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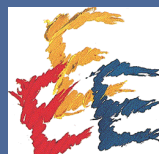
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FEEM newsletter

Goals

Fondazione Eni Enrico Mattei was founded by Eni and its major companies and recognised by the President of the Italian Republic in 1989. It is a non-profit, non-partisan research institute specialising in energy, environmental and development issues, on an international scale. The goal of the Fondazione is to promote interaction between researchers, industry and policy makers and, through research, to improve the rigour, credibility and quality of recommendations for public and private decision making regarding energy and environmental issues.

Research Units

The Fondazione's research agenda is approved by the Board of Directors, with the guidance of the Scientific Committee.

In the execution of its various programmes, the Fondazione operates with its own staff as well as involving a world-wide network of outside researchers.

The main research areas are:

- Corporate Sustainable Management
- Climate Change Modelling and Policy
- Privatisation, Antitrust, Regulation
- Knowledge, Technology, Human Capital
- Natural Resources Management
- Sustainability Indicators and Environmental Evaluation
- Voluntary and International Agreements
- Special Project Venice 21

Organisation

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A Balance of Two Years of Research within the “Concerted Action on Voluntary Approaches” (CAVA)

Rinaldo Brau*

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With the final international policy workshop held at Centre Borchette in Brussels last February 1st, designed at presenting a synthesis of the main results of the network, the CAVA project (Concerted Action on Voluntary Approaches) has come to an end, at least as far as the organisation of the “events” originally foreseen in the project is concerned.

CAVA is a concerted action which has aimed, on the one hand, to achieve adequate economies of scale in conducting research on voluntary approaches (VAs) and exchanging results of ongoing work, especially involving economists and law scientists; on the other hand, it has aimed to establish a connection with the policy process, bringing the latest research results to those involved in this process. The final conference served, actually, as an instrument to attain this specific scope, being mainly addressed to high level policy-makers and industrialists. The explicit aim was to test the real interest in the knowledge collected throughout the project, beyond the somewhat restricted domain of academics and civil servants dealing with VAs who were involved in the previous thematic workshops. In fact, dissemination mainly occurred through brief round tables centred on each of the policy briefs which the CAVA partners had prepared and previously distributed to the participants. In this respect, the

high level of the participants and the series of policy briefs produced (the interested reader is referred to the website of the project: <http://www.cerna.ensmp.fr/Progeuropeens/CAVA/FinalWorkshop.html>) has represented a real success for the single institutions involved in CAVA.

Within CAVA, Feem’s research activities have regarded the theme “VAs and Competition”. As “practitioners” may know, competition concerns have been pointed out by the European Commission for a few years. Since many environmental agreements are signed by an industry representative and since part of their content is usually a prescription of single firms’ behaviour, it is said that VAs could constitute an occasion for anticompetitive practices such as cartel or barrier to entry formation. However, other than inspecting how and under what conditions this concern has a real foundation, the work of FEEM has been addressed to the (“trickier”) analysis of the likely trade-offs existing between the limitation of competition and the aim of VAs utilisation by policy makers, i.e. an effective and economically efficient protection of the environment. The answer to this research agenda, which clearly emerges from FEEM’s literature survey on “Voluntary Approaches, Market Structure and Competition”, is that a trade-off certainly exists between VAs’ use and competition protection, in the sense that a more concentrated

industry favours the adoption and the effectiveness of voluntary initiatives. However, as discussed in the workshop held in Milan in May 2000, the extent of this trade-off is not an exogenous variable since it depends on the accuracy of the design of the VA and policy mix. And this design remains in the hands of the policy maker.

Other than the Fondazione Eni Enrico Mattei, the partners of the CAVA network have been the CERNA-Ecole Nationale Supérieure des Mines de Paris – scientific co-ordinator of the project --, the University College Dublin (UCD), the CEEM-University of Gent, the Öko-Institut, and the Institute of Local Government Studies-Denmark (AKF). Each partner headed one of the 5 major themes, prepared specific literature surveys on its own theme and organised the thematic workshops which have represented the milestones of the project. The CERNA- Ecole des Mines has been co-ordinating the research agenda, updating the CAVA website and ensuring the publication of the CAVAWorking papers.

As a consequence of this organisational structure, the first outputs of this concerted action have been the literature surveys and the 5 collections of papers presented at the thematic workshops. The expertise and the information arising from these two sources have subsequently represented the base for the preparation of the policy briefs presented at the February conference. By looking at the title of these policy briefs and commenting on their content, we can therefore have a good idea of the kind of work carried out by each partner and have a quick look to the policy results which were achieved.

In particular, the Centre for Environmental Economics and Management of the University of Gent presented a policy brief titled “National Patterns in the Use of Voluntary Approaches in Environmental Policy”, which represents the more recent result of

a work started in November 1998 with a two-day workshop on “The World-Wide Use of Voluntary Approaches”. The papers presented therein, together with the literature survey prepared and made available in the CAVA website have allowed for an in-depth recognition of the state of the art of these policy instruments all over the world and within the European Union, where “negotiated agreements” have been the prevailing form taken by VAs.

The focus of the policy brief by the Öko-Institut has been “The Integration of Voluntary Agreements into Existing Legal Systems”. A point which has been emphasised is that the existing laws limit the use and the form which VAs can take within the member states of the European Union. The presumed flexibility of these policy tools must therefore be checked in light of the possibility of putting into practice the designed scheme from a juridical viewpoint. With regard to this point (and many other more specific issues, such as the rights of third parties and the involvement of the public, the procedural rules required for the implementation of environmental agreements, the use of eco-labelling and environmental management systems) the corresponding literature survey available at the CAVA website represents an extremely useful starting point for the recognition of the problems and practical issues related to the implementation of a VA-based environmental regulation. Of course, the differences at a national level can be quite relevant, as emerged from the workshop organised by the Öko-Institut in February 2000, to which the interested reader can refer in order to get more detailed information.

The research theme developed by AKF has been “The Efficiency of VAs”. As underlined in the final policy brief and in greater detail in the literature survey, the intrinsic economic efficiency of VAs seems somewhat questionable, given that the support of a series of (costly) policy devices or institutions is

generally required in order to ensure the environmental effectiveness of these instruments. However, in a policy-oriented perspective, the “limited” efficiency of VAs should be compared not to ideal alternatives but to other feasible solutions which could ensure the same degree of compliance. As for the workshop organised by this CAVA partner, held in Copenhagen in May 1999, one of its distinguishing characteristics was the presentation of a few very qualified theoretical and empirical papers.

The fourth of the five themes foreseen by the CAVA project has been the analysis of some institutional aspects related to the effectiveness and efficiency of VAs as environmental policy tools. In particular, under the leadership of the University College Dublin, a workshop devoted to the analysis of the so-called collective action and free-riding issues was organised. Differently from the other partners, no specific literature survey has been produced, being the actual content of this theme not specifically separable from the issues covered by the other surveys.

In short, after two more years of policy research, which the activity of the CAVA network has contributed to catalyse towards a few burning questions, we can affirm that we know more about VAs’use. One of the main lessons is that VAs should be used in a policy mix, combined with both traditional instruments and Kyoto mechanisms. More research on how these policy mixes should be structured from a practical point of view is certainly called for in order to come to an effective and flexible environmental policy.



Issue for Climate Change: Technical Change, Coalitions, Uncertainty

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In recent years FEEM's Climate Change Modelling and Policy Unit has been busy with research on three main fronts: induced technical change, the feasibility to fulfil Kyoto emission limits by constituting coalitions different from those initially foreseen by the agreements themselves, the role of uncertainty. The output of the research carried out in the last couple of years is collected in a number of papers which are described below.

Most of the work in the above-mentioned areas has been conducted using the well known Nordhaus' RICE Model of Integrated Assessment. This model is characterised by, among others, three useful features: it represents the world as divided in (six) regions, thus allowing for the study of strategic interactions among players simulating different coalition formations; it considers the economic and the environmental systems jointly, taking into account, albeit in a simplified way, the feedback between the two; it provides an exogenous representation of technical progress that can be easily endogenised.

The implementation of (a form of) endogenous induced technical change and the introduction of technological spill-over effects is the central topic of the paper "Endogenous Induced Technical Change and Costs of Kyoto" written by Paolo Buonanno,

Carlo Carraro and Marzio Galeotti. The paper was presented at the Workshop "Economic Modelling of Environmental Policy and Endogenous Technological Change", held in Amsterdam on November 16-17, 2000, organised by the Institute for Environmental Studies, with FEEM as co-organiser. In that paper, the RICE model is extended to the possibility that technical change can be induced by environmental policy measures. In the ETC-RICE model both the output production technology and the emission-output ratio depend upon the stock of knowledge, which accumulates through R&D activities. R&D is thus an additional policy variable that comes into play along with pollution abatement and capital investment. Two versions of this climate model are studied, one with endogenous technical change but exogenous environmental technical change (i.e. no induced technical change) and the other one with both endogenous and induced technical change. Finally, a third version of the model also captures technological spill-over effects. As an application, the three versions of the model are simulated allowing for trade of pollution permits as specified in the Kyoto Protocol and assessing the implications in terms of cost efficiency, economic growth and R&D efforts of the three different specifications of technical change.

In the recent debate on the cost and benefits of different climate policies the role of restrictions in the market for GHGs emission permits is an issue that has been increasingly discussed in the policy arena. These restrictions are often advocated for equity reasons: in particular, developed countries should not be allowed to trade freely in the permit market, in order to be induced to abate their own emissions through domestic policy and measures, rather than by "exploiting" the lower abatement costs of developing countries. Nonetheless restrictions on emission trading are also advocated on efficiency grounds, because they would stimulate environmental innovation and the adoption of environmental-friendly technologies, thus reducing abatement costs, at least in the long run. It is important to study the problem of ceilings with a model which, on the one hand, endogenises the process of adoption and diffusion of environmental technical change, and on the other hand captures the link between this process and the introduction of ceilings on emission trading. This is the content of the paper "Emission Trading Restrictions with Endogenous Technological Change", by Paolo Buonanno, Carlo Carraro, Efram Castelnuovo and Marzio Galeotti, to be published in *International Environmental Agreements*. Basically, the implications of restrictions on trading are analysed both in terms of their cost effectiveness and in terms of their distributional effects. The analysis takes into account the role of environmental technical change that could be enhanced by the presence of ceilings on trading. However, this effect is shown to be offset by the increased abatement cost induced by the larger than optimal adoption of domestic policy measures when ceilings are binding. This analysis provides little support in favour of quantitative restrictions on emission trading even when these

restrictions actually have a positive impact on technical change. Even in terms of equity, ceilings find no justification within this theoretical and modelling framework. Indeed, two findings are that flexibility mechanisms in the presence of endogenous technical change increase equity and that the highest equity levels are achieved without ceilings, both in the short and in the long run. The analysis has been recently extended to account also for knowledge spill-overs across world regions.

The study of coalitions with the RICE model is the goal of "Can Equity Enhance Efficiency? Lessons from the Kyoto Protocol", written by Francesco Bosello, Barbara Buchner, Carlo Carraro and Davide Raggi. The paper analyses the relationship between different equity rules and the incentives to sign and ratify a climate agreement. A widespread conjecture suggests that a more equitable ex-ante distribution of the burden of reducing emissions would provide the right incentives for more countries - particularly big emitters - to accept an emission reduction scheme defined within an international climate agreement. The paper shows that this conjecture is only partly supported by the empirical evidence that can be derived from the Kyoto Protocol. Even though more equitable burden-sharing rules provide better incentives to sign and ratify a climate agreement than the burden-sharing rule implicit in the Kyoto Protocol itself, a stable global agreement cannot be achieved. The only strategy to achieve a global agreement without free-riding incentives is a policy mix in which global emission trading is coupled with a transfer mechanism designed to offset ex-post incentives to free-ride. The next step is to carry out the above analysis with our ETC-RICE model that allows for induced technical change and knowledge spill-overs.

The role of Uncertainty in the RICE model and the interaction with induced technical change is analysed in the paper "Global Warming, Uncertainty and Endogenous

Technical Change: Implications for Kyoto" by Efram Castelnuovo, Michele Moretto and Sergio Vergalli. Its goal is basically to evaluate how the optimal choices of the agents in a stylised economy are affected by the introduced possibility of having "the end of the world" at a certain, unknown, point in time. In the model, termed ETC-U-RICE, two different representations of technological progress have been considered: ETC model, when R&D expenditures are not environmental-friendly and the ITC model, when also environmental R&D spending is considered. The main findings are the following. When uncertainty is considered, the behaviour of the agents is more cautious. Emissions are reduced by cutting down production, thus growth is less intense. This is why uncertainty is costly, as mirrored by the higher level of total abatement costs faced by the agents. As long as R&D expenditures are not environmental-friendly, they are optimally reduced, and do not help very much to trigger the "engine" of growth. The fact that emissions are very dangerous in case of uncertainty brings agents to demand less (or offer more) permits, driving downward their price (at least as long as the developing countries are not admitted to trading rights to pollute). When also environmental R&D spending is considered, conclusions turn out to be different. Uncertainty in the model stimulates firms to re-allocate resources in order to improve the emissions-output ratio, so being able to produce more GNP, *ceteris paribus*. In this case, growth is indeed boosted by "green" research and development. This leads the authors to conclude that uncertainty makes the key-variable R&D spending even more important when environment also is a concern.

At present FEEM's Climate Change Modelling and Policy Unit is tackling the following issues:

- the introduction of banking of emission permits: the aim is to extend emission trading to the case of purchases of permits at future dates;

- the introduction of economic uncertainty when induced technical change in present: the idea is to allow for some form of uncertainty in obtaining positive returns from R&D investment
 - the introduction of international trade of inputs and of goods: the current versions of our model provide for temperature as the only link between world regions.
- both in productivity and in carbon-efficiency;
- the introduction of backstop technologies: the idea is to allow for both continuous and discrete forms of technical change;



MULti-sectoral, INtegrated and Operational Decision Support System for Sustainable Use of Water Resources at the Catchment Scale

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* *University of Padova and Fondazione Eni Enrico Mattei*

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MULINO is a 3-year recently financed project by the European Commission within the Energy, Environment and Sustainable Development Programme. Its main aim is to provide local authorities and the European Commission with an operational tool to support the integrated management and sustainable use of water resources.

Scientific objectives

A great deal of scientific knowledge is now available in many related fields, like hydrologic modelling, environmental impact assessment, economic valuation, multi-criteria analysis, decision support. However, these areas are mainly treated in isolation and a substantial lack of integration remains, and, much more, its practical implementation in water management Europe is substantially missing. In this context, the purpose of the MULINO project is the provision of

an operational Decision Support System (DSS) for the multi-sectoral assessment and simulation of human activities, to be used for the assessment and management of the sustainable use of water resources at the catchment scale.

Concrete needs of end users, actively involved in the project since the design of the proposal, have contributed to design a DSS tool, which integrates socio-economic and environmental modelling techniques with a geographic information system (GIS). The application context is twofold: a) the support of water management in concrete decisional cases, and b) the assessment of water resources in representative European catchments.

