ayala**, Basque Centre for Climate Change (BC3)
Co-author(s): David Hoyos, University of the Basque Country
Petr Mariel, University of the Basque Country
Paper Title: **Using a discrete choice experiment for landscape protection, management and planning under the European Landscape Convention: An application from the Basque Country**

Like many landscapes throughout the world, the landscapes of Llanada Alavesa (Basque Country, Spain) are suffering from human and natural alterations, necessitating urgent management. We apply a Discrete Choice Experiment (DCE) to assess the social preferences for the key attributes that form the landscapes of a specific area (Llanada Alavesa). The DCE is motivated by the need to provide policy-makers with useful information related to landscape protection, management and planning in the context of the European Landscape Convention (ELC). A Random Parameter Logit (RPL) model was used since we observed large variations in the values placed by individuals on landscape features that could not be explained fully on the basis of the socio-economic differences between the respondents. According to our welfare analysis, citizens seem to support the protection, management and planning programme when this promotes organic farming and native forests which, in turn was found to be strongly culturally dependent. This study concludes that the DCE valuation method may be an appropriate tool to protect, manage and plan landscapes in accordance with the principles and objectives of the ELC.

Presenting Author: **Carmelo León**, University of Las Palmas de Gran Canaria
Co-author(s): Jorge Araña, U. Las Palmas de Gran Canaria
Javier de León Ledesma, U. Las Palmas de Gran Canaria
Matías González, U. Las Palmas de Gran Canaria
Paper Title: **The economic benefits of reducing the environmental effects of landfills: the impact of heterogeneity**

This paper estimates the economic benefits of different alternative policies considered for reducing the external effects caused by the utilization of landfills in solid waste management. The preferences of the local population in the surrounding areas of a landfill are evaluated utilizing a discrete choice experiment in which subjects are presented with alternative policy decisions that involve reducing the material processed through the landfill. Data are modelled utilizing various models for capturing heterogeneous preferences, resulting in a mixture or normals modelling approach (MM-MNL) outperforming other alternative models of heterogeneity. The results show that the policy of moving the landfill away from the population does not provide the most benefits when compared to a policy of increasing recycling in the household. The economic benefits of the waste management policies are heterogeneous across the population surrounding the landfill and the distance decay functions are non-linear for most waste management policies. Thus, the economic benefits can increase or decrease the further away the subject lives from the landfill, depending on the preferences of his/her segment and the type of policy employed.

Friday 5 September 2014

PARALLEL SESSION III-A: Energy Policies

Chairperson: **Stefan Ambec**

Presenting Author: **Ali Motavasseli**, Tilburg University

Paper Title: **Long-run effects of carbon pricing with multiple non-fossil energy sources**

Carbon pricing is the most favorable type of environmental policies aiming to both restrict fossil fuel consumption and to promote backstop technologies. Yet, substitutes for fossil fuel consumption, particularly solar and wind generators and biofuels, have important differences that enforce policymakers to be selective on which clean energy to promote mainly. The possibility of having crowding out effect on some energy substitutes following adoption of carbon pricing is discussed.

Comparing different carbon pricing policy levels, a looser policy can lead to adoption of both capital intensive solar and land intensive biofuel in the long run while the tighter policy leads only to adoption of capital intensive solar energy and stops using biofuels.

The sustained welfare, defined as the instantaneous utility in the long run, may increase if a relatively tighter policy is adopted.

Presenting Author: **Norbert Ladoux**, Toulouse School of Economics

Co-author(s): **Helmuth Cremer**, Toulouse School of Economics
Firouz Gahvari, University of Illinois

Paper Title: **Energy taxes and oil price shock**

This paper examines if an energy price shock should be compensated by a reduction in energy taxes to mitigate its impact on consumer prices. It shows that the consumer price does not increase by as much as the producer price implying a small reduction in the energy tax in dollars. The energy tax rate, on the other hand, decreases sharply. This decline is primarily due to an adjustment in the Pigouvian component: A constant marginal social damage being divided by a higher producer price. The redistributive component of the tax remains at about 10% of the social cost of energy.

Presenting Author: **Henrik Vetter**, State and University Library

Paper Title: **Quasi optimal regulation: Flat rate taxes in the long run**

Under perfect competition, a flat rate tax is usually an efficient regulation of external harm. This presupposes that the social production set is locally linear homogenous around the first-best allocation. We analyse a flat rate tax when externalities cause the production set to fail the linear homogeneity property. We find a simple relation between harm and the second best flat rate tax. Moreover, we show that the allocation under the proper tax equals the allocation under Ramsey pricing. That is, in the absence of lump sum instruments, a flat rate tax is efficient regulation in the meaning that it realises all the gains there are to be had from regulation.