Successful execution of the MULINO project will be accomplished by achieving three main project objectives:

1. Design and implement an operational DSS tool to support decisions based on hydrologic modelling, multi-disciplinary indicators and indices and a multi-criteria evaluation procedure

- for local (catchment-based) management of water resources.
2. Test the tool (developed in multilingual versions) in representative case studies (in Italy, Belgium, Portugal, Romania and the UK), in co-operation with local actors (stakeholders and end users).
 3. Demonstrate the potential of the tool in assisting the sustainable management of water resources, targeting:
 - the European Commission, in the dynamic assessment and monitoring of the evolution of water resource management at the local level within the framework of the Catchment-based Information System of the JRC;
 - local water management administrations in their efforts to implement or adapt to European water policy acts and local regulations.

Methodological approach

Firstly, the local networks of research institutions, stakeholders and end users will be organised. Then, the common methodological framework will be defined/detailed referring to specific needs presented by the end users of the project (local water management authorities and the JRC). The first prototype of the integrated tool will be built within the first year. Locally, the networks will organise workshops to support the DSS implementation within the current EU policy framework. Geographical information will be collected and stored first in local GIS's and subsequently in the Catchment-based Information System (CIS) at the JRC.

The tests of the integrated tool with data from the selected catchments will proceed in parallel with the development of the 3 releases of the prototype. A parallel effort will be devoted to defining/building a set of alternative water management scenarios, based upon results of the data collection activities, networking and their evaluations. Exchanges of experiences with other local authorities and research institutions will be set up through an international

workshop at the end of the second year.

Simulations of the various scenarios with the integrated tool will produce environmental and socio-economic indicators used in multi-criteria analysis, thus providing local administrations and the EC with a set of scenario evaluations.

The DSS will take into account the various socio-economic and political aspects that usually drive the local implementation of EU policies and regulations, in particular, local income variation, environmental impacts, intersectorial conflicts and local development. The results obtained, databases generated and the MULINO-DSS tool will then be used by the CIS of the JRC, enriching the set of European representative catchments and their data processing tools.

The results will be disseminated as a final CDROM and through the MULINO web site:

(<http://www.feem.it/web/loc/mulino/index.html>).

Scientific innovation

The MULINO project is motivated by a policy background at the European level, relying primarily on the Water Framework Directive (2000/60/EC), that the Member States need to adopt in co-ordination with other related policies/ regulations and in particular the recent Reform of CAP (Agenda 2000).

The novel aspects of the MULINO project are:

- The adoption of a problem solving approach, dealing with real problems of high socio-economic relevance, pertaining to selected and representative European catchments and raised by local stakeholders and end users.
- The methodology developed in strict co-ordination with the methods, approaches, and data standards proposed by European institutions (EEA, Eurostat, etc.).
- The bringing together of partners and case studies in areas with distinctly different socio-economic and environmental features.

- The multi-sectoral approach, with specific emphasis given to the dynamic analysis and modelling of agricultural land uses, because of their relevance for water resources depletion in many European regions and their rapid and significant transformations induced by Agenda 2000, the new reform of the Common Agricultural Policy (CAP).
- The methodology implemented for local applications (five representative case studies), but developed also for being applicable in a European context, in the newly established Catchment-based Information System (CIS) of the Joint Research Centre (JRC).

Expected impacts

The combined framework of new EU policies (Water Framework Directive, Agenda 2000, etc.) will represent one of the main driving forces of land use changes in Europe in the coming years, with dramatic effects on natural resources and economic activities. Other forces (market, cultural background) will interact within this framework in determining the final outcome. When the frame changes, local socio-economic systems react differently, depending on both their characteristics and the specific way in which the general principles of European regulations are implemented locally. The lack of operational tools able to carry out scenario simulations at the territorial level will cause the impossibility for both local administrations and the European Commission to foresee the evolution trends of socio-economic and environmental systems in the EU. Given the considerable lack of implementations of the available theory and tools of operational Decision Support Systems, there is a need for more effective research developed in collaboration with the specific stakeholders and interested end users.

In the field of water management the MULINO consortium has thus evidenced the specific need for a tool supporting local administration in

dealing with the ordinary management of water in the context of multi-sectoral conflicts and the analysis of the possible consequences of expected changes in the socio-economic or environmental context. Another need connected to the previous one has been identified for a tool supporting the European Commission in monitoring and assessing the management of water resources at the continental level, through a dedicated Catchment-based Information System already established by its competent JRC at Ispra.

By answering these questions, the MULINO consortium believes that the project can contribute specifically toward improving the understanding of changes of land use and their effects on the European environment, and, in particular, of water resources. In this respect it is a direct

contribution to several European policies in the field of water, obviously, but also agriculture, environmental protection and spatial development.

Within the time frame of three years the MULINO-DSS will be available to the administrations involved in the project, but also to other interested bodies and will represent a useful tool for management purposes related to water management issues in different contexts: ordinary multi-sectoral resource management, multi-criteria evaluation of future scenarios, etc.

The MULINO consortium

To cope with the general aims and the specific objectives described so far, an international consortium of outstanding European organisations

has been set up to address the very different types of specialised knowledge required by the various aspects of the project.

The project coordinator is FEEM (Carlo Giupponi, Valeri Cogan and Anita Fassio), while the rest of the partners constituting the consortium are: Centro de Investigação da Universidade Atlântica (EIA/UATLA); Department of Geography of the Université Catholique de Louvain (UCL); Silsoe Research Institute (SRI); Agriculture and Regional Systems Unit, Space Applications Institute, Joint Research Centre, Ispra (CEC-JRC); Center for Advanced Studies, Research and Development in Sardinia (CRS4); Research Institute of Soil Science and Agrochemistry of Bucharest (RISSA); Survey and Land Research Centre – Cranfield University (SSLRC).



Economic Growth and Innovation in Multicultural Environments

Dino Pinelli*

*Fondazione Eni Enrico Mattei

ENGIME intends to provide to European researchers *an interdisciplinary forum that studies the complex relationships between economic growth, innovation and cultural diversity*. Six interdisciplinary workshops will be organised over three years. The network is coordinated by FEEM and involves other eight European partners.

It will be funded by the European Commission, DG Research, Key Action: Improving Socio-Economic Knowledge Base. It is currently in the negotiation phase and due to start in the first half of 2001.

Background

The EU can be thought of as the biggest laboratory of intercultural collaboration of today's world (Hofstede, 1991). In 1994 the Killilea report of the European Parliament (1994, explanatory statement par. 6) said that an "estimated 40 million Community citizens speak a language other than the nine official European Community languages and the two national languages, Irish and Letzeburgesch. This represents one person in eight. In addition, 12 million people descended from immigrants

speak a non-European language". Since then, accession of Austria, Sweden and Finland in 1995 brought in new languages and cultures (see Table 1). The process of enlargement and the immigration from outside EU will further increase the degree of diversity, while EU institutions are being formed and profound structural changes, such as the process of globalisation and the raising of a knowledge-based economy, are taking place. Interpreting Stendhal, Chastel wrote "C'est donc dans la nature même, dans la physionomie géographique de la péninsule et dans la diversité des provinces qu'il faudrait chercher le ressort le plus intéressant de l'art italien." (Chastel, 1982, p 1).

Is the richness of cultural diversity going to be as fruitful for European competitiveness as Stendhal and Chastel suggested it was for Italian art? European policy-makers need to answer important questions, such as:

- "which integration approaches are best suited to current European societies (e.g. is it possible to find a balance between harmonisation of legislation and allowing for socio-economic-cultural diversity)?" (European Commission, 1999)

- how can the integration of cultures be favoured? Which policies and practices stimulate interactions of cultures so they will result in innovative and creative behaviour?
- how can the position of minorities on the labour market be improved? Which policies and practices will support the opening of the labour market to the specific skills and knowledge of minorities?
- should immigration be regulated? If so, how?
- to what extent should the education system reflect cultural and language differences?

To answer these questions, it is necessary to evaluate the cost and benefits of diversity by studying the complex relationships that link economic growth and innovation, cultures and cultural diversity.

The working idea

Cities offer a natural laboratory for studying diversity at work and to understand how culture, cultural diversity and economic growth and innovation interplay. Cities are in fact the geographic places where cultures and languages more often meet. The consequences are two-sided. On the one hand, cities are the places where

cultural and racial conflicts more often explode. On the other hand, many social scientists assign to cities a central role in the process of economic growth and innovation (Jacobs, 1969, 1984; Lucas, 1988, Sassen, 1994), mainly because of the diversity of skills, expertise, experiences, needs and the easiness of human relationships that cities offer. According to Jacobs (1984, p 39), the core activities of economic life, innovation and imitation, can only happen in cities, because cities are "versatile enough at production to possess the necessary foundation for the new and added production work" given the "complex symbiotic relationships formed among their various producers" and because, city markets are "at once diverse and concentrated". Cities are "the open-ended types of economies in which our open-ended capacities for economic creation are not only able to establish new little things, but also to inject them into everyday life" (Jacobs, 1984, p 224-25). Some cities, such as London, Paris, New York, Tokyo, have a strategic role in the development of activities that are strategic to world economic growth and innovation, such as finance and

Research teams			
Organisation Name	Dimension of analysis	Relevant expertise	CO
Fondazione Eni Enrico Mattei	Economic	Economic growth and innovation; new economic geography, urban and spatial development	Italy
University College London, Centre for Economic Learning and Social Evolution	Economic	Economic theory of knowledge flows; endogenous growth, training and inequality; European integration	UK
Faculty of Economics and Applied Economics, Catholic University of Leuven	Economic Cultural	Economic analysis of cultural factors Intercultural processes; diversity in Human Resources Management; organisational psychology	Belgium
Psycoanalytic Institute for Social Research	Sociological and political	Migration, ethnic relations and social participation; <u>governance.</u> Governance issues at European level.	Italy
Maison de la Recherche en Science Humaines, Laboratoire d'analyse socio-antropologique du risque (LASAR), Université de Caen Basse-Normandie	Cultural and sociological	Social consequences of anthropological factors; social issues at urban level; unemployment and exclusion	France
Institute of historical, sociological and linguistic studies, University of Ancona	Historical	Urban history; history of migration; historical experiences of integration of minorities in cities	Italy
Centre for economic research and environmental strategy	Economic	Economic theory of knowledge flows; economic analysis of social capital	Greece
Institute of Higher European Studies	Cultural	Practical experience of cross-cultural communication	Netherlands
Idea Strategische Economische Economische Consulting	Communication	Communication to policy-makers	Belgium

specialised services. “The risk, complexity, acceleration of information, multiplicity of firms and expertise often involved require face-to-face contacts that are only possible in this sort of cities” (Sassen, 1994, p 85). A key characteristic of this sort of cities, the global cities, is the cultural diversity of their population.

The *working idea* of ENGIME is that a useful approach to understand the costs and benefits of European diversity is to think of Europe as a potential reproduction on a world scale of some of the characteristics that urban centres have on a national and regional scale, given the high density of population and the variety of cultures represented. In other words, crucial lessons concerning the design of Europe-wide institutions and policies can be drawn from studying the relationships between culture, cultural diversity and economic growth and innovation in culturally diversified cities.

Cultures, languages and institutions

The word culture is currently used with several meanings, all derived from its Latin source, which refers to the tilling of the soil. In most Western languages, culture means ‘civilisation’ including concepts like education, art and literature. An economist would think of culture referring to some aspects that are immediately relevant for economic

growth, such as languages, legal systems, market micro-structures.

Social anthropology has developed a wider concept of culture. But definitions vary and anthropologists disagree about the precise meaning of culture: over 164 different definitions have been proposed (Schneider and Barsoux, 1997). One of the most comprehensive and generally accepted definitions was offered by Kroeber and Kluckhohn (1952): “Culture consists of patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiment in artefacts; the essential core of culture consists of traditional (e.g. historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, on the other as conditioning elements of future action”.

Literature has evidenced that cultural interactions are likely to have double-sided consequences. On the one hand, the existence of different cultural values may cause misunderstandings, frustration, or conflicts. Misunderstandings will happen if people interpret the behaviour of other cultures from their own cultural framework. Negative framing, for example labelling other cultures who suggest a different approach as

irrational, may set in motion a spiral of negative evaluative judgements of other cultures, ultimately resulting in a feeling that working together will be impossible. The notion of ‘culture shock’ is often used to describe this sense of frustration. On the other hand, when individuals from different cultures come in contact with each other significant complementarities may emerge, in terms of skills, practices, way of dealing with problems and knowledge of solutions.

Here we are concerned with the likely consequences at aggregate level (and particularly for economic growth and innovation) of positive and negative implications of cultural interactions.

Cultural diversity and economic growth

Cultural diversity entails costs and benefits. On the cost side, a common culture and a common language allows individual to interact (and trade) more easily: a contract need not be translated if two individuals speak the same language. Moreover, often, cultural diversity may lead to cultural *shocks and conflicts*. On the benefit side, skills and knowledge are often culture-specific: individuals with different cultural backgrounds have different skills, expertise and experiences. If the different skills, expertise and experiences are relevant to each other, cultural diversity

Table 1. The Euro-mosaic: EU member states and their ethnic and linguistic minorities

Austria	Slovenes (Carinthia), Hungarians (Burgenland), Croatians (Burgenland)
Belgium	Waloons (south Belgium), Germans (western Belgium)
Denmark	Germans (Slesvig), Faroe islanders
Finland	Swedes (Aland), Laps (Lapland)
France	Bretons (Brittany), Flemish (Dunkerque/Hazenbrouk), Germans/Alsations (Alsace-Lorraine), Basques (Biarritz/Bayonne), Catalans (Roussillion), Occitans (south France), Corsicans (Corsica), Ligurians (Maritime Alps), Gypsies, Bonifacians (Corsica)
Germany	Frasons (Schleswig-Holstein, Lower Saxony), Danes (Schleswig-Holstein), Poles (Westphalia), Sorabians (Saxony/Brandenburg)
Greece	Turks (Thracia), Aromunians (Thessalia), Albanians, Sephardim Jews
Italy	Occitans (Piedmont), Franco-Provincals (Valle d’Aosta), Walser (Valle d’Aosta, Piedmont), South Tirol Germans, other Germans (Tretino, Veneto, Friuli), Ladini (Dolomites), Friulani (Friuli), Slovenes (Friuli), Croatians (Molise), Albanians (southern Italy), Greeks (Apulia, Calabria), Sardinians (Sardinia), Catalans (Alghero), Gallo-romance (Apulia/Calabria), Gypsies
Ireland	
Luxembourg	
Netherlands	Frasons
Portugal	Spaniards (Tras-o-montes)
Spain	Galicians (Galicia), Basques (Euskadi: Alava, Guipuzcoa, Vizcaya, Navarra), Catalans (Catalonia), Aranesians (Lerida)
Sweden	Finns (Torne valley), Laps
United Kingdom	Scots (Scotland), Welsh (Wales), Cornish (Cornwall), Manx (Isle of Man), Franco-Normans (Channel Islands), Irish (Northern Ireland)
Source(s):	Toso, 1996

creates an environment where the gains from *complementarities* can be significant, provided that there exists enough *communication* across individuals. The following mechanisms emerge as the keys of relationships between diversity and economic growth and innovations:

- *Conflicts and social exclusion.* According to the OSCE High Commissioner on National Minorities ethnic conflict is one of the main sources of large-scale violence in Europe today. Violence and conflicts imply loss of efficiency and reduced economic growth. To the extent that cultural diversity leads to or reinforces potential social conflict, cultural diversity will impose additional costs on the economy;
- *Trust and social capital.* The definition of these concepts is still subject to debate, however, it can be summarised as “the norms and network of civic community that enable participants to act together more effectively to pursue shared objectives”. The literature has widely discussed the influence of trust and social capital on economic growth and innovation. To the extent that cultural diversity affects social capital and trust, cultural diversity will also affect economic performances;
- *Knowledge spillovers.* The knowledge of one individual spills over other individuals and improves other people’s productivity. The literature has identified knowledge spillovers as a major source of innovation and agglomeration economies. It has been suggested that *variety and diversity* promote knowledge spillovers and therefore economic growth and innovation. To the extent that cultural diversity is part of the process of knowledge spillovers that characterises the innovation process, especially within cities, it will affect economic growth.

The workplan

Six themes have been selected by ENGIME partners to be covered in the workshops.

Cross-cultural communication is the key word that links the workshops together.

Cross-cultural communication involves individuals, their interactions and their reactions to external stimuli. Therefore every issue has to be analysed according to the following dimensions: how differently individuals react to stimuli from the external environment depending on their culture (cultural dimension); how their reactions have evolved over time (historical dimension); how reactions of individuals differ according to the groups and social structure they are in and how groups and social structure change as a consequence of individual reactions (sociological dimension); what are the implications of reactions of individuals for economic growth and innovation at aggregate level (economic dimension); how differently individuals react according to the political structures they are in and how the political structure changes as a consequence of their reaction (political dimension).

This is why each workshop is multidisciplinary, and involves five dimensions of research: historical, cultural, economic, sociological and political. Every discipline is represented in the proposing consortium and will represent a catalyst for research carried out outside the consortium.

The sequencing of workshops starts from the mapping of EU cultural and socio-economic diversity and the analysis of cross-cultural communication, then it analyses in detail the key mechanisms (trust, conflicts, knowledge spillovers) that link diversity with economic growth and innovation. In particular, WKS1 studies where Europe and its cities stand in terms of cultural diversity and how this is reflected in social-economic structures. WKS2 studies the form of *communication*, with attention to the economic incentives and disincentives to communicate. WKS3 studies the *costs* of breaking communication down in terms of social exclusion. WKS4 studies the models of representation and governance, and how they can promote *communication*. WKS5

studies trust and social capital (*communication* is restored), their interrelationships and how they affect economic growth. WKS6 summarises previous work in terms of effects on economic growth, focusing on knowledge spillovers.

The partners

The study of the effects of diversity on innovation and economic growth requires an interdisciplinary approach. A mix of historical, cultural, economic, sociological and political disciplines is needed. FEEM has gathered together a group of leading institutions in those disciplines.

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The Role of Educational Institutions In The Art Sector: From Academies To The Grand Tour

Ilaria Bignamini and Enrico Castelnuovo

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KNOWLEDGE AS AN ECONOMIC GOOD: WHEN ART HISTORIANS AND ECONOMISTS CAN TALK TO EACH OTHER

More than five years ago Fondazione Eni Enrico Mattei and the Beijer International Institute of Ecological Economics of Stockholm embarked in a very ambitious research programme: understanding what types of institutions and incentives influence the creation and the diffusion of knowledge in different domains. The central idea of the programme is that knowledge is essentially an economic good and that individuals contributing to its creation and diffusion and most of all using it respond to economic incentives. Think of the lively debate on patents on HIV vaccines: should pharmaceutical companies who invested millions in vaccine research be rewarded by high prices and profits, or should public agencies intervene somehow and make vaccines available to everyone at a cheap price?

As economists, we have been used to think of these types of issues as mostly applied to science and technology. Yet, when we first drafted this programme of research we thought that the issue was

The establishment of Academies of Art in Florence and Rome during the second half of the Sixteenth Century marked the beginning of a new era¹. Early academies ennobled art education, contributed to the social and cultural rise of the artist and established new career patterns. The changes they introduced regarding the creation, selection and transfer of theoretical and visual knowledge were long lasting, but they will be better understood when compared with the context of art education during the Middle Ages and when due attention is paid to changes which took place before their establishment.

Starting-points

During the Middle Ages there was no difference, from a social point of view, between artists and craftsmen and their education was similar². For centuries the production and consumption of works of art pivoted mostly upon major monastic and episcopal centres. Some education and training was offered by workshops and scriptoria, where manuscripts were copied and illuminated, and where gold and silver works as well as ivory sculptures, stained-glass windows, enamels and embroideries were produced. Schools attached to cathedral churches probably

equally relevant for the arts. We had limited knowledge of the field, we were aware of landmarks contributions in the Economics of Art by people like William Baumol or Bruno Frey, but we thought that more work was needed and that this work had to be interdisciplinary.

Interdisciplinarity is of course wonderful, but it is hard to talk across different languages. We needed to find art historians who could listen to us talking of things like rational individuals maximising their utility, not laugh, and actually think how this type of approach could also be useful to them.

When we started organising the first conference of this programme in Castelgandolfo, we approached Enrico Castelnovo, a great scholar of medieval art history, especially interested in the social and economic organisation of the art world. Enrico Castelnovo was interested in our programme, but he was willing to write a paper only if Ilaria Bignamini was going to write it with him. Ilaria, a young Research Fellow at Oxford University, together with Castelnovo contributed a wonderful piece on Art Academies and schools and the way in which they influence stylistic evolution in paintings. She presented the paper at Castelgandolfo and really managed to show how interdisciplinary gaps can be bridged. She fell short of convincing economists that Art History and Economics are essentially the same subject!

According to Bignamini and Castelnovo, centralised public art academies had a fundamental role in the development of the arts and led to great achievements like the diffusion of Renaissance in Florence during the 15th century. However, they were often moulded by ruling powers to define a predominant, national style and the strict institutionalisation of learning and of the artistic career were

played an important role, but little is known about them as to the transmission of art knowledge. The life of St. Bernardus, Bishop of Hildesheim early in the Eleventh Century, suggests that before becoming a great art patron the Saint had practised various arts and he might have been introduced to art techniques at the school of the Cathedral.

Presumably early in the Twelfth Century, an important treatise on various arts, *De Diversis Artibus*, was written in a monastery of southern Germany. Its author, probably priest, is known as Theophilus³. The treatise is divided into three books; the first dealing with painting and its techniques (mural, table, parchment painting, illumination etc.), the second with glass (especially stained-glass) and the third with gold, silver, bronze and copper works. It is unlikely that Theophilus's book was addressed to individual artists and craftsmen; more probably its readers were instructors at major educational centres attached to monastic and episcopal workshops and schools. Information provided by this treatise ranges from ways of organising a workshop, or a furnace, to descriptions of the tools, materials and techniques.

The author, who shows some direct experience of monastic workshops, might have been a practising artist, possibly a goldsmith like Roger of Helmarshausen, an important maker of liturgical objects of the Twelfth Century, with whom Theophilus has been identified by some authors. In those days goldsmiths were at the top of art hierarchy.

Although monasteries tended to monopolise art production, works were also made for municipalities and courts. In the Eighth Century a Longobard Duke of Spoleto presented the Abbey of Ferentillo, near Terni (Umbria), with a marble slab carved in relief. It shows the features and bears the signature of a certain "Ursus magester" (Master Ursus), who presumably was running a workshop producing sculptures. Similarly, the goldsmith Wolwinus portrayed himself in a gold altar commissioned for the

Church of St. Ambrose by Angilbertus, Bishop of Milan in the Ninth Century. Wolwinus, who is wearing secular dress and is crowned by the patron saint while he presents him with the altar, signed his work and described himself as an "aurifaber".

Monastic workshops and schools of cathedral churches are not the only centres to take into account when considering the transmission of artistic knowledge. The renaissance of urban life during the Eleventh and Twelfth Centuries led to the rapid growth of the demand for art works, to the increase of workshops, to the creation of itinerant groups of stone-cutters, or sculptors, and to the rise of skilled artists describing themselves as masters (the word used was "magister"), which implied that they had completed their apprenticeship and were running a shop. Guilds were later to codify rules regulating workshops, their production and the relationships between masters and apprentices.

New attitudes towards artists and art production were soon to become manifest, especially in central Italy. A particularly interesting document is the *Libro dell'arte*, an art treatise written by the Florentine painter Cennino Cennini in Verona at the turn of the Fifteenth Century. A pupil of Agnolo Gaddi, Cennini illustrates how artists's workshops were run in Florence during the previous century, and gave details about art techniques and working methods. But, above all, Cennini's *Libro* contains an apology for painting, a technique that thanks to innovations introduced by Giotto and the wide-spread reputation of that artist had reached the pinnacle of the hierarchy of the arts. Giotto is regarded as the model-artist and also as the painter ennobling the activities of Cennini himself, who reminds the reader that he had been a pupil of Agnolo Gaddi who, in his turn, had been a pupil of his father, Taddeo Gaddi who had long been working in Giotto's workshop. In Cennini's book, passages on the figure of the painter and his training are related to his defence of painting

sometimes detrimental to innovation. In contrast, unregulated and self-supporting private academies like the early English Academy were more likely to promote innovation and changes in the major stylistic patterns.

These themes kept being at the heart of our programme and were revisited in our latest conference, which took place in Palermo on the 20th and 21st of April of this year. Just when we came back from Palermo we learned the very sad news that Ilaria Bignamini had prematurely and suddenly passed away. To remember her and to testify how important was her contribution to the understanding of our subject, we here reproduce her paper with Enrico Castelnuovo, which was presented at Castelgandolfo in 1995.

and, as a consequence, they are rather idealised. In spite of this the book includes interesting information about the painter's education. Painters are obviously advised to stay as long as possible in the workshop of a good master, but it is also recommended that they assiduously study works by other contemporary masters and concentrate on those by one artist only.

The idea of the superiority of painting over other arts can also be traced in the rules of guilds. In 1355, for instance, the members of the painters's guild of Siena proudly wrote: "noi siamo per la grazia di Dio manifestatori agli uomini grossi che non sanno lectera de le cose miracolose..." (We are, by the grace of God, illustrators for ignorant and illiterate men who cannot read of miraculous things.) In this case, the superiority of painting was clearly instrumental to the visualisation of religious matters.

By the end of Fourteenth Century, new attitudes towards the artist (now a figure distinguished from mere craftsmen), towards the painter (ideally a pupil of Giotto and other famous masters), and towards

painting (at the pinnacle of the hierarchy of the arts), had produced substantial and enduring changes in the social and cultural standing of artists, especially in Florence. This had the further effect of making a new institution necessary, which offered artists a more comprehensive educational curriculum than traditional workshop training. Fifteenth Century court patronage, humanism and theories about drawing, or disegno (the artist's prime idea), which developed mostly in Florence, did the rest and created the conditions for the establishment of academies of art.

Early Academies of Art

By the time Academies were established, drawing had long been regarded as a central feature of art education. Workshop training and apprenticeship progressed from copies after works by masters to simple drawings of individual parts of the human body, to studies of the whole human figure and to compositions with more than one figure. Young artists also copied three-dimensional models, drew after the nude model and studied drapery. Yet, these stages varied considerably from workshop to workshop, and not all the masters had the same professional skills. Not many of them could offer young artists a good selection of works to copy or could afford the cost of living models posing before the artists. (Usually models, though the employment of undressed female models is documented in Venice from the late Fifteenth Century.) Moreover, the study of theory, geometry, perspective and human anatomy, though pursued by individual artists, was rarely taught to apprentices and young artists as part of their workshop training. Early academies such as the Florentine Accademia del Disegno and the Roman Accademia di S. Luca were established for this purpose, but it took sometime before they actually offered all the educational services, which are described in their rules. Services

they offered to patrons were initially more effective. The case of the Accademia del Disegno is telling.

The Accademia del Disegno was created in 1563, shortly before Cosimo I de' Medici (Duke of Florence from 1537) became Grand Duke of Tuscany in 1569⁴. The Academy was part of a wider institutional system for the arts pivoting upon the Court. There was, in fact, a close relationship between Cosimo's political ambitions, his patronage of the arts and institutional events such as the publication of the first edition of Giorgio Vasari's *Vite de' più eccellenti architetti, pittori, et scultori italiani* (1550), the project of the Gallery of the Uffizi (begun by Vasari in 1560), the creation of the Accademia del Disegno (1563), the establishment of public exhibitions of works of art executed by academy members (at the Ospedale degli Innocenti, the first was held in 1564) and the second edition of Vasari's *Vite* (1568). These institutions celebrated the supremacy of the Florentine School and the munificence of Cosimo himself. The seventy-five artists admitted to the Academy during the first year (1563-64) came from shops of artists working for Cosimo and his family, that is to say those of Vasari, Bronzino, Michele di Ridolfo Ghirlandaio, Pier Francesco Foschi, Giovan Angelo Montorsoli and Bartolomeo Ammannati. Members of noble families such as the Medici, Strozzi, Ricasoli and Alammani families were also admitted to the Academy. The Academy liberated the artists from traditional guild control; the incorporation of it as a guild on its own right dates from 1570. It also promoted the arts of disegno as liberal pursuits, grounded in theory. In principle both artists and noble amateurs were given the possibility of attending classes on geometry, astronomy and natural philosophy as well as anatomy, life drawing and drapery studies. In practice, it was only in the Seventeenth Century that nude male models were regularly employed and that anatomy was studied, probably not so much

through dissections performed for the artists at the hospital of Santa Maria Nuova, as stated in the Academy's rules, but through studies of three-dimensional écorché figures made by sculptors under the supervision of anatomists.

The Academy, of course, created new discriminations among the artists. It divided them into two groups; those granted membership and those excluded from it, namely artists working for lesser patrons and the market, and artists practising the so-called minor or applied arts, even including those who enjoyed court patronage.

The Accademia di S. Luca, established in Rome in 1593, was a less discriminating institution⁵. Federico Zuccari, its first Principe, designed it as an open educational body; young artists from all over Italy and Europe could apply to it. Although artists practising minor or applied arts were excluded, a parallel institution called Compagnia, or Confraternita, di S. Luca was created for them. The Academy also took over the old guild, or Università dei Pittori, and supervised the whole body, including garzoni. The educational curriculum designed by Zuccari for the Roman Academy was similar to that of the Florentine Academy except for anatomical dissections, which were not allowed in the Papal States. But, as in Florence, the real activity of the Academy was confined to debates about the rules and no regular teaching was offered until the mid-Seventeenth Century.

'Printed academies'

More effective for the transmission of visual knowledge were drawing manuals, or 'printed academies', published from the beginning of the Seventeenthth in Italy and elsewhere in Europe⁶.

'Printed academies' were part of a larger production of art treatises and engravings, which made a vast body of visual knowledge widely available. These manuals supplemented workshop training and academy education and served as substitutes

for actual institutions. They were addressed to professional and young artists, to amateurs, craftsmen and house-painters.