Presenting Author: **Stefan Ambec**, Toulouse School of Economics

Co-author(s): **Claude Crampes**, Toulouse School of Economics

Paper Title: **Environmental and energy policies with intermittent sources**

We examine environmental and energy policies with intermittent energy provision. We rely on a stylized model of energy investment and production with two sources of energy: an intermittent, pollution-free and non-storable source (e.g. wind), and a non-intermittent and polluting source (e.g. coal). The two sources differ in both private and social cost as well as in availability. We first characterize the first-best energy mix with two types of consumers: reactive and non-reactive. Reactive consumers adapt their demand to short-term price variability while non-reactive consumers do not. We show that the first-best can be decentralized with prices contingent on energy availability (whether wind turbines are spinning or not), a Pigouvian tax on pollution emissions and a fix price contract offered to non-reactive consumers. Next we introduce environmental and energy policies in the model with non-reactive consumers. Since the fix price of electricity does not depend on energy availability, windmill capacity is backed-up with thermal power plants. We examine renewable portfolio standards (RES), pollution taxes and feed-in tariffs (FIT). RES and FIT enhance investment into intermittent sources of energy. However, they might boost electricity production beyond the efficient level. They must then be complemented with a tax on energy consumption or a tax on pollution emissions or both instruments.

Friday 5 September 2014

PARALLEL SESSION III-B: Social Issues and Environmental Policies

Chairperson: **María Loureiro**

Presenting Author: **Rosa Mato Amboage**, UAB

Co-author(s): José María Da-Rocha, Universidade de Vigo
Jaume Sempere, El Colegio de México

Paper Title: **Wealth Distribution in Markets with Output Permits: Do Permanent Transfers Increase Inequality?**

We build a dynamic general equilibrium model to analyze revenue and wealth distribution in markets with output permits. We show that revenue and wealth inequality are affected differently by the tradability of output permits. In fact, when the wealth of the less productive firms (those who sell its quota) is taken into account, a more egalitarian wealth distribution can arise after the introduction of ITQs. Finally, we calibrate the model to match the increase in revenue inequality observed in the Northeast Multispecies U.S. Fishery after the introduction of ITQs. We show that, although inequality in revenues increases, wealth inequality reduces.

Presenting Author: **Lorena Remuzgo**, Universidad de Cantabria

Co-author(s): Carmen Trueba, Universidad de Cantabria
Vanessa Jordá, Universidad de Cantabria
José María Sarabia, Universidad de Cantabria

Paper Title: **Multidimensional Inequality in Environmental Economics: An application to the global level of GHGs emissions**

Human activity carried out during the industrial era has led to a dramatic increase of both CO₂ and other greenhouse gases (GHGs) emissions. In this sense, as the success in the battle against climate change must be accompanied by the reduction of the atmospheric concentration of GHGs, these gases play an important role in understanding the global climate change. In this paper, an analysis of multidimensional inequality is applied to the study of Environmental Economics. We have considered the three main GHGs emissions: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). For this purpose, we employ the multivariate generalized entropy measures, proposed by Maasoumi (Econometrica, 54, 1986). Among the characteristics of this multidimensional inequality measure, it is worth pointing out its property of being additively decomposable by subgroups, which allows additionally the construction of indices of multivariate polarization. The data used in this analysis was extracted from the database Climate Analysis Indicators Tool (CAIT) of the World Resources Institute (WRI, CAIT, 2012) and the groups of countries are formed based on the International Energy Agency classification (IEA, 2012). The results show that the higher the weight given to the changes among the most polluting countries, the greater the increase observed in international emissions inequality. The inequality decomposition by population groups exhibits that the within-group inequality component is the main contributor to the whole inequality value. Finally, some economic policy implications are commented.

Presenting Author: **Aon Waqas**, Universitat de les Illes Balears and Institute of Management Sciences
Co-author(s): Jaume Rosselló, Universitat de les Illes Balears
Paper Title: **Influence of meteorology in the modeling of high frequency tourism data**

Revenue Management has become widespread among tourism industry. Developed and applied first in the air transport industry, other tourism related sectors are currently trying to apply complex techniques to optimize product availability and prices to maximize revenues. The aim of this paper is to analyze the short-run behavior of different tourism high frequency time series data in order to find if a relationship with meteorological extremes exists. Then, the hypothesis to be tested is that meteorological conditions both in the destination and the origin country are related to the tourist behavior and the most important consumer tourist choices. The results show how although the improvement of models using real daily flow data is marginal, when data on information search are analyzed a high significance arises.

Presenting Author: **Nicolas Treich**, LERNA -INRA
Co-author(s): Matthew Adler, Duke University
Paper Title: **Consumption, Risk and Prioritarianism**

Most economic problems combining risk and equity have been studied under utilitarianism. As an alternative, we study consumption decisions under risk assuming a prioritarian social welfare function. Under a standard assumption about the utility function (i.e., decreasing absolute risk aversion), there is always more current consumption under ex ante prioritarianism than under utilitarianism. Thus, a concern for equity (in the ex ante prioritarian sense) means less concern for the risky future. In contrast, under standard utility and social welfare functions, there is less current consumption under ex post prioritarianism than under utilitarianism.