The authors sometimes were well-known artists, but more often they were unsuccessful artists combining the activities of shop-keepers, print-dealers, pigment sellers, and drawing and painting instructors. The number of buyers is remarkable; Dr. William Salmon's *Polygraphice* -an English best seller addressed to both apprentices and professional artists-went through eight editions in nearly thirty years (1672 to 1701) and by 1701 it had sold 15,000 copies. Women were important buyers, and the market of 'printed academies' (like that of novels) soon became dominated by middle and upper-class female audience. Moreover, 'printed academies' had a wider geographical impact than art schools and they reached the provinces much earlier. The lessons they taught were more accessible than those of actual academies because they combined the functions of a preparatory school with that of an academy. Finally, they popularised the theoretical and visual lessons taught at academies, they popularised styles and stimulated a general taste for art. The modern art world would have never existed if it were not for the dramatic growth of the art press in the Seventeenth and Eighteenth Centuries, especially the production of engravings after the Antique and the Old and Modern Masters, book illustrations, magazines and 'printed institutions' of all sorts (printed academies, collections, museums and tours of Italy and other countries). These printed educational institutions are central to any consideration of the transfer of visual knowledge, and many of them offered models as selective as those of actual academies.

The French Academy

No academy was as effective in selecting models for the artists and no academy was so powerful in imposing itself as a model-academy as the state-created and state-

directed Académie de Peinture et de Sculpture. Established in Paris in 1648, it was reorganized by the King's Private Advisor, Jean-Baptiste Colbert, in 1663, and directed by the Premier Peintre du Roi, Charles Le Brun⁷. Like the Florentine Accademia del Disegno, but on a grander scale, Colbert's Academy was part of a wider institutional system which pivoted on the Court-State and its Government. Decisions were centralised to a degree never attempted before and never achieved later, not even by the dictatorships of our century. In addition to the Paris Academy of Art, Colbert created a French Academy in Rome (1666) and innumerable other institutions including the Académie de Danse (1661), Académie d'Inscriptions et Belle Lettres (1662), Académie des Sciences (1666), Académie de Musique (1669), Académie d'Architecture (1671), royal manufactures such as the Gobelins (1662) and Savonnerie (1663), and also a school of design and one for apprentices attached to the Gobelins (1666-67).

As soon as Colbert was appointed Private Advisor to Louis XIV in 1661, he also became Vice-Protector of the Académie de Peinture et de Sculpture. (He later was Surintendant des Monuments, 1664, and Protecteur de l'Académie de Peinture, 1672.) In such capacity, he ordered that all the brevétaires, the licensed artists, should become members of the Academy. The monopoly of the Academy had begun and it extended to annual exhibitions, later called the salons, which started in 1664 (but were not held regularly until 1737). Only the members of the Academy were allowed to exhibit their works at the Salon and in the livret, or catalogue (the first was published in 1699), their names were listed according to their status within the Academy: first the Premier Peintre du Roi, then the Recteurs, Professeurs, Académiciens and Agréés. In 1661 the Grand Prix de Rome was also created; the best students were sent to Rome to complete their education. To insure that they worked there with the

guidance of French masters an Académie de France à Rome was created in 1666. Subjects of religious and mythological history selected by the Academicians for the Prix de Rome left little freedom to young artists, who had to conform to the classical taste favoured by the political and artistic establishments. The publication of theoretical treatises such as those by Roland Fréart de Chambray (*Idée de la Perfection de la Peinture*, 1662) and Roger de Piles (translation of Du Fresnoy's *De Arte Graphica*, 1668), and the Academy's monthly conférences (started in 1667 and read by Academicians and amateurs such as André Félibien) were instrumental to the creation of an academic aesthetics. The principal aim of the conférences was to confirm that history painting was the pinnacle of the academic hierarchy. History painting was seen as encompassing all the genres (portraiture, landscape, genre, still-life) and therefore could be regarded as truly universal. The privilege for students sent to Rome was that they could study the best models of history painting and attain perfection in the study of the human body. But even in this students had no freedom in selecting their models; works to copy by Italian masters and classical sculptures were selected by the Academy Director. Young sculptors also had to make marble and plaster copies to send home for the use of the Paris Academy and to decorate Versailles and other royal gardens. Finally, while drawing after the living model, they were required to retain the perfected anatomical features they had studied while copying works by approved masters, especially Raphael and Annibale Carracci. Drawings produced by the French painter Louis Chéron at the academies in Paris and Rome, and drawings he later made at private academies in London are telling. They show how the anatomical features for drawings after the living male model were closely derived from copies of Carracci's ignudi (especially those painted on the ceiling of Palazzo Farnese, Rome). Those for drawings

after the female model he executed in London in the early 1720s were still, after forty years he had left from Rome, closely derived from Raphael (especially those at the Farnesina, Rome)⁸.

At the time Chéron was in Rome, in the late 1670s, the French Academy had virtually taken over the Accademia di S. Luca. Gian Pietro Bellori's influential book on the *Vite de' pittore, scultori ed architetti moderni* (1672) had been dedicated to Colbert and the Director of the Paris Academy, Charles Le Brun, had been elected Prince to the Roman Academy in 1675. This mirrored a more general political alliance between France and the Papal States, which lasted until the end of the Seven Years War in 1763.

The English Academy

The Edict of Nantes was signed in 1685. Chéron, like other Huguenot artists, was excluded from membership of the French Academy and, more generally, from the artist's profession. Like many Huguenots, he emigrated to England, where he established one of the first academies of art in London⁹. A few decades earlier, from the 1670s, many Dutch artists, auctioneers, dealers and print-sellers had also started to migrate to England, due to a serious recession in Holland creating dramatic unemployment. These two large emigrant artistic communities (along with artists who arrived from Italy, France, the Flanders, Germany, Switzerland and Sweden) imported new teaching methods and visual models into England. The Dutch imported also the female academy nude (the undressed female model was not employed at academies in Italy and in France until early in the Nineteenth Century) and they were responsible for the introduction of new marketing techniques including regulated auctions and auction catalogues.

The art market in Seventeenth Century Holland was far more expanded than in other countries due to the absence of commissions

from the Church, the Court and from wealthy aristocratic patrons, but it was a market inhibited by guild control, which was incapable to discriminate through prices between the different qualities of art products. The case of one of the greatest painters ever, Johannes Vermeer (who never made a living) is telling¹⁰.

When considering transfers of knowledge, one should never forget contributions from immigrants. Their chances to succeed have always depended on the political and social character of the country they migrated to and on the 'openness' of sectors they entered into. Artist-immigrants, who arrived in England in those days were particularly lucky because they met with a society far more liberal and open than any other in Europe (except for Holland), with a booming economy, and with a national school of painting, sculpture, architecture and design in its infancy. In fact, a modern British School was still to be created, the art market had not been organised yet, and the number of potential buyers of art works was so high as to make the lack of patronage from the Court and encouragement from the Government quite irrelevant. Immigrants played an active role in creating new outlets such as auction houses and print-shops, and they were founding members of early art clubs and private academies, whose multi-national and heterogeneous character was markedly different from that of any continental counterparts.

From its origins in 1673 until 1768, the English Academy was an unregulated and self-supporting private institution created and democratically directed by the artists themselves in response to growing market demands. It was open to all artists with no discrimination of nationality, religion or professional expertise. It contributed to the development of a mature system of interacting institutions. Advertisements on the press were widely used to publicise sales, auctions, exhibitions, illustrated books and other initiatives including

subscriptions to academies. The whole artistic community was involved in the decoration of public leisure gardens, most of them worked as stage designers and book illustrators. Unlike in Italy or in France, annual public exhibitions of contemporary art were created before the Royal Academy, and public exhibitions were open to all the artists. Data about the number of the visitors are telling. The first exhibition of the Society of Arts was held in London in 1760 and it lasted for less than three weeks. There were 12,000 visitors (about 1,000 a day) and there was a total of 6,582 catalogues sold at 6 pences each. The following year there were 13,000 visitors and each of them was requested to buy a copy of the catalogue sold at 1 shelling¹¹.

In half a century the unregulated English Academy had become a fully modern institution, whereas most other European academies only achieved similar results later, after the collapse of the Ancien Regime. The teaching offered by the market-oriented English Academy was inevitably different from that of other European academies. It was, first of all, a life-class meeting in the evening, when most subscribers were able to join after the working day. Experienced artists supervised the work of young artists but no title of professor was used, nor were instructors always the same individuals. Sculptors made plaster models for the artists to copy and those who wished to perfect in drawing after the Antique could attend the Duke of Richmond's Gallery of Casts, while young designers could attend William Shipley's Drawing School and compete for annual premiums offered by Society of Arts for designs of machines, textile materials etc. Finally, famous anatomists attended private academies established in London from 1720 onwards in order to learn how to draw from the human figure, which enabled them to supervise artists when making illustrations for their anatomical treatises. William Cheselden, one of the foremost anatomists of the Eighteenth

Century, attended the Academy established by Louis Chéron in London in 1720, and he employed artist-members of the Academy to produce illustrations for his influential treatise, *Osteographia*, of 1733. Anatomists also helped sculptors to cast ecorché figures and they performed dissections for the artists and anybody who was curious about them. (In England, dissections were frequently advertised in the press.)

Familiarity with the practice of drawing after the living model and anatomy, the use of both male and female models, the lack of pre-selected visual models, and the necessity to meet diversified market demands enabled the English Academy to become competitive with other European schools. But an unregulated Academy without official recognition could hardly be a major institution and help to promote the British School at home and abroad. This was a good enough reason as to convince many British artists to fight for the establishment of the Royal Academy of Arts. Artists particularly sensitive to this issue came from the ranks of traditional history painting and portraiture, and some of them, like Joshua Reynolds, the first President of the Royal Academy, had visited Italy in order to complete their education. Those artists thought that no real British School could ever exist without the backing of an official institution, without a programme of formal education offered to young artists, prestigious annual exhibitions organised by the Academy, and an aesthetics conforming to the hierarchy of pictorial genres, Academy lectures were initiated and, more generally, the artistic profession became institutionalised.

The Royal Academy of Arts, established in London in 1768, partly answered to the new requirements but, unlike its European counterparts, it was a private institution which supported itself with fees paid by subscribers, and with tickets and catalogues sold

at annual exhibitions. These were markedly different from the French salons; all artists could submit their works for exhibition at the Royal Academy, not only academy members. The most important feature the Royal Academy shared with its continental counterparts was the institutionalisation of the artist's career.

To be an Academician meant to be promoted to professional skill and perfection, independent of actual results. In 1735 Voltaire, who was proud of being a member of no academy, had pronounced severe words about French institutions:

“Nous n'avons pas un grand peintre depuis que nous avons une académie de peinture, pas un grand philosophe formé par l'Académie des Sciences; je ne dirai rien de la française”.

(We had no great painter since the Académie de Peinture was established, no great philosopher educated at the Académie des Sciences; I will not even mention the Académie Française.)¹².

In 1761 William Hogarth recalled Voltaire's words in order to discourage his colleagues from following Reynolds and his friends in their attempts at establishing a regulated Royal Academy¹³. Hogarth was defeated, but the banner of rebellion and intellectual freedom was soon taken up by William Blake, who in c.1808 wrote fierce words against Reynolds and the Academy:

“Reynolds's Opinion was that Genius May be Taught & that all Pretence to Inspiration is a Lie & a Deceit, to say the least of it. I do not believe that Rafael taught Mich. Angelo, or that Mich. Angelo taught Rafael, any more than I believe that

the Rose teaches the Lilly how to grow, or the Apple tree teaches the Pear tree how to bear Fruit. I do not believe the tales of Anecdote writers when they militat^e against Individual Character”¹⁴.

Individual freedom taken to such Romantic extremes was hardly compatible with an institution like the Academy, which perpetuated the traditional principle that the transmission of knowledge in art should be based on the practice of copying works by famous Old Masters selected for young artists by experienced Modern Masters -once workshop masters and now academy professors. Late in the Eighteenth Century and during the following century rebellious voices of all sort pronounced against the Academy. In countries that had long entered the modern and bourgeois era like England those voices gave expression to the rebellion of individuals or groups against an institution unable to answer the needs of modern art movements. In countries that had recently and dramatically entered into the bourgeois era like France the voices of individuals were mixed with political ideologies, which contributed to transform the Academy yet again. Many French artists, including Jacques-Louis David, believed that the Revolution and new subject-matter would produce a novel Academy, but it did not take them long to realise that the Academy could only be transformed to a limited extent and that the Museum was far more promising an educational institution. In January 1794, David wrote:

“...the Museum is not a mere collection of luxury goods, or trifles useful but for curiosity. It should become a great school. Masters will take their pupils there, fathers their children. The sight of works of genius will stimulate the growth of art and science seeds in those young people, who are naturally gifted for them. Time has come for you, the legislators, to stop ignorance half its way...save the Museum, save those works that can disappear in an instant and that avaricious nature might produce never again”¹⁵.

Tours and Museums

Long before reformed institutions for the new bourgeois and industrial era were created, the Grand Tour and the ‘grand museums’ began to play a role far more crucial than that of any academy with respect to the creation, selection and transfer of visual and theoretical knowledge in the art sector.

The educational tour of Italy, the Grand Tour, made by the upper and educated classes of European society and by countless artists during the Eighteenth Century was the ‘invisible academy’ -or the virtual educational institution- of modern Europe¹⁶. One of the most relevant consequences of the Grand Tour were archaeological excavations carried out on an unprecedented scale and massive exports of art works from Italy, especially classical sculptures and Old Master paintings. This trade (and these activities) contributed to the enlargement of pre-existing collections and created the conditions for the establishment of new museums, where the aesthetic lessons of classical and Italian art were taught to wider sections of the educated public and to all the artists. The impact of ‘museum towns’ such as Rome, Naples and its environs, Florence and Venice and that of ‘grand museums’ such as the Vatican, the Uffizi and later the Louvre and British Museum on the creation and transfer of visual knowledge was unrivalled by any other institution. Their role was subsequently expanded by new tours to previously little explored cultural and geographical areas, which created the conditions for the establishment of new museums and collections of Medieval and non-European art during the Nineteenth-Century.

Tours and museums became more important than any academy or art school, and the training of the artist began to coincide with the education of the public until avant-garde movements reintroduced the notion that the upper crust of the art production should be accessible to the few only. But museums and the press helped again and commercial advertisements, for

instance, have made wide use of incomprehensible formal solution originally elaborated by avant-garde artists.

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Notes

¹ Pevsner, 1940; *Academies of Art between Renaissance and Romanticism 1986-87*; Castelnovo and Bignamini, 1991.

² Castelnovo, 1987.

³ Theophilus, 1986.

⁴ Barzman, 1986-87; Wazbinski, 1987.

⁵ Pietrangeli et al., 1974.

⁶ Bolten, 1985; Bignamini, 1996.

⁷ Duro, 1996; Locquin, 1912; Crow, 1985; Montagu, 1989.

⁸ Bignamini and Postle, 1991, ills. 7-10 pp. 11-12.

⁹ Bignamini, 1986-87; id., 1998.

¹⁰ Montias, 1989.

¹¹ For further quantitative data, see Bignamini, 1990.

¹² Voltaire, 1954, letter no. 919, pp. 191-92.

¹³ Hogarth, 1966-68, p. 92.

¹⁴ Blake, 1984, pp. 452-53.

¹⁵ Quoted Castelnovo, 1985, p. 145.

¹⁶ Hibbert, 1987; Black 1992; De Seta, 1992; Wilton and Bignamini, 1996.



In this section of the newsletter, co-ordinators report briefly on recent relevant facts concerning their research units. The list is not exhaustive, as programmes are included only when there are events worth mentioning.

Research units in this issue:

CORPORATE SUSTAINABLE MANAGEMENT

RESEARCH UNIT CO-ORDINATOR: *Andrea Marsanich*

CLIMATE CHANGE MODELLING AND POLICY

RESEARCH UNIT CO-ORDINATOR: *Marzio Galeotti*

PRIVATISATION, ANTITRUST, REGULATION

RESEARCH UNIT CO-ORDINATOR: *Bernardo Bortolotti*
SCIENTIFIC CO-ORDINATOR: *Carlo Scarpa*

KNOWLEDGE, TECHNOLOGY, HUMAN CAPITAL

RESEARCH UNIT CO-ORDINATOR: *Dino Pinelli*

NATURAL RESOURCES MANAGEMENT

RESEARCH UNIT CO-ORDINATOR: *Carlo Giupponi*

SUSTAINABILITY INDICATORS AND ENVIRONMENTAL EVALUATION

RESEARCH UNIT CO-ORDINATOR: *Marialuisa Tamborra*

VOLUNTARY AND INTERNATIONAL AGREEMENTS

RESEARCH UNIT CO-ORDINATOR: *Carlo Carraro*

SPECIAL PROJECT VENICE 21

RESEARCH UNIT CO-ORDINATOR: *Ignazio Musu*

CORPORATE SUSTAINABLE MANAGEMENT

RESEARCH UNIT CO-ORDINATOR:

Andrea Marsanich

While many industrial countries already devote a significant fraction of their wealth to environmental protection, there is still a pressing need for effective environmental management at the corporate level.

Research in this unit aims at improving corporate environmental performance by providing companies with the organisational and technical tools for the effective and equitable management of environmental issues.

Research focuses on:

- Environmental and social accountability;
- Environmental and social reporting;
- Risk management;
- Eco-efficiency;
- Finance and business ethics.

EEBN – EUROPEAN ENVIRONMENTAL BENCHMARKING NETWORK

CO-ORDINATOR: Matteo Bartolomeo

Funded by the European Commission, DG Industry

The project, initiated by the European Commission (DGIII), aiming at the development and use – by firms, industry associations, local authorities – of benchmarking techniques in the environmental management domain has been carried out by FEEM in cooperation with, INEM - International Network for Environmental Management, (Germany) -, the Technical University of Delft (the Netherlands), Groundwork Blackburn (UK), CEFIC - Confederation of Chemical Industry, (Belgium)

The EEBN, an open network of interested parties, has been developed through the implementation of a website, the publication of a quarterly newsletter and a collection of case studies, and the organisation of workshops.

The first EEBN workshop “Environmental Benchmarking Improving performance and

profitability – a one day conference to promote the power of benchmarking for SMEs and the supply chain” was held in Manchester on April 19, 2000 and organised by Groundwork Blackburn.

The second EEBN workshop “Environmental Benchmarking of Products” was held in Delft on November 6, 2000, organised by the Technical University of Delft. The project has been closed by the final EEBN workshop “Benchmarking as a tool to improve environmental performance” held in Milan on December 5, 2000 and organised by Fondazione Eni Enrico Mattei (FEEM) in cooperation with International Network of Environmental Management (INEM).

STEPS – SUSTAINABLE TOURISM AND ENVIRONMENTAL PROTECTION FOR ISLANDS

CO-ORDINATOR: Federica Ranghieri

Funded by the European Commission, DG Research, Environment and Climate Programme

Main results of STEPS project was presented during the international conference on Sustainable tourism held in Venice on December 18th, 2000 and organized by FEEM.

The “*Cloverleaf Model*” and the Sustainable Development Matrix were adopted in order to study the possibility of sustainable tourism approach to the three islands and in SMEs involved in the project. The methodology underlines four types and sources of information and data: Resource flow, Resource flow impact, Stakeholders Analyses and Carrying Capacity.

Ponza case study was developed by Fondazione Eni Enrico Mattei in cooperation to the “Grand Hotel Chiaia di Luna”. Research of qualitative information and quantitative data lets us study the main environmental and social impact of tourism sector in the island. The University of Macedonia, in cooperation to the Doryssa Bay Hotel, carried out Samos Island case study. The study bring to the need of

a coordination that could plan the sustainable development of the country even from a economical point of view, at now a handful of international tour operators manages almost 80% of the incoming from international tourists.

The Sheffield University carried out the Harris’ case study. Tourism in Harris has, of course, very different characteristic from tourism in the Mediterranean Islands. This means that also the study of a sustainable tourism have to approach in a different way. The cloverleaf tool can offer to Harris the opportunity of: market diversification, more use of local produce, cost saving by improving material use efficiency, appropriate development.

STEPS project finished in December 2000, but FEEM will promote other initiatives connected to the sustainable tourism issues.

ENVIRONMENTAL MANAGEMENT IN LIGURIA

CO-ORDINATOR: Andrea Marsanich

The project, developed in Genova, tries to assess the state of the art in environmental management and accounting in Liguria, a region where geographical peculiarities have determined a certain level of concern about environmental issues leading to particular regional environmental regulation. The research, using a questionnaire sent to a sample of local companies, covers a range of issues going beyond standardised environmental management systems (EMAS or ISO14001). Actually it tries to give a representation of the level of integration of environmental issues in companies’ management and accounting systems, even in those companies where the application of those standards has not yet been considered.

PUBLICATIONS

- Brian Slack: Globalisation in Maritime Transportation: Competition, Uncertainty and Implications for Port Development Strategy, FEEM Working Paper Nota di Lavoro 8.2001
- Roberta Salamone and Giulia

Galluccio: Environmental Issues and Financial Reporting Trends, FEEM Working Paper Nota di Lavoro 32.2001

- Giovanni Landi wrote "The EU Environmental Law" included in the manual "Environmental Law" which will be published by CEDAM
- EEBN quarterly Newsletter

SEMINARS AND CONFERENCES

Giovanna Landi participated in the UNICHIM working group "Soils and Contaminated Subsoil Water" and attended the conference "City Air" organised by ARPA Emilia Romagna (Regional Agency for the Environment), presenting the work "Law for the Protection of City Air Quality" Bologna, 28-30 November 2000.

Andrea Marsanich attended the Workshop "Environmental Management Systems: Experiences and Applications", organised by AIAS, Milan, March 27, 2001, presenting a work titled "Environmental Management Systems: Some Results of FEEM Research"

Fondazione Eni Enrico Mattei organised the conference "Energy Saving and Waste Minimisation in the Process Industry", together with the Department of Process Integration UMIST Manchester and the Chemistry and Process Engineering Department of the University of Genoa, Genoa, 15 June 2001

RESEARCHERS

Andrea Marsanich (co-ordinator), Matteo Bartolomeo, Simona Berardi, Andrea Comini, Alba Di Grazia, Giovanna Landi, Daniela Mauri, Federica Ranghieri, Nadia Scanarotti, Erica Sozzi, Marialuisa Tamborra

CLIMATE CHANGE MODELLING AND POLICY

RESEARCH UNIT CO-ORDINATOR:
Marzio Galeotti

Research in this unit addresses the socio-economic dimension of climate

change, mitigation and adaptation policies. It focuses on a comparative evaluation of existing models and the development of new integrated assessment models for the study of policies aimed at climate change control. Special emphasis is placed on policy optimisation models and on endogenous technical progress and double dividend issues.

The goal is twofold: to make progress at the scientific and academic level, and to be up front in the policy dialogue and debate, which provides the unit with the necessary inputs to develop innovative and constructive scientific research. The unit participates in international networks and study groups of scholars and scientists, in world-wide negotiations on climate change issues, and in several projects supported by national and international institutions.

CLIMNEG

CO-ORDINATOR: **Marzio Galeotti**

In December 1997, 158 countries reached at Kyoto an historical agreement on limiting greenhouse gas emissions. The "Kyoto Protocol" imposes to Annex 1 countries (roughly developed countries plus transitional economies) to reducing their overall emissions of six greenhouse gases by 5.2% below 1990 levels over the period 2008-2012; developing countries are instead committed to voluntary actions only. Although already signed, the Protocol will come into force only once it is *ratified* by at least 55 parties whose CO₂ emissions represent at least 55% of the total from Annex 1 parties in 1990.

The FEEM Climate Change Modelling and Policy Unit is presently involved in the CLIMNEG EC funded research project. Aim of this research is to analyse whether the specific commitments imposed to its participants by the Kyoto Protocol, are effectively suitable to lead to the final *ratification* of the treaty (i.e. all the participants must find it *profitable* or in other words must gain from the agreement) and to its sustainability over time (i.e. it must be *stable* or in other words no participant should

have an incentive to defeat from the agreement).

The investigation concerning the profitability and the stability of the Protocol is being conducted using the well known Nordhaus' RICE Integrated Assessment Model. This model presents, among others, two useful features: it represents the world as divided in six major regions, allowing for the study of strategic interactions among players simulating different coalition formations and it considers jointly the economic and the environmental system, taking into account, even if in a simplified way, the feedback between the two.

The first phase of the research, focused on the Kyoto Protocol "tout-court", confirmed a common result of the related literature: the treaty can hardly be justified on the "pure" economic ground being neither profitable (for some countries the costs of participation are higher than the benefits) nor stable (some countries have an incentive to leave the agreement and "free-ride").

In a subsequent step, the analysis investigated two interlinked issues: on the one hand it considered the possibility to fulfil Kyoto emission limits by constituting coalitions different from those initially foreseen by the agreement. This in order to verify the possible existence of alternative profitable and stable alliances, able to produce the desired emission reduction. On the other hand it investigated the potential of different transfer schemes from would-be winners to losers of the agreement to increase its profitability and stability.

A very preliminary result of this research phase, still under way, is that the transfers implicitly induced by Emission Trading, one of the "flexibility mechanisms" described in article 17 of the Protocol, seem effectively able to "stabilise" some coalitions.

Further developments of the research will address the issues of stabilisation and enlargement of the agreement using instruments different from transfers. In this respect a strategy to be explored is the possibility to couple an environmental agreement to a parallel agreement on trade or on the exchange of technology so as to

compensate the costs of the first with the benefits of the second. This approach called “issue-linkage” is a novelty with respect to the standard procedures described in the Kyoto Protocol and can offer interesting opportunities to enforce the agreement.

GLOBAL WARMING, UNCERTAINTY AND ENDOGENOUS TECHNICAL CHANGE: IMPLICATIONS FOR KYOTO
CO-ORDINATOR: Michele Moretto

The bio-physical aspects of a large number of environmental phenomena are still highly uncertain. The great scientific debate on the evolution of global temperature or on ozone depletion are just two examples of the relevant role of uncertainty. This physical, chemical, and biological uncertainty, that goes under the name of *ecological uncertainty*, makes it difficult to evaluate the costs and benefits associated with environmental policy interventions as well as the effectiveness of instruments to control greenhouse gas emissions. The fact that natural developments do not follow linear evolutionary trends makes it even more difficult to take into account the role of uncertainty. In fact, natural developments are characterised by radical changes that may dramatically modify living and economic conditions. Moreover, natural phenomena may also be “irreversible”. That is, as sustained by the IPCC, the possibility of catastrophic events induced by global warming cannot be excluded a priori. Consequently, the so called Integrated Assessment Models (IAM) need to be able to capture “jumps” and irreversibilities in order to predict and avoid dangerous divergence from equilibrium paths.

Different aspects of uncertainty have been considered so far. Many models have been built in order to evaluate the cost of *uncertainty*. A “common” approach is to try to quantify the value of “early knowledge”, that is, the economic value of resolving the uncertainties about climate change sooner rather than later. Another perspective is given by the possibility

offered by some models to evaluate the outcome of a given action under different future scenarios which can be chosen by the user. Finally, a third approach to uncertainty is to describe how an uncertain, but possible, future and irreversible event can influence present decisions. In this approach the uncertainty stems from the agents’ ignorance on the level of global temperature required to trigger a “catastrophic” event that, once occurred, brings about a dramatic fall in the social welfare (utility levels).

Catastrophic environmental outcomes due to stock pollutants have been analysed both in the *theoretical* and in the *applied quantitative* economic literature. From a theoretical point of view, many authors have established a relationship between an environmental indicator (pollution, level of temperature, aggregated extraction) and the probability of a catastrophe: in particular, the closer is the environmental indicator to a certain threshold, the higher is the probability of the catastrophic event. Several works have analysed the role of ecological uncertainty in connection with global warming with the help on numerical models. The approach generally followed is to incorporate in an IAM a hazard rate function linking an environmental (usually endogenous) variable of the model to a “survivor probability”, which is in turn used to weight the utility level pre-catastrophe and the so-called “utility post-catastrophe”. Specifically, after the catastrophic event, the utility is usually fixed to a certain level occurred in the past, or (in a more extreme version) to a nil value.

To our knowledge, no attempt has been made to date to embed the above described “hazard rate” framework in a model dealing explicitly with endogenous technical change. Uncertainty may well influence the agents’ decisions regarding R&D expenditures, both environmental and not. For instance, in presence of *backstop* technologies uncertainty works in favour of low polluting production methods. But does this conclusion still hold in presence of endogenous technical change? How does uncertainty affect investment decisions? How are

pollution trajectories modified in this respect? In order to try to answer these questions, we follow the “hazard rate function” approach and incorporate it into a version of the well known climate model as RICE extended to include endogenous environmental technical change and emissions trading. The result is what we called ETC-U-RICE (Endogenous Technical Change with Uncertainty-RICE). With such model we are also able to study some consequences of the implementation of the Kyoto agreement under different policy options, i.e. with or without different degrees of introduction of one of the so-called “flexibility mechanisms” (specifically, the Emissions Trading). Hence, with this work we also try to investigate how the imposition of ceilings on emissions (termed “Kyoto constraints”) modifies the behaviour of the agents in terms of domestic abatement, consumption, physical and environmental investment, as well as how uncertainty influences the trading of emissions rights (quantity and price), when allowed.

ENFORCING ENVIRONMENTAL POLICY - EUROPEAN RESEARCH TRAINING NETWORK ON THE LEGAL AND ECONOMIC INSTRUMENTS OF ENVIRONMENTAL POLICY IN THE AREAS OF CLIMATE CHANGE AND AIR POLLUTION POLICIES (EEP)
CO-ORDINATOR: Carlo Carraro

Funded by European Commission, DG Research, Research Training Network Programme, 2000-2003

The network examines the instruments of environmental policy in the areas of climate protection and air pollution. It associates six European research teams in environmental law and economics established in France, Germany, Italy and UK, within both public and private non profit organisations. The Network aims to enhance the scientific knowledge of the functioning and effectiveness of various instruments of local and international climate change and air pollution policies and to promote the development and implementation, at

an appropriate level in Europe, of other instruments to complement or supplement current legislation.

Firstly, a comprehensive analysis of the environmental dimension and the socio-economic impact of marketable rights, joint implementation mechanisms and fiscal instruments will be carried out. Secondly, models for their efficient and effective implementation will be developed. Finally, policy recommendations for the shaping of such instruments in concrete legislative measures will be elaborated. The US experience will be used throughout as a point of reference.

As a *training network*, EEP intends to promote the mobility of researchers and the development of an interdisciplinary approach to research and environmental policy, thus contributing to the high quality training of young researchers in human sciences.

The project co-ordinator is the Johann Wolfgang Goethe-Universität Frankfurt am Main (U Frank-FSUR), Germany. FEEM is responsible with CIRED (Paris) for the economic evaluation of the instruments of climate change and air pollution policies.