Friday 5 September 2014

PARALLEL SESSION III-C: Renewable Energy

Chairperson: **Emilio Cerdá**

Presenting Author: **Nikos Apostolopoulos**, University of Peloponnese

Co-author(s): Panagiotis Liargovas, University of Peloponnese

Paper Title: **Solar energy enterprises Locality matters**

The purpose of this paper is twofold. On the one hand, it aims to highlight the significant role of regional parameters when analyzing the competitive advantage of renewable energy enterprises in Greece by applying Porter's diamond model, and at the same time to implement the aforementioned model in the case of solar energy enterprises. The paper suggests that analysis should be spread to lower levels than the national one, because renewable energy production companies, either at the stage of installation or at the stage of operation, are fully affected by local conditions and natural resources. Natural resources play a significant role in the profitability and competitiveness of solar energy enterprises. Measuring or analyzing competitiveness of this kind of enterprises is not always easy because there are essential differences in comparison with other types of industrial activity. In this paper, specific regional data are also incorporated in the analysis of the diamond model conditions, which affect competitiveness. Through Porter's diamond model we can adopt a multidimensional approach towards this subject related to factor conditions, strategy, related industries, demand and governance.

Presenting Author: **Daniel Nachtigall**, Freie Universitaet Berlin

Co-author(s): Dirk Rübhelke, BC3

Paper Title: **The Green Paradox and Learning-by-Doing in the Renewable Energy Sector**

The green paradox conveys the idea that climate policies may have unintended side effects when taking into account the reaction of fossil fuel suppliers. In particular, carbon taxes that will be implemented in the future induce resource owners to extract more rapidly which increases present carbon dioxide emissions and accelerates global warming. Our results suggest that future carbon taxes may even decrease present emissions if resource owners face increasing extraction costs and if there is a clean energy source that is a perfect substitute and exhibits learning-by-doing (LBD). If the marginal extraction cost curve is sufficiently flat, resource owners respond to a future carbon tax with lowering total extraction and only slightly increase present extraction. Moreover, taxation leads to higher energy prices which induces the renewable energy firms to increase output not only in the future, but also in the present because of the anticipated benefits from LBD. This crowds out energy from the combustion of fossil fuels and may outweigh the initial increase in present extraction, leading to less emissions in the present.

Presenting Author: **Elena Górriz, CTFC – EFIMED**
Co-author(s): Irina Prokofieva, CTFC
Paper Title: **Meeting wood for energy targets: government-lead or market driven?**

In view to tackle climate change, EU targets on Renewable Energies for 2020 were transposed into member states by means of the National Actions Plans around 2010. For Spain, this plan included a target on energy production from woody biomass and policy instruments to stimulate its demand and supply. However, with the economic crisis the legal and financial framework facilitating this development have been modified, affecting expected return rates. In this study we investigated the congruence of the policy objectives with the governance mechanisms applied in practice, in terms of discourses, policy instruments and resources devoted and main outcome indicators. We therefore reviewed policy documents and gathered the perception of forest biomass stakeholders on the development of energy wood in Spain in 2013. Results show a consensus in wood energy as an opportunity to cover the costs of fire prevention forestry works and to create employment in rural areas. These objectives are considered as the main justification of bioenergy development, followed by climate change concerns and energy independence. The progress of the heating differs considerably from the electricity production: whereas the use of biomass for heating continues increasing with low State support, the electricity plants' projects heavily rely on the subsidized prices. Substitute good prices and boilers' efficiency were identified as the main drivers of the heating growth, followed by the smaller investments they imply and the current familiar and municipal budgetary restrictions. Electricity production, instead, requires bigger infrastructure and therefore larger investments. Most stakeholders elicit a lack of trust in the State in meeting the biomass targets and refer to the market as the main driver of the growth of energy wood. Economic stakeholders express their worries about fossil fuel prices fluctuations or potential biomass imports; otherwise they find this technology as sustainable due to its competitiveness.

Presenting Author: **Emilio Cerdá, Universidad Complutense de Madrid**
Co-author(s): Pablo del Río, Consejo Superior de Investigaciones Científicas
Paper Title: **Different interpretations of the cost-effectiveness of renewable electricity support: some analytical results**

The costs of support for electricity from renewable energy sources are an issue of concern for governments all over the world. The cost-effectiveness of such support is one of the main criteria to assess the success of policy instruments. However, significant confusion exists in the literature about which costs should be minimised. Some authors define the concept of cost-effectiveness as that which minimises the generation costs of renewable energy. Others define it as that which minimises the costs of support. In this paper, the optimisation problems corresponding to each of the approaches are formally stated, the corresponding optimality conditions are obtained, the optimal solutions of both approaches are compared and some mechanism of transfer of rents from consumers to producers, with good properties, are proposed.