The project website is: <http://www.rz.uni-frankfurt.de/FB/fb01/eep>.

The project started in July 2000. Two internal EEP Workshops were held respectively in Frankfurt (September 2000) and Paris (January 2001). A Young Researcher Workshop was organised by FIELD in London on 9-10 April 2001 to report and discuss first results. FEEM has reported on ancillary benefits of abatement measures.

CONCERTED ACTION FOR TRADABLE EMISSION PERMITS (CATEP)

CO-ORDINATOR: **Carlo Carraro**

Funded by European Commission, DG Research, Environment and Sustainable Development Programme, 2000-2003

The Kyoto Protocol allows trading of greenhouse gas emissions across national frontiers as a means of complying with agreed national

quota limits. CATEP (Concerted Action on Tradable Emission Permits) intends to bridge the gap between Europe and the US in integrating emissions trading into global climate change policy. The fundamental objective of CATEP is to provide a link between the work of the research community on the one hand, and the needs of the practitioners on the other. In particular, CATEP intends:

1. Mobilise existing and on-going research on tradable emission permits and other related flexible mechanisms so as to provide the policy process at European level with the latest insights and findings; outputs: series of Research Policy Briefs;
2. Identify the frontiers of such research and help animate relevant new research; outputs: Working papers presented at Workshops.
3. Help key sectoral interest groups and the social partners keep informed on latest findings and developments; outputs- the Workshops will be designed to encourage and facilitate shared learning, and a forum will be provided at such workshops for such interest groups.
4. Keep researchers informed by the policy process on emerging needs and issues; outputs: from the outset - including the design of this proposal - users and potential users have been involved in discussions as to what issues and themes research should concentrate on, and how it should be approached and 'packaged'

A series of five **Workshops** on key issues are to be held over 30 month. They will address the following issues: overview of key issues emissions trading, including theory and practise; domestic trading; regional trading; global trading; synthesis on key insights from the other workshops presented with particular focus on the needs of those in the policy process mechanisms. Besides, there will be one **Country Forum** that will provide an opportunity for practitioners operating at national level to present their progress, and raise issues for discussion amongst peers, and the research community.

The project started in December 2000 and will last 30 months. It is co-ordinated by the Prof Frank Convery of University College of Dublin (Ireland)

TRADE AND THE ENVIRONMENT IN THE PERSPECTIVE OF THE EU ENLARGEMENT (TRADE)

CO-ORDINATOR: **Mari Luisa Tamborra**

Co-financed by the European Commission, DG Environment

FEEM will organise and host a two-days workshop under the title "Trade and the Environment in the Perspective of the EU Enlargement". This workshop is aimed at stimulating the debate on the use of economic instruments in implementing environmental and trade policies in the EU and in Central Eastern European Countries, with a particular focus on their future accession. The workshop is intended to gather together academics, researchers, practitioners and policy makers working both in the environmental and trade fields.

The background for this workshop is the growing attention to the issue of trade and its impact on the environment. In fact, the literature has highlighted that trade liberalisation and globalisation have enhanced economic growth in industrialised countries and in some developing countries, although in some cases this has been achieved at the expenses of the environment. Moreover, economic instruments often constituting protectionist barriers to trade have been reduced dramatically in the course of these last few decades, whereas the use of these instruments is currently questioned and debated in the environmental policy field. In fact, the vast literature on environmental policy has identified two main approaches: the *command-and-control approach* which includes standards and quotas and the *market-based approach*, e. g. economic instruments such as emission permits, incentives and taxes. These considerations led inevitably to the need of fostering the

compatibility of trade and environment policies. This need becomes even more crucial in view of the accession of some CEECs to the European Union, as trade and foreign direct investments are expected to increase, thereby determining an impact on the overall sustainability of production and consumption patterns in the enlarged European Union. Moreover, pre-accession countries are not only required to cope with competitive pressure and market forces within the Union, but also to adopt, implement and enforce the "acquis communautaire" both in the environmental and trade fields ("The Copenhagen criteria", Copenhagen European Council, 1993).

The workshop will contribute to better understanding the linkages between trade and environment policies and the use of economic instruments for these purposes and to reinforcing existing links and establishing new links between researchers of Eastern and Western Europe.

The first part of the workshop will be devoted to analyse the impacts of both trade and Foreign Direct Investments on the environment. Then, the impact of environmental policies on trade is discussed and a final session is devoted to the specific effects of the EU enlargement in relation to trade and environmental policies. Publication of about 10 working papers on trade and environment will be available and directly downloadable from FEEM web site after the workshop (www.feem.it).

The workshop will be held at Fondazione Eni Enrico Mattei in Milano on 17-18th May 2001: http://www.feem.it/web/attiv/_attiv.html. For further information on the workshop please contact: Marialuisa Tamborra (tamborra@feem.it).

CARBON FLOWS BETWEEN EASTERN AND WESTERN EUROPE (CFEWE)
CO-ORDINATOR: **Carlo Carraro**

Funded by the European Commission, DG Research, European Network for Research into Global Change (ENRICH)

There is concern among countries and corporations as to what extent climate change policy measures will affect their strategic position. One of the uncertain factors is how the climate regime and the related national and EU policies will affect the flows of energy and carbon between Western and Eastern Europe. Eastern Europe compared to its Western part is endowed with respectively large natural gas reserves and vast areas with huge stocks of forest. Likely, over the next 50 years Eastern Europe will become a major source of fossil fuel carbon and biomass carbon for Western Europe.

The project aims at exchanging and propagating ideas, opinions and context-rich information on "carbon flows between Eastern and Western Europe" among stakeholders (initially representatives of EU and national governments, companies in the field of energy and forestry, NGOs and researchers).

The work will be performed by six academic institutes: the Institute for Environmental Studies (IVM) - Vrije Universiteit Amsterdam, which coordinates the network, and Fondazione Eni Enrico Mattei (FEEM), in association with the Science Policy Research Unit (SPRU) - University of Sussex, The Czech Ecological Institute, Warsaw Ecological Economics Centre and the Russian Academy of Sciences as subcontractors.

A first workshop will be hosted by FEEM on the 5th - 6th of July 2001. Background papers on the statistics, policy and economics of carbon flows will be prepared by each institution involved. Whereas IVM, FEEM and SPRU will investigate different aspects in a global perspective, the Polish, Czech and Russian institutes will take country specific perspectives. Participants from governments (national, European level), from large energy firms in both Western and Eastern Europe, from forestry based industries (e.g. paper industry) and from academia will be invited as speakers. FEEM study will be focused to the identification of long-term scenario related to aspects such as

technologies, market liberalisation, growth, governance and co-ordination of Transition economies.

The workshop is intended to identify possible future scenarios for carbon flows, from the perspective of different stakeholders that have additional sources of information. The output of the first workshop constitutes the main guidance for elaborating the initial papers.

These papers will be presented and discussed in a second larger workshop that will be hosted by IVM. The discussions and conclusions of this workshop as well as the identified possible scenarios will be published together with the papers in the final report of the project. A final edited volume will be distributed among members of stakeholder groups.

The project started in February 2001 and will last until the end of January 2003.

PUBLICATIONS

- *Efficiency and Equity of Emissions Trading with Endogenous Technical Change*; P. Buonanno, C. Carraro, E. Castelnuovo, M. Galeotti, in *Efficiency and Equity of Climate Change Policy*, edited by Carlo Carraro, Kluwer/FEEM Series Economics Energy Environment, Kluwer Academic Publishers 2000
- *Emissions Trading Restrictions with Endogenous Technological Change*; P. Buonanno, C. Carraro, E. Castelnuovo, M. Galeotti, FEEM Working Paper Nota di Lavoro 43.2000
- Can Equity Enhance Efficiency? Lessons from the Kyoto Protocol; F. Bosello, B. Buchner, C. Carraro, D. Raggi, FEEM Working Paper Nota di Lavoro, forthcoming
- Where is the Double Dividend? A Dynamic General Equilibrium Analysis of Carbon Taxation in the Italian Economy, Roson R. (2001), mimeo, Università Ca' Foscari di Venezia.
- Environmental Policies and Income Distribution in a Dynamic General Equilibrium Model of the Italian Economy, Roson R. (2001), mimeo, Università Ca' Foscari di Venezia.

SEMINARS AND CONFERENCES

Prof Robert S. Pindyck, of the Sloan School at MIT (Boston, USA), has given a seminar on "Precautionary Principles in Environmental Policy" at FEEM, Milano, on October 25, 2000.

Marzio Galeotti, co-ordinator of the unit, was invited on October 26th, 2000 by the Fundacion Entorno - Empresa y Medio Ambiente of Madrid to a one day meeting on "Emission Trading: Challenges and Opportunities". He gave a talk on "Efficiency and Equity of Emission Trading".

Carlo Carraro, FEEM Research Director, and Marzio Galeotti have participated in an international workshop on "Economic Modelling of Environmental Policy and Endogenous Technical Change" to be held in Amsterdam from 16 to 17 November 2000. At the workshop, co-organised by FEEM, IIASA, and IVM, Carlo Carraro and Marzio Galeotti have presented a paper (co-authored with Paolo Buonanno) titled "Endogenous Induced Technical Change and the Costs of Kyoto"

The unit contributed to the Conference "EEP Young Researchers Workshop", 9-10 April 2001, London. For more information on the network: <http://www.uni-frankfurt.de/fb01/eep/eep.htm>

FEEM has organised in May 2001 a workshop under the title "Trade and the Environment in the Perspective of the EU Enlargement", co-financed by the European Commission, DG Environment. This workshop is aimed at stimulating the debate on the use of economic instruments in implementing environmental and trade policies in the EU and in Central Eastern European Countries. The workshop is intended to gather together academics, researchers, practitioners and policy makers working both in the environmental and trade fields.

RESEARCHERS

Marzio Galeotti (co-ordinator), Polina Averianova, Francesco Bosello,

Barbara Buchner, Carlo Carraro, Efrem Castelnuovo, Sergio Currarini, Alessandra Gorla, Martina Marian, Michele Moretto, Davide Raggi, Roberto Roson, Marialuisa Tamborra, Sergio Vergalli, Fabio Zagonari

PRIVATISATION, ANTITRUST, REGULATION**RESEARCH UNIT CO-ORDINATOR:**

Bernardo Bortolotti

SCIENTIFIC CO-ORDINATOR:

Carlo Scarpa

Privatisation is a world-wide phenomenon experiencing an unprecedented momentum. Between 1977 and 1997, more than 1,850 large scale privatisations were carried out in the world, bringing government revenues of over 750 billion dollars. The phenomenon, which grew exponentially, involved more than 100 countries and all the sectors in which State-owned enterprises usually operate: agriculture and industry, finance, telecommunications, energy and services of public utility.

The structural changes that privatisation involves call for a systematic inquiry about many fundamental policy issues:

- the different objectives and methods of privatisation, the profound causes of divestiture, and the efficiency newly privatised firms;
- the new role of the State as a regulator in sectors like public utilities and infrastructure;
- the new antitrust policy in a global economy with an enhanced private sector.

This is the ambitious agenda of our unit.

SOURCES OF PERFORMANCE IN PRIVATISED FIRMS: AN ANALYSIS OF THE GLOBAL TELECOMMUNICATIONS INDUSTRY

CO-ORDINATOR: Bernardo Bortolotti

It is by now well established that the privatisation of state-owned enterprises (SOEs), especially those privatisations effected through public

share offerings, generally leads to improvements in the financial and operating performance of divested firms in both developed and developing countries.

It is far less clear *why* privatisation improves performance, and academic research has thus far made little progress in disentangling the separate effects of competition, regulation, and ownership structure on the performance of privatised companies.

The paper *Source of performance in privatised firms: a clinical study of the global telecommunications industry* by Bernardo Bortolotti, Marcella Fantini, William Megginson, and Juliet D'Souza provide answers to these questions by examining the most economically significant and politically sensitive industry being privatised in the world today - the national telecommunications monopolies.

While the study follows in the spirit of earlier telecom privatisation studies, the authors make two important new empirical contributions. First, they carry out the first multi-national examination of privatisation-related performance changes for telecoms using the Megginson, Nash and van Randenborgh [MNR] (1994) methodology for comparing mean (univariate) performance measures in the pre- versus post-privatisation periods. Since this has emerged as the most commonly employed methodology for examining privatisation's impact on the performance of divested firms, using this technique allows us to directly compare the results of telecom privatisations to those documented for other firms. Second, the author perform the first panel data estimation of the effects of telecom privatisation and regulation using *firm-level* data, rather than just country-level information. Employing observations for individual companies allows to examine the firm-specific sources of any performance changes documented. In particular, we can study how ownership and regulatory changes impact the output, profitability, efficiency, investment,

employment and leverage levels of privatised telecoms. The author examines the financial and operating performance of 31 national telecommunications companies fully or partially divested via public share offering over the period November 1981 to November 1998. The study is restricted to share issue privatisations (SIPs) for reasons of data availability—since only these generate comparable, publicly available pre and post-privatisation financial information. The authors first build a dataset using balance sheet data for a seven-year period around the privatisation dates including various measures for profitability, output, efficiency, employment, capital expenditure and leverage. This dataset also incorporates national measures of telecom service levels, such as number of lines in service, and controls for making cross-country comparisons possible (GDP per capita). Then they perform univariate comparisons of the pre- versus post-privatisation performance levels of these firms using the standard MNR univariate testing procedure. Panel data estimations are run to explain performance over time in terms of ownership changes and structural changes due to regulatory reforms occurring during the study period. Beginning with conventional pre versus post-privatisation comparisons, the authors find that profitability, output, operating efficiency and capital investment spending increase significantly after privatisation, while employment and leverage decline significantly. However, these univariate comparisons do not account for separate regulatory and ownership effects (retained government stake), and almost all telecoms are subjected to material new regulatory regimes around the time they are privatised. These separate effects are examined using both random and fixed-effect panel data estimation techniques for a seven-year period around privatisation. Privatisation is significantly related to higher profitability, output and efficiency, and with significant declines in leverage. However, numerous separable effects for regulatory,

competition, retained government ownership and foreign listing (on U.S. and U.K. exchanges) variables are reported.

Competition significantly reduces profitability, employment and efficiency after privatisation while creation of an independent regulatory agency significantly increases output. Mandating third party access to an incumbent's network is associated with a significant decrease in the incumbent's investment and an increase in employment. Retained government ownership is associated with a significant increase in leverage and a significant decrease in employment, while price regulation significantly increases profitability. Major efficiency gains result from better incentives and productivity, rather than from wholesale firing of employees and profitability increases are caused by significant reductions in costs—rather than price increases. On balance, the financial and operating performance of telecommunications companies improves significantly after privatisation, but that a significant fraction of the observed improvement results from regulatory changes—alone or in combination with ownership changes—rather than from privatisation alone.

PUBLICATIONS

- Giancarlo Spagnolo: Optimal Leniency Programs, FEEM Working Paper Nota di lavoro 42.2000
- Axel Gautier and Dimitri Paolini: Delegation and Information Revelation, FEEM Working Paper Nota di lavoro 47.2000
- Michele Moretto and Paola Valbonesi: Option to Revoke and Regulation of Local Utilities, FEEM Working Paper Nota di lavoro 51.2000
- Giancarlo Spagnolo: Self-Defeating Antitrust Laws, FEEM Working Paper Nota di lavoro 52.2000
- William L. Megginson and Maria K. Boutchkova: The Impact of Privatisation on Capital Market Development and Individual Share Ownership, FEEM Working Paper Nota di lavoro 53.2000

- Stefano Bosi, Guillaume Girmans and Michel Guillard: Optimal Privatisation Design and Financial Markets, FEEM Working Paper Nota di lavoro 23.2001
- Bernardo Bortolotti, Juliet D'Souza, Marcella Fantini and William L. Megginson: Sources of Performance Improvement in Privatised Firms: A Clinical Study of the Global Telecommunications Industry, FEEM Working Paper Nota di lavoro 26.2001
- Forthcoming book *Privatisation and Institutions*, Bernardo Bortolotti, Marcella Fantini, Domenico Siniscalco; forthcoming with Oxford University Press, in the OUP/FEEM Series "Studies in Economics"

SEMINARS AND CONFERENCES

The unit organised a Conference on "The Firm and Its Stakeholders: The Evolving Role of Corporate Finance", with CEPR and CeRP, which was held in Courmayeur, Italy, on March 23-25, 2001

Forthcoming : "Intermediate Presentation of the Results of the PFM Project" to be held in Brussels in the second half of the year.

RESEARCHERS

Bernardo Bortolotti (co-ordinator), Carlo Scarpa (scientific co-ordinator), Gabriella Chiesa, Marcella Fantini, Giovanna Nicodano, Laura Poddi, Mirlinda Rusi, Domenico Siniscalco

KNOWLEDGE, TECHNOLOGY AND HUMAN CAPITAL

RESEARCH UNIT CO-ORDINATOR: *Dino Pinelli*

This research unit intends to contribute to the development of a unified framework for the analysis of economic incentives characterising the creation and the diffusion of knowledge. Individual projects analyse the characteristics of knowledge as an economic good, the institutional organisations governing research and development at the firm level, the impact and effectiveness of

different education systems and the relationship between the creation of human capital and economic growth. New databases have been constructed to support research and policy analysis. The databases mostly focus on micro-data including information on firms and their R&D activities, training and formation of human capital.

ENGIME - ECONOMIC GROWTH AND INNOVATION IN MULTICULTURAL ENVIRONMENTS

CO-ORDINATOR: Dino Pinelli

Funded by the European Commission, DG Research, Improving Human Potential and Socio-Economic Knowledge Base

ENGIME is coordinated by FEEM and involves other eight European partners. It is currently in the negotiation phase and it is due to start in the first half of 2001.

ENGIME intends to *provide to European researchers an interdisciplinary forum that studies the complex relationships between economic growth, innovation and cultural diversity.*

The EU can be thought of as the biggest laboratory of intercultural collaboration of today's world. The process of enlargement and the immigration from outside EU will further increase the degree of diversity, while EU institutions are being formed and profound structural changes, such as the process of globalisation and the raising of a knowledge-based economy, are taking place.

In face of these challenges, the EU needs to identify the condition (policy, regulatory, institutional) under which European diversity can result in faster innovation pace and higher economic growth.

It is necessary to evaluate the cost and benefits of diversity by studying the complex relationships that link economic growth and innovation, cultures and cultural diversity.

Cities offer a natural laboratory for analysing diversity at work. *Cities* are the places where costs (for example in the form cultural and racial

conflicts) and benefits (for example in the form of cross-cultural knowledge spillovers that foster the processes of innovation and assign to cities a central role in the process of economic growth) of diversity show up. Using *cities as laboratory*, six consequential workshops will be organised by partners over three years to address relevant issues.

Each workshop is multidisciplinary, and involves five dimensions of research: historical, cultural, economic, sociological and political. Every discipline is represented in the proposing consortium and will represent a catalyst for research carried out outside the consortium.

The sequencing of workshops (WKS henceforth) starts from the mapping of EU cultural and socio-economic diversity and the analysis of cross-cultural communication, then it analyses in detail the key mechanisms (trust, conflicts, knowledge spillovers) that link diversity with economic growth and innovation. In particular, WKS1 studies where Europe and its cities stand in terms of cultural diversity and how this is reflected in social-economic structures. WKS2 studies the form of *communication*, with attention to the economic incentives and disincentives to communicate. WKS3 studies the *costs* of breaking *communication* down in terms of social exclusion. WKS4 studies the models of representation and governance, and how they can promote *communication*. WKS5 studies trust and social capital (*communication* is restored), their interrelationships and how they affect economic growth. WKS6 summarises previous work in terms of effects on economic growth, focusing on knowledge spillovers.

THE KNOWLEDGE ECONOMY: INSTITUTIONS AND PROPERTY RIGHTS

CO-ORDINATOR: Giorgio Barba Navaretti

The knowledge economy is defined as such because information and related intangible assets are key factors of production in driving sectors such as high-tech and internet

related industries. Yet, knowledge is a semi-public good which cannot be efficiently traded through the market like any other standard commodity. We are therefore faced with the extraordinary challenge of designing institutions and policy measures able to compensate market failures for the diffusion and the creation of knowledge. Although there are various studies looking at the processes ruling the creation and the diffusion of knowledge, especially technological knowledge, a comprehensive interdisciplinary framework for the analysis of very diverse aspects of the issue is missing.

Within their research programmes on knowledge, technology and human capital started in 1995, FEEM and the Beijer Institute co-operated in organising a major international Conference on *Knowledge as an Economic Good* which took place in Palermo on April 20-21. Some of the major European and American scholars worked on this topic have participated. Although the Conference dealt with the economic problem of designing optimal incentives for the creation and diffusion of knowledge, Conference contributors were scholars in different disciplines: economists, sociologists, antropologists, art historians. The first set of papers xamined the dynamics of institutions from a historical perspective, looking at technological innovation (David Landes and Jack Goody) and artistic innovation (Svetlana Alpers). A second group of papers, presented by economists, analysed the incentive systems characterising sets of institutions in different contexts and optimal design of institutions: science as opposed to technology (Giorgio Barba Navaretti, Partha Dasgupta, Karl Goran Maler and Domenico Siniscalco); innovation within the firm (Kenneth Arrow and William Baumol); performing and visual arts (Bruno Frey). The final set of works looked at the issue of proppertry rights on knowledge and studied specific issues like patenting in vaccine and information technolokgy and the role of the state and the market in supporting broad research

programmes like the genoma one (Giorgio Barba Navaretti, James Bessen, Carlo Carraro, Fabià Gumbau, Michael Kremer, Erik Maskin, Alessandra Pome', Danny Quah Domenico Siniscalco).

PURE - PUBLIC INVESTMENT AND PRIVATE RETURNS TO EDUCATION

CO-ORDINATOR: Giorgio Brunello, Claudio Lucifora

Funded by the European Commission, DG Research, Targeted Socio-Economic Research Programme

The overarching objective of the project is to study the effect of the differences in educational differentiation and school admission rules (free or selective entry) on observed outcomes in the labour market, in particular, in terms of the levels and dispersion of private returns to education and education-related inequality in earnings. The project is co-ordinated by the Research Institute of the Finnish Economy (ETLA), Finland and the partenariat comprises partners from all EU15 countries.

In the first phase of the project, surveys on national studies and experiences have been collected and compared in the book *Returns to Human Capital in Europe. A Literature Review*, eds. Asplund R. and PTeelho Pereira, ETLA, 1999.

In the second phase the partners have investigated empirically the relationships between observed trend in returns to education and the underlying market forces (supply side and demand-side factors), and carefully differentiated measures of returns by type and level of education. The investigation has been replicated in each country using national data sets with the objective of highlighting and comparing national systems of education. All the results have been collected and published in the book *Education and Earnings in Europe: A Cross Country Analysis of the Returns to Education* Eds by I Walker, C. Harmon and N. Wiestgard-Nielsen. As far as Italy is concerned, the results show that

whilst the returns to education (based on gross earnings) are in line with the European average, the educational attainment of the population is generally much lower. A preliminary cross-country comparison of earnings growth related to the educational level using a specifically constructed pseudo-panel has also been carried out. Results show that employees with tertiary education have steeper experience profiles than employees with upper secondary or compulsory education. Results show that differences in earnings growth by education are lower in countries with a higher level of corporatism and higher in countries which have experienced both relatively fast labour productivity growth and a relatively low educational attainment. The educational system also seems to matter, because countries with a more stratified system of secondary education have smaller differences in earnings growth by education. The results are published in *Education and Earnings Growth. Evidence from 11 European Countries*, G. Brunello and S. Comi, FEEM Working Paper n°29/00.

Finally a study of the educational wage gap has been carried out in order to offer a European perspective to the observed facts and investigates the role of cohort effects in the dynamics of educational wage gaps in Europe. The dynamics and level of the gap have been studied considering also the difference in level and evolution of the European labour market institutions. The results are collected in the FEEM Working Paper n°85/00.

More information is available on the PURE website www.etla.fi/PURE/

GRIT- GROWTH, INEQUALITY AND TRAINING

CO-ORDINATOR: Alfonso Gambardella

Funded by the European Commission, DG Research, Targeted Socio-Economic Research Programme

GRIT started on December 1st, 1998, and it has just finished, on Dec 1st,

2000. Apart from FEEM, the partners are CORE, Université Catholique de Luovain, Belgium; CERES, Greece; ZEW, Germany.

GRIT had three main goals – i) to produce a set of country studies (the countries of the partners involved plus the US and Japan) on the recent facts and trends about wage inequality, along with suitable institutional assessments; ii) to produce empirical models (and some theoretical papers) on the general subject of the Project; iii) to draw policy implications from the earlier analyses.

The teams spent the first part of the Project (up to about Summer 1999) mainly on the country studies, and on the preparation of the data bases for the empirical models. A paper '*Wage Inequality, Skills and Technical Change. The Empirical Evidence in Italy*', reports on the empirical evidence in Italy, in comparison with some benchmark countries such as the US and the UK.

In the second part the FEEM team has developed three papers, which are now just a few steps away from their completion. The first paper, *Technology, Industry Structure and Inequality*, by Alfonso Gambardella and David Ulph, develops a theoretical model which examines the performance of an economy composed of two sectors. The first sector could be thought of as one of the new sectors which produce (or use extensively) information technology services. This sector is human capital intensive, and it employs skilled workers. The second sector is the classical manufacturing system, which employs both skilled and unskilled workers. Main results concern the dynamics of inequality.

The second paper, *Productivity Effects of Technological and Organisational Complementarities: Evidence from Italian Companies*, by Alfonso Gambardella and Salvatore Torrisi, uses a large data base produced by Mediocredito Centrale on Italian manufacturing companies during 1995-1997 to analyse relationships among several dimensions of the companies.

Finally, *How Provincial is your*

Human Capital? Effects on Economic Performance in European Regions, by Alfonso Gambardella, Myriam Mariani, and Salvatore Torrissi, studies the relationships between the internationalisation of human capital and productivity using 1989-1996 data on European NUTS2 regions.

PUBLICATIONS

- Ioanna Kastelli: Science and Technology Policy in Greece. Policy Initiatives for R&D Cooperation, FEEM Working Paper 69.2000

The unit also contributed to the following books:

- *Returns to Human Capital in Europe. A Literature Review*, eds. Asplund R. and P Telhado Pereira, ETLA, 1999
- *Education and Earnings in Europe: A Cross Country Analysis of the Returns to Education* Eds by I Walker, C. Harmon and N. Wiestgard-Nielsen, 2000

SEMINARS AND CONFERENCES

A major conference has been organised by FEEM (jointly with the Beijer Institute for Ecological Economics, Stockholm) in April 20-21, 2001 in Palermo "Knowledge as an Economic Good"

RESEARCHERS

Dino Pinelli (co-ordinator), Giorgio Barba Navaretti, Giorgio Brunello, Simona Comi, Marco Da Rin, Andrea Ferri, Franca Ferri, Alfonso Gambardella, Claudio Lucifora, , Carole Maignan, Myriam Mariani, Valeria Papponetti, Riccardo Tarquini, Salvatore Torrissi

NATURAL RESOURCES MANAGEMENT

RESEARCH UNIT CO-ORDINATOR:
Carlo Giupponi

The objectives of this research unit are twofold. Firstly, the unit intends to contribute to the knowledge of factors that influence demand and supply of water in the Mediterranean regions and of policies and management

practices that increase efficiency in the use of water. The aim is to achieve a reduction of current disequilibria and face eventual crises. Special attention is devoted to groundwater resources, and their long-term sustainable use, both from a quantitative and qualitative point of view.

The second objective is to contribute to identify the potential physical and socio-economic impacts of climate change on Mediterranean coastal zones, with a particular focus on the city of Venice, the lagoon and its watershed.

This research unit is currently involved in the activity of the Venezia21 Project, in particular for what concerns the development and application of new methodologies in the field of Integrated Coastal Zone Management, with pilot study in the Sant'Erasmus island in the Lagoon of Venice. The unit is also collaborating with the CORILA consortium in the evaluation of the costs and benefits involved in the interventions for safeguarding the Venice lagoon.

With its new European research project on Multi-sectoral, Integrated and Operational Decision Support System for Sustainable Use of Water Resources at the Catchment Scale (MULINO), the unit extends its contribution at the European level. Furthermore, the European Commission is encouraging the transfer of information between projects that have similar fields of study. MULINO has been identified as one of the EC projects in a core group of the cluster that deals with the development of Decision Support Systems in the context of sustainable water management.

MULTI-SECTORAL, INTEGRATED AND OPERATIONAL DECISION SUPPORT SYSTEM FOR SUSTAINABLE USE OF WATER RESOURCES AT THE CATCHMENT SCALE (MULINO)

Funded by the European Commission, DG Research, EESD Programme

Financed by the EC, the newly born (starting date January 2001)

MULINO project fits the objectives of the first Key Action of the "Energy, Environment and Sustainable Development" (EESD) Programme – "Sustainable management and quality of water".

The purpose of the project is the provision of an operational Decision Support System (DSS) for the multi-sectoral assessment and simulation of human activities, to be used for the assessment and management of the sustainable use of water resources at the catchment scale. Concrete needs of end users, actively involved in the project since the design of the proposal, have contributed to design a DSS tool, which integrates socio-economic and environmental modelling techniques with a geographic information system (GIS). The policy background, relies primarily on the Water Framework Directive (2000/60/EC) and on Agenda 2000. The application context is twofold:

- a) the support of water management in concrete decisional cases;
- b) the assessment of water resources in representative European catchments.

The three main objectives of the project are:

1. Design and implement an operational DSS tool to support decisions based on hydrologic modelling, multi-disciplinary indicators and indices and a multi-criteria evaluation procedure for local (catchment-based) management of water resources.
2. Test the tool (developed in multilingual versions) in representative case studies (in Italy, Belgium, Portugal, Romania and the UK), in co-operation with local actors (stakeholders and end users).
3. Demonstrate the potential of the tool in assisting the sustainable management of water resources, targeting:
 - local water management administrations in their efforts to implement or adapt to European water policy acts and local regulations;
 - the European Commission, in the dynamic assessment and monitoring of the evolution of

water resource management at the local level within the framework of the Catchment-based Information System of the JRC.