Friday 5 September 2014

PARALLEL SESSION III-D: Water Resources

Chairperson: **Catarina Roseta Palma**

Presenting Author: **José Albiac**, CITA - Centro de Investigación y Tecnología agroalimentaria de Aragón

Co-author(s): Mohamed Taher Kahil, CITA-Government of Aragon
Ariel Dinar, University of California, Riverside

Paper Title: **Cooperative arrangements for sustainable water management under scarcity and drought in the Jucar Basin, Spain**

Water scarcity is increasing worldwide, especially in arid and semiarid regions. Climate change is projected to further exacerbate water scarcity problems in those regions. Emerging demands for the protection of water-dependent ecosystems is increasing competition for the already scarce water resources, especially during dry years. Under these circumstances, the efficient and fair allocation of water among users is becoming a major challenge for water authorities. New water allocation mechanisms based on the involvement of stakeholders are needed. This paper develops a game theory framework in order to analyze water sharing agreements to address scarcity and drought in the Jucar Basin in Spain. The paper empirically tests the propensity of stakeholders to cooperate and the options for protecting ecosystems under scarcity and drought. The results provide evidence that achieving cooperation could reduce drought damage costs. However, cooperation may have to be encouraged by public agents when scarcity is very high, in order to increase economic benefits and protect ecosystems. The game theory concepts examined in this paper are very useful in analyzing the acceptability and stability of cooperative arrangements, and could be helpful to initiate a bargaining process aimed at reaching an agreement to share water resources in a river basin.

Presenting Author: **Javier Alarcón**, Universidad Politécnica de Madrid

Co-author(s): Alberto Garrido, Universidad Politécnica de Madrid
Luis Juana, Universidad Politécnica de Madrid

Paper Title: **The optimal allocation rule and the water market as the most effective tools of managing water shortage in an irrigation district**

In this work the efficiency of water markets in an irrigation district is put under consideration. This efficiency is referred to the private economic losses arising from a reduction of water availability, so the most efficient or optimal allocation rule will be the one that minimizes those losses or the one that provides the maximum private benefit. Although other rules could be compared with a water market, we focus on this optimal allocation and the proportional reduction as well. The fundamentals of these three practices are included.

Both the proportional and the optimal rule have been applied to an irrigation community and a water market has been simulated, in order to compare to each other in terms of economic

efficiency. This has been done solving the respective optimization problem. Results show that water markets will improve the suboptimal allocation made applying proportional reductions, even when transaction costs are high. They also show that the greater the water restrictions, the greater are the gains from trade. It can be inferred too that, as long as all determinants have been taken into account and transaction costs are low enough, the losses of income ensuing from any prescribed water reduction will be the lowest both by means of the optimal allocation as with the market. Anyhow results and conclusions are clearly dependent on the relations made between allocations and yields.

Presenting Author: **Encarna Esteban**, University of Zaragoza
Co-author(s): Ariel Dinar, University of California, Riverside
Paper Title: **Groundwater-dependent ecosystems: How does the type of ecosystem affect the optimal management strategy?**

Overexploitation of groundwater affects the quality and quantity of aquifer water and creates serious survival problems for ecosystems that depend on these water bodies. Groundwater dependent ecosystems (GDEs) provide several ecological goods and services to societies and also have positive impacts on the groundwater resources to which they are connected, as both are mutually dependent upon each other. The protection of these ecosystems is not considered in groundwater management. This paper assesses the conjunctive management of groundwater and GDEs. One of the main issues revealed is the knowledge of the interaction between the ecosystems' well-being and the groundwater management policy. The paper discusses three generic ecosystem behavior functions that may change the optimal groundwater management policy once they are incorporated in the optimization model. The paper identifies optimal conditions for the conjunctive management and highlights the necessity for groundwater management regulation in order to protect GDEs.

Presenting Author: **Catarina Roseta Palma**, Instituto Universitário de Lisboa
Co-author(s): Eva Iglesias, Universidad Politécnica de Madrid
Monika Köppl-Turynaz, Instituto Universitário de Lisboa
Paper Title: **Illegal groundwater pumping**

Aquifer overexploitation is a serious problem in many regions. Most existing models minimize the difference between optimally managed aquifers and common property myopic solutions by not considering the environmental consequences of aquifer overexploitation. Moreover, it is becoming clear that illegal extractions are a significant stumbling block on the path towards the implementation of better management policies. In this paper we develop a model of illegal pumping for irrigation in a setting where there are soil-productivity differences, with and without environmental externalities. We also discuss policy options when economic and social penalties affect compliance.

Saturday 6 September 2014

PARALLEL SESSION IV-A: Landscape Development

Chairperson: **Maria Cunha-e-Sá**

Presenting Author: **Elsa Varela**, European Forest Institute

Co-author(s): Jette Jacobsen, University of Copenhagen
Mario Soliño, INIA

Paper Title: **Beyond the burnt area: insights on the social preferences for fire prevention management**

Forest fires are thought to be one of the main threats faced by Northern Mediterranean forest ecosystems, and they are expected to be aggravated by climate change effects. In these forests, the main preventive action consists on forest compartmentalization by fuel break networks. However, the costs of creating and maintaining such networks are high and the negative impacts (landscape impact and soil erosion) of these structures can be locally significant. Moreover, forest fires and fire prevention are complex issues, subject to a variety of perceptions among the population that most likely lead to heterogeneous social preferences for fire prevention. In contrast with earlier studies that focused on fire suppression and trade-offs with other environmental services, this paper looks at the design of fire prevention measures. It analyses the heterogeneity of preferences using different distributional approaches and providing with knowledge on who will be affected by a policy change and what can be relevant for natural resource managers.

Presenting Author: **Sidnoma Traore**, LAMETA

Co-author(s): Jean-Michel Salles, LAMETA

Paper Title: **Urban park's ecological and recreational aspects in developing country: evaluating the Bāngr-Weoogo Park in Ouagadougou**

The recognition of recreational and conservation benefits of protected areas provides a usable economic rationale for their management. The value of recreational and conservation benefits of the Bangr-Weoogo urban parks near Ouagadougou in Burkina Faso is evaluated using choice experiment. We aim to see if visitors' preferences shared between recreation and biodiversity of urban park, at first views divergent, can be reconcilable in developing countries context by identifying trade-offs between the different characteristics of the park. Our results show that Current Park is preferred and increase of biodiversity is the feature able to improve the visitors' well-being. Likewise, modification of current recreational restrictions or the increase of relaxing areas reduces their welfare.

Presenting Author: **Maria Cunha-e-Sá**, Universidade Nova de Lisboa
Co-author(s): Sofia Franco, Universidade Nova de Lisboa
Paper Title: **Forest Management in an Urbanizing Landscape**

This paper aims at building a theoretical framework to examine the impact of development pressure on private owner's forest management practices, namely, on regeneration and conversion cut dates. As the rent for developed land is rising over time, our model creates the possibility of switching from forestry to residential use at some point in the future, thus departing from the Faustmann's traditional setup. Comparative statics results with respect to stumpage prices, regeneration costs and urban growth parameters are provided. The results obtained depend on the impact on the opportunity cost of holding the stand and the impact on the opportunity cost of holding the land, generalizing Faustmann's unambiguous results.

Saturday 6 September 2014

PARALLEL SESSION IV-B: Fisheries and Marine Resources

Chairperson: **Arantza Murillas-Maza**

Presenting Author: **Duncan Knowler**, Simon Fraser University

Co-author(s): Salvador Garcia-Martinez, University of Baja California Sur

Paper Title: **The Value of Marine Species to Local Communities: A Case Study of Whale Watching in Baja California Sur, Mexico**

Over-exploitation of the environment is still a common problem for which tourism does not provide a simple solution, particularly in developing countries. The situation demands economic conservation measures that provide incentives for local people to act as stewards of the environment and helps to make their voices heard while supporting effective solutions for biodiversity conservation. This study investigates the local economic value of the eastern North Pacific stock of gray whales (*Eschrichtius robustus*) to two communities in Baja California Sur, Mexico, that depend on the whales' annual visit. A cost benefit framework was developed to estimate the economic rent that gray whales generate for local people. Results show substantial local value amounting to Pesos 3.4 million annually and to Pesos 27.4 million over a thirty-year time horizon. The analysis also shows that increasing the current price offered, would provide a cost effective strategy to maximize the rent captured from whale watching operations.

Presenting Author: **Rosa Mato Amboage**, UAB

Paper Title: **Harvesting Control Rules and Reference Points in Stochastic Age-Structured Fisheries Models**

Fishery management is commonly based on the use of harvesting control rules (HCR), reference points, and the risk of the stock dropping below a limit point. In this paper we explore the relationship between over-shing risk and biological reference points in a stochastic age-structured model. We find that, given a predetermined risk level of the stock dropping below a limit reference point, the optimal target reference point can be placed above the usual reference point B_{msy} (Maximum Sustainable Yield). Moreover, optimal HCR is a function of the state of the resource and it depends on the relative age composition of the spawning biomass. Therefore, biomass-based HCR or surplus production models (SPM), underestimate fishing effort in seasons with good recruitments, compared to age-structured models. Finally, we apply the model to the Southern Hake Fishery to exemplify the earlier theoretical results.

Presenting Author: **Arantza Murillas-Maza**, AZTI-Tecnalia
Co-author(s): Pascal Le Floc'h, University of Brest
Paper Title: **Fisheries management measures: incentives and governance issues implemented in European Western Waters in the context of the CFP**

The list of past and existing management measures applied to different fisheries developed in Western waters is analyzed by a typology of co-management between government and stakeholders. Restrictions on fish stocks access have changed fishermen behavior in several major ways. A comparative methodology, based on qualitative data collected through interviews and focus groups, is developed for fisheries commercially exploited by fishing fleets from different European countries: France, Ireland, Spain and the United Kingdom.

Saturday 6 September 2014

PARALLEL SESSION IV-C: Agricultural Economics

Chairperson: **Oscar Alfranca**

Presenting Author: **Encarna Esteban**, University of Zaragoza
Co-author(s): José Albiac, CITA - Centro de Investigación y Tecnología agroalimentaria de Aragón
Paper Title: **The Control of Salinity Problems when Farms are Heterogeneous**

The expansion of intensive agriculture has created substantial pollution loads in many water basins worldwide. Most of the pollution emissions from agriculture are considered as nonpoint because the difficulty to identify the polluter, the source location, and the total emissions' amount. The economic literature has broadly deal with agricultural nonpoint pollution; however, a common feature in most of the studies is the establishment of a unique pollution damage function for all farm lands. Nevertheless, different pollution damage functions may appear when farms are heterogeneous. This work proposes the study of salinity pollution problems from farms with different soils types and related biophysical processes. Results clearly show that when pollution damage functions are not the same a unique control instrument results in sizable welfare losses. The main conclusion of this study states that in presence of heterogeneity, government interventions are more damaging than not regulation at all.

Presenting Author: **Rui Pedro Mota**, Universidade Nova de Lisboa
Co-author(s): Maria Cunha-e-Sá, Universidade Nova de Lisboa
Paper Title: **Managing Multiple Ecosystem Services Provision: Cereal Production, Soil Quality and Habitat Preservation**

We develop a model for the optimal management of multiple ecosystem services provision, namely, of cereal production, soil quality and habitat preservation for an endangered species (in general, biodiversity preservation) in a cereal steppe area. When ecosystem services are jointly produced, paying for only one service may be detrimental to the whole system. The interactions between these three ecosystem services provide interesting insights, given the presence of trade-offs. As land is privately owned there is scope for intervention. We compare the social planner's solution with the regulated one. While private landowners do not internalize the habitat preservation yet they take into account the effect of their decisions on soil quality. Thus, we identify the optimal mix of instruments (taxes and subsidies) required to implement the social optimum. We derive the optimal policy instruments at the optimum, as well as along the optimal path. Policy implications are derived.

Presenting Author: **Nuria Osés-Eraso**, Universidad Pública de Navarra
Co-author(s): Juan Benito, Universidad Pública de Navarra
Roberto Ezcurra, Universidad Pública de Navarra
Paper Title: **Negative externalities in cropping decisions: private versus common land**

This paper analyzes to what extent the definition of property rights affects cropping decisions when these decisions generate negative externalities. To that end, we implement an experimental study where agents make cropping decisions in two different treatments: private and common land. The results show that there are no statistically significant differences between the two treatments in the contribution to the negative externality, thus revealing that the definition of property rights does not affect cropping decision in this context. Furthermore, our findings indicate that the implication of the agents in activities generating negative externalities tends to increase over time, thus amplifying its adverse consequences.

Saturday 6 September 2014

PARALLEL SESSION V-A: Environmental Policies Applications

Chairperson: **Marta Escapa**

Presenting Author: **Satya-Lekh Proag**, ENSTA ParisTech

Co-author(s): Jonathan Bainée, ENSTA ParisTech

Paper Title: **Curbing air pollution in Paris as the French capital goes electric: from cost-benefit analysis to cobaye decision-making tool**

In November 2013, the Council of Paris voted the implementation of a charging point network infrastructure in the French capital, intended to both private and professional road users. This policy is part of a wish to promote the emergence of the electric automobility and hence curb air pollution in Paris. It mainly focuses on the implementation of charging points on delivery areas, but also plans to make its well-known car sharing system “Autolib” denser.

In this paper, we propose a methodology to assess this public policy, taking into account both the techno-economic constraints and potentialities of the electric car, and the interdependencies of a wide variety of public policies and private strategies associated with the emergence and the diffusion of the contemporary electric automobile.

Our research lies in public economics, and considers a supplemented version of the traditional cost-benefit analysis (CBA), called CoBAYe. Indeed, this new decision-making tool proposes to use a systematic typology based on the consideration of direct, indirect and induced effects of the implementation of a public policy. Then, CoBAYe takes into account spatial, temporal, technical and functional interdependencies between public policies and private strategies, and in that way this paper will present:

-First, a new methodology which can be used to evaluate any transversal public policy, taking into account both uncertainty and public policies and private strategies interdependencies that are part of the spatio-temporal framework of the decision.

-Second, a way to apprehend dynamically the direct, indirect and induced effects which could be generated by the public policy implementation.

-Third, an ex-ante evaluation of the deployment of a charging point network infrastructure in Paris, as well as its anticipating results on both the local economy and the emergence and diffusion of the contemporary electric automobile.

Presenting Author: **Angel Bujosa Bestard**, Universitat de les Illes Balears

Co-author(s): Antoni Riera, Universitat de les Illes Balears
Catalina M. Torres Figuerola, Universitat de les Illes Balears

Paper Title: **Valuing tourism demand attributes to efficiently guide climatic change adaptation measures: the case of the Spanish domestic market**

The observed climate change phenomena will have substantial impacts on the current distribution of tourism flows, given the influence climate conditions have on the determination of the spatial and seasonal tourism patterns. This represents an important part of the total economic impact climate change (CC) can exert on the competitiveness of Spanish coastal tourism destinations. In this context, where the implementation of adaptation measures becomes of special interest to counteract the expected market share losses, this paper focus on the contribution that economic valuation can make to the efficient design of CC adaptation policies. To this aim, using data from the 2005 Familitur Survey on domestic tourism flows during the peak season, a destination choice model is implemented to firstly, highlight the role of temperature and its substitutability relationship with the remaining destination-specific attributes; secondly, to forecast changes on market shares induced by CC effects and, finally, to compute the economic value tourists assign to a set of different destination assets as the only way to efficiently neutralize the expected market share losses.

Presenting Author: **Renan Goetz**, University of Girona

Co-author(s): Yuri Yatsenko, Houston Baptist University
Natali Hritonenko, Prairie View A&M University
Angels Xabadia, University of Girona
Awudu Abdulai, University of Kiel

Paper Title: **Duration and Renovation of Contracts in the Presence of a Holdup Problem – A Dynamic Approach**

The owner of an asset or natural resource often transfers the right to use or exploit it to a firm in exchange of a rent. The limited time of the license and the failure of the owner to commit to compensate the agent for any improvement in the asset or resource, is likely to lead to the holdup problem. So far, for overcoming the holdup problem the economic literature paid little attention to time itself. However, time is a crucial element while the contractual relationship unfolds over time, and in practice it often forms a building element of the contract. Within a dynamic principal agent framework this paper analyzes under which conditions and at which point in time the holdup problem may arise. It determines the contract duration that maximizes the net benefits of the principal and its relationship to the occurrence of the holdup problem. For overcoming the holdup problem the paper suggests to construct a sequence of overlapping short-term contracts. For this purpose it determines the minimal length of these short-term contracts and the length of the overlapping periods. Overlapping periods itself are achieved by advance notice of the renewal of the contract. Finally, this study finds that the owner can adjust the rent over time to extract the entire cooperative benefits.

Saturday 6 September 2014

PARALLEL SESSION V-B: Environmental Labeling

Chairperson: **Carmen Arguedas**

Presenting Author: **Jenny De Freitas Fernandes**, Universitat de les Illes
Balears
Co-author(s): Lucie Bottega, Gremaq
Philippe Delacote, INRA
Paper Title: **Private certification and certifiers' objective: whose
profit is this?**

Private certification and labels are taking an ever growing importance in the world of responsible consumption. However, the objective of certifying organizations is still to be investigated. Considering a Bertrand-type duopoly, this paper considers which impact the objective of diverse certifiers may have on the market outcome. We found that in our setting the Industry certifier is closer to the constrained social planner objective. A single instrument, the quality label, is insufficient as we have more than one market failure, a quality subsidy proves to be welfare enhancing for all types of certifiers.

Presenting Author: **Esther Blanco**, University of Innsbruck
Co-author(s): Stefan Borsky, University of Southern Denmark
Paper Title: **Setting one voluntary standard in a heterogeneous
Europe - EMAS, environmental taxes and institutional
quality**

This paper addresses the determinants of the implementation rate of the Environmental Management and Auditing System (EMAS): one European Union wide standard certifying firms' voluntary behavior within European Union countries. Using a panel poisson regression model on the number of EMAS registrations, this paper focuses on the differences between countries' environmental regulatory stringency and institutional quality. Results show that the relevant differences in these two aspects among countries significantly explain the number of EMAS certifications. A stricter environmental regulation, which increases the threshold of environmental efforts qualifying for voluntary abatement, decreases the number of EMAS certificates. Similarly, the lower the institutional quality, which reduces the de facto enforcement of regulation, the higher the number of EMAS certificates. Interestingly, the interaction term between these variables support a crowding-in of voluntary action for increases in environmental regulatory pressure in countries with high institutional quality. In sum, results illustrate how setting one voluntary standard common to all countries in a heterogeneous Europe results in relevant differences in its success of implementation.

Presenting Author: **Carmen Arguedas**, Universidad Autónoma de Madrid
Co-author(s): Esther Blanco, University of Innsbruck
Paper Title: **Corporate Social Responsibility: Fraud, Certification
and Consumers' Beliefs**

In this paper, we present an oligopoly model of vertical product differentiation to analyze the strategic decision of firms to certify their Corporate Social Responsibility (CSR) efforts in settings where firms can market themselves as responsible, even if they are not, and consumers can (partially) trust firms' claims. The attributes of equilibria configurations are crucially affected by consumers' equilibrium beliefs on firms' claims.

First, we find that increasing fines for fraud extend the likelihood of firms supplying the high quality version, but the likelihood of certification decreases. Second, fraud only arises under intermediate fraud fines, and in contexts where the low and uncertified high quality versions coexist in the market. Third, the presence of fraud induces (weakly) lower equilibrium prices of the different varieties than those with no cheating. And finally, when the low quality version of the product is supplied, the coexistence of fraud and certification induces a differentiation premium below the marginal high quality cost, and a certification premium above the marginal certification cost. This study can work as a foundation for analyzing the desirability of public subsidies for CSR and certification programs as well as for the study of the social cost of fraud.

Saturday 6 September 2014

PARALLEL SESSION V-C: Spanish session

Chairperson: **Julia Torralba**

Presenting Author: **Marcos Pérez Pérez**, University of Vigo
Co-author(s): M. Dolores Garza Gil, Universidad de Vigo
Manuel M. Varela Lafuente, Universidad de Vigo
Paper Title: **Modelo multiespecífico para la merluza y el lirio en el caladero nacional**

El objetivo de este trabajo es desarrollar un modelo depredador-presa para dos especies de importancia comercial capturadas por la flota pesquera española en el caladero nacional (zonas ICES VIIIc y IXa). En este modelo, la merluza del sur (*Merluccius merluccius*) representa el depredador y el lirio o bacaladilla (*Micromesistius poutassou*) representa la presa. El lirio es la principal presa de la merluza en el área de estudio, y representa alrededor del 40 % de la dieta de merluza. Las dinámicas poblacionales del depredador y de la presa siguen la formulación de Lotka -Volterra, y se asumen como logísticas. También se supone una interacción lineal entre las poblaciones de depredadores y presas, con dos coeficientes de interacción: α es el efecto de un cambio unitario en la presa sobre la tasa de crecimiento porcentual del depredador, y β es la tasa de ataque o eficiencia de búsqueda del depredador. Las poblaciones interactúan aleatoriamente en proporción a la densidad de población. El objetivo es maximizar el valor presente de los beneficios de la pesquería mixta, utilizando el principio del máximo de la teoría del control óptimo. Los resultados obtenidos hasta el momento muestran que la externalidad derivada de la interacción entre ambas especies aumenta con el precio de la merluza y con el coste de captura del lirio, y disminuye cuando aumenta el precio del lirio o el coste de captura de la merluza.

Presenting Author: **M^a Teresa Pastor Gosálbez**, Universidad Cardenal Herrera CEU
Paper Title: **Los recursos hídricos de los ríos: un problema de incentivos**

Analizar la distribución y gestión de un recurso escaso como es el agua dulce en superficie desde una perspectiva estratégica es el objeto del trabajo. En particular, analizamos las asignaciones (repartos) eficientes caracterizadas por Ambec (2008). Observamos que para algunas de estas propuestas los agentes que participan en dichos acuerdos pueden tener incentivos a no revelar sus verdaderos beneficios por el uso del bien con la intención de obtener una mejor asignación final.

Presenting Author: José María Carretero Gómez, Universitat de les Illes
Balears
Co-author(s): Eduardo Alonso-Pauli, Universitat de les Illes Balears
Paper Title: **Sistemas integrados de gestión de calidad y medio
ambiente: evidencia empírica en la industria española**

A partir de una encuesta realizada a 168 establecimientos industriales españoles que han implantado sistemas de gestión de la calidad (ISO 9000) y sistemas de gestión medioambiental (ISO 14000), analizamos empíricamente las características de los establecimientos que han decidido integrarlos en un único sistema de gestión frente a los que no lo hacen. Los resultados sugieren que los establecimientos que integran ambos sistemas presentan estructuras organizativas del trabajo más estables, están más internacionalizados, tienen una mayor intensidad en la relación con los clientes y proveedores y son empresas menos familiares.

Presenting Author: **Julia Torralba**, Universidade de Vigo
Co-author(s): Manuel Besada, Universidade de Vigo
Paper Title: **Variabilidad climática y pesquerías: una aplicación de
los efectos del calentamiento local a la pesquería de la
sardina iberoatlántica**

Los modelos dinámicos deterministas de gestión pesquera para administrar de forma óptima los recursos marinos han sido ampliamente utilizados en la literatura de recursos naturales. Sin embargo, la evolución de los recursos pesqueros se ve influenciada de forma importante por las condiciones cambiantes del clima, en las cuales es fundamental el calentamiento de las aguas oceánicas; dicho calentamiento tiene un componente aleatorio importante, que a su vez está muy vinculado con el cambio climático. En este trabajo utilizamos la temperatura superficial del mar para explicar la dinámica del stock en el ecosistema si este crecimiento fuera de tipo estocástico. A partir de observaciones de la SST, biomasa, capturas y esfuerzo pesquero en la zona del atlántico que baña la península ibérica, implementamos un modelo de producción y de teoría de optimización dinámica estocástica, para obtener resultados óptimos de las variables citadas a corto y medio plazo.

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