The project partners constitute a multi-disciplinary consortium of researchers:

- Fondazione ENI E. Mattei (FEEM) (co-ordinator)
- Centro de Investigação da Universidade Atlântica (EIA/UATLA)
- Department of Geography of the Université Catholique de Louvain (UCL)
- Silsoe Research Institute (SRI)
- Agriculture and Regional Systems Unit, Space Applications Institute, Joint Research Centre, Ispra (CEC-JRC)
- Center for Advanced Studies, Research and Development in Sardinia (CRS4)
- Research Institute of Soil Science and Agrochemistry of Bucharest (RISSA)
- Survey and Land Research Centre – Cranfield University (SSLRC)

The MULINO-DSS will therefore adopt an application-driven approach, in which the scientific backgrounds and previous research of the consortium members will be integrated with local knowledge and needs expressed by already identified user groups, to build an operational tool suitable for the intended purpose.

PUBLICATIONS

- Cesare Dosi and William K. Easter: *Water Scarcity: Institutional Change, Water Markets and Privatisation*, FEEM Working Paper Nota di Lavoro 102.2000
- *Agricultural Use of Groundwater*, edited by Cesare Dosi, Kluwer Academic Publishers, FEEM/Kluwer series "Economics Research Environment", 2001

SEMINARS AND CONFERENCES

- C. Giupponi attended the Information Day on "Integrated Catchment Water Modelling", 14 November 2000, organised by the European Commission.
- C. Giupponi and F. Brochier participated to the RICAMARE workshop, "The Socioeconomics of

Climate Change in the Mediterranean Basin: Impacts, Vulnerability, and Adaptation", 9-10 February 2001, at FEEM, Milano.

- C. Giupponi and F. Brochier gave their contribution to the workshop on "Contingent Valuation: Experiences and Applications" held in Venice, 11 May 2001.
- V. Cogan will attend the seminar on "Good Practice in River Basin Planning", 29-30 May 2001, organised by WWF with the support of the European Commission.
- A. Fassio will present the MULINO project at the "Integrated Water Management Conference", 11-13 May 2001, at the Agricultural Research Institute, Nicosia, Cyprus.
- A. Fassio will attend the "International Workshop on Geo-Spatial Knowledge Processing for Natural Resource Management", 28-29 June 2001, at the University of Insubria, Varese (Italy).

MULINO-related workshops:

- The first plenary meeting was held at FEEM's headquarters (Milan), on the 22nd and 23rd of March, 2001, where the methodological framework was discussed and tasks clarified.
- A thematic workshop will be organised by the Portuguese team (AIA/UATLA) around September 2001. The workshop will be focussed on the involvement of various stakeholders in water management and in identifying the local networks in the case study catchment areas. It will include representatives from Local Authorities, the end users for whom the DSS tool will be designed, as participants.
- A second plenary workshop is due on December 2001 and will be related to the implementation of the case studies data sets into the data processing and simulation evaluation modules, for testing the first DSS prototype.

RESEARCHERS

Carlo Giupponi (co-ordinator), Valeri Cogan, Anita Fassio, Frédéric Brochier

SUSTAINABILITY INDICATORS AND ENVIRONMENTAL VALUATION

RESEARCH UNIT CO-ORDINATOR:

Marialuisa Tamborra

The main objective of the unit is the promotion and the use of an integrated approach to the analysis of the issues related to sustainable development. The analysis of the concept of sustainable development requires a multidisciplinary approach. To cope with this need, the unit members have different backgrounds: engineering, economics, and natural sciences. The main lines of research are: sustainability indicators at the regional and local levels, evaluation of critical natural capital, green accounting, strategic environmental impact assessment, energy-related environmental issues (externalities).

TOWARD AN ANALYTICAL STRATEGIC ENVIRONMENTAL ASSESSMENT (ANSEA)

CO-ORDINATOR: *Marialuisa Tamborra*

Funded by the European Commission, DG Research, Energy, Environment and Sustainable Development Programme

This project is co-ordinated by TAU Consultora Ambiental, Madrid and is aimed at providing an enhanced theoretical and methodological background to Strategic Environmental Assessment (SEA) to assist EU action in this area. The innovative character of ANSEA in respect to mainstream SEA theory and practice is represented by its focus on the analysis of the decision making process.

The first task of the project, which was centred on the elaboration of the theoretical basis for ANSEA has almost finished: a joint theoretical report has been edited and subsequently assessed by the Advisory and Scientific Boards during a meeting in Wuppertal (November 9–10th, 2000).

Recommendations of the Advisory and Scientific boards were very constructive and have been considered and discussed within the ANSEA group. Integrations and modifications will be done in the final version of the theoretical report, in order to take account of the most relevant recommendations.

At the beginning of March, the fourth meeting of the project has taken place at FEEM in Milan. The main outcome of the project has consisted in a re-definition of the key concepts of ANSEA. In particular, a distinction between procedural and substantive values that need to inform the Decision-making process has been accepted by all partners. At present the research group is discussing in-depth the criteria that help in identifying those values. Each partner has also presented the preliminary results of the case studies with the aim of agreeing on the methodology to be used for further analysis. Further information is to be found in the project website: www.taugroup.com/ansea

ENVIRONMENTAL VALUATION IN EUROPE (EVE)

CO-ORDINATOR: Marialuisa Tamborra

Funded by the European Commission, DG Research, Environment and Climate programme

This concerted action, co-ordinated by the Cambridge Research of the Environment (CRE) of the Department of Land Economy at the Cambridge University is about to finish. The final aim of EVE was to build a European multidisciplinary network of researchers working on environmental valuation. The concerted action focused on different topics that were discussed in 9 different workshops (see highlights of research units appeared in the FEEM Newsletter issues 2.1999, 1.2000 and 2.2000).

A series of Policy Research Briefs has been published for each of the workshops and are available on paper or directly downloadable from the

EVE web-site. The eleven Policy Research Briefs consist in:

- an introductory Policy Research Brief that explains the objectives of EVE, titled *The Concerted Action on Environmental Valuation in Europe (EVE): An Introduction* by C. Spash;
- 9 Policy Research Briefs that synthesise the relevant issues and outcome of the 9 workshops covering the following topics: (i) *Conceptualising and Responding to Complexity* by G. Munda; (ii) *Natural Capital* by M. O'Connor; (iii) *Conceptions of Value in Environmental Decision-making*, by J. O'Neill & C. Spash; (iii) *Conceptualising Sustainability* by A. Leist & A. Holland; (iv) *Property, Rights and Fairness* by R. Lawrence; (V) *Environmental Quality, health and Value of Life* by M. Willinger; *Greening National Accounts* by M. O'Connor, A. Steurer & M. Tamborra, *Participatory Approaches to Environmental Policy* by B. De Marchi & J. Ravetz;
- A final Policy Research Brief that draws some conclusions on the EVE concerted Action titled: *Environmental Valuation in Europe: Findings from the Concerted Action*, by C. Spash & C. Carter.

Further information is to be found in the EVE web-site:

<http://www.landecon.cam.ac.uk/eve/>

SUSTAINABLE URBAN TRANSPORTATION FOR THE CITY OF TOMORROW (SUTRA)

CO-ORDINATOR: Dino Pinelli

Funded by the European Commission, DG Research, Energy, Environment and Sustainable Development Programme

Transportation problems are among the most pressing strategic development problems in many cities. The problems to be solved are the inefficiency of urban transportation systems and underlying land use patterns, which negatively affect quality of life, economic efficiency, and the environment; the high costs

of urban transportation in both socio-economic and environmental terms; and the environmental consequences both in terms of physical aspects that include land and resource use, ecological aspects, and human health problems.

The primary objective of SUTRA is to develop a consistent and comprehensive approach and planning methodology for the analysis of urban transportation problems, that helps to design strategies for sustainable cities. Specific objectives are as follows: 1) to develop and apply a set of indicators for sustainable urban development; 2) to evaluate the status quo of the participating cities as a baseline-scenario in terms of these indicators; 3) analyse these scenarios using a set of different models and assessment tools, evaluate in terms of the indicators defined; 4) use a discrete multi-criteria optimisation approach to compare and evaluate the alternatives, identify preferable strategies, benchmark and compare cities to find generally applicable strategies; 5) to communicate these strategies and underlying information to policy makers, major actors and the general public.

A total of seven cities (Buenos Aires, Gdansk, Genoa, Geneva, Lisbon, Madrid, Tel Aviv) are involved directly with case studies, another four cities (Athens, Berlin, Milan, Vienna) are used for comparison, taking advantages of previous projects under the 4th Framework Telematics (ECOSIM) and Esprit (SIMTRAP) projects.

The project co-ordinator is ESS GbmH-Environmental Software & Services GbmH, Gumpoldskirchen, Austria. FEEM is the lead partner for the elaboration of scenarios of urban development and for the economic assessment part of the project.

The project started in July 2000. Over the last six months, work has progressed on the elaboration of the set of sustainability indicators and integration of the models. A SUTRA scientific workshop was held in Geneva, 5/6 February 2001. The objective of the meeting was to review the scientific background and conceptual analytical framework of

the project a series of presentations and discussions sessions. Further information is to be found in the project website: <http://www.ess.co.at/SUTRA/>.

NEWEXT - NEW ELEMENTS FOR THE ASSESSMENT OF EXTERNAL COSTS FROM ENERGY TECHNOLOGIES
SCIENTIFIC CO-ORDINATOR: Riccardo Scarpa,
PROJECT MANAGER: Marialuisa Tamborra

Funded by the European Commission, DG Research, Energy, Environment and Sustainable Development Programme

This new project is co-ordinated by IER- Stuttgart University and has a duration of 30 months (starting in January 2001). The main objective of the project is to improve the assessment of externalities by providing new methodological elements for integration into the existing EU external costs accounting framework. The project will conduct an empirical survey on the monetary valuation of the reduction of life expectancy to provide an empirical basis for this most important single parameter in the accounting framework. The standard price approach will be introduced to achieve a monetary valuation of ecosystem damage, which could not be monetised in previous work. A methodological framework for the modelling of multi-media (air/water/soil) impact pathways will be developed and demonstrated to complement the strong focus on air pollutants in ExternE. A methodology for the assessment of externalities from major accidents in non-nuclear fuel chains will be developed. FEEM is involved as sub-contractor of Bath University in the monetary valuation of mortality impacts in Italy. A survey study will be conducted to elicit willingness-to-pay (WTP) for extensions in life expectancy in the UK, Italy and France. The methodological framework has been developed by an expert team in the USA, and tested in Canada, the USA and Japan. The

survey is computer based, avoiding interviewer bias, it introduces the concept of risk and probability that can be used to measure the value of life, as well as to value a reduction in the risk of death in the future. The reductions in risk are valued in a context-free situation, reducing the bias associated with people believing, often mistakenly, that certain risks do not apply to them. This means that the results are applicable in contexts other than the air pollution context that is of immediate interest here. The quantitative results of the survey will be put into a standard database format for statistical and econometric analysis. Willingness-To-Pay values for each risk category will be analysed according to the statistical distribution that best fits the empirical data. Maximum Likelihood (ML) estimation techniques will be adopted since these are recognised as being consistent. The results will be analysed and compared, to provide an indication as to how attitudes vary between countries within the EU, and the results will be compared to results obtained in Japan, Canada and the USA using the same methodology. In February the first two meetings have been organised to launch the project. FEEM has taken part to one of them that gathered together the research partners involved in the monetary valuation of mortality impacts.

AIRPORTS - DEVELOPING ENVIRONMENTAL HEALTH INDICATORS FOR LARGE AIRPORT SYSTEMS IN EUROPE
SCIENTIFIC CO-ORDINATOR: Marialuisa Tamborra
PROJECT MANAGER: Pietro Caratti

Financed by the European Commission - DG Public Health

This new one-year project is co-ordinated by the Department of Risk Analysis and Toxicology of the University of Maastricht and involves four other research institutes in Europe: FEEM (Milan, Italy), Imperial College School of medicine – Dpt. of Epidemiology & Public

Health (London, UK), St George Hospital Medical School - Dpt. of Public Health Sciences (London, UK), Nofer Institute of Occupational Medicine (Lodz, Poland). The background for this project consists in the understanding that civil aviation is becoming a truly global industry, with a few conglomerates of airlines serving a world-wide network of large “hub” airports. The local and regional environment of the airport has to cope with the impact of airport and airport-related activities. The impacts of all these activities on public health are partly specific to the airport system: aircraft noise, air pollution, kerosene odours and also air-crash risk. Other indirect effects of large airport settings are landscape changes, road traffic, industrial noise and pollution. The project aims to develop environmental health indicators to monitor trends in local health impacts resulting from exposure to environmental risk factors related to the operation of large airports in Europe. The monitoring data can be instrumental to guide public health policy at the regional and national level. The health indicators are also suitable for deciding between alternative options for the developments within an airport operations system. In addition, this set of environmental health indicators can be used for European-wide comparison of health impacts of large airports.

The first meeting has taken place in Maastricht from the 15th to the 18th of March where the objective and methodology of the project have been discussed and agreed among all partners.

PUBLICATIONS

- Roberto Roson and Stefano Soriani: Intermodality and the Changing Role of Nodes in Transport Networks, FEEM Working Paper 105.2000
- Inge Mayeres and Stef Proost: Should Diesel Cars in Europe be Discouraged?, FEEM Working Paper 1.2001
- Paola Doria and Davide Pettenella: The Decision Making Process in Defining and Protecting Critical

- Natural Capital, FEEM Working Paper 2.2001
- Julie Catherine Sors: Measuring Progress Towards Sustainable Development in Venice: A Comparative Assessment of Methods and Approaches, FEEM Working Paper 16.2001
 - Julie Catherine Sors: Public Participation in Local Agenda 21: A Review of Traditional and Innovative Tools, FEEM Working Paper 17.2001
 - Markandya, and M. Tamborra, *Green Accounting in Europe. A comparative study*, Vol II, Kluwer Academic Publishers, Dordrecht/Boston/London, forthcoming.
 - M. O'Connor, A. Steurer, M. Tamborra, *Greening National Accounts in Spash*, C. & C. Carter (eds.) EVE Policy Research Brief Series, Cambridge Research for the Environment (CRE), University of Cambridge, 2001

SEMINARS AND CONFERENCES

- Participation of Pietro Caratti to the seminar: "La VIA in Italia, problemi e prospettive: Le normative delle Regioni e delle provincie autonome", XII Convegno Nazionale Annuale AAA (Associazione Analisti ambientali), organised by AAA and University of Pisa, November 9-10th 2000.
- Participation of Marialuisa Tamborra and Pietro Caratti to the conference: *Industria e Grandi Infrastrutture: Ruolo e Prospettive della Valutazione di Impatto Ambientale* ("Industry and Large Infrastructures: Role and Perspectives for Environmental Impact Assessment"), organised by EIA Italian Centre and Istituto per l'Ambiente, Palazzo Stelline, November 28th 2000.
- Participation of Marialuisa Tamborra to the course: "Stated Preference Methods", by professors Bengt Kriström and Thomas Laitila, University of Gran Canaria, Las Palmas, January 8-12th, 2001;
- Presentation by Marialuisa Tamborra and Luca del Furia of the results of the ExternE National Implementation titled: *La*

Metodologia e le Applicazioni del Programma di ricerca ExternE in Italia ("The Methodology and Implementation of the ExternE Research Programme in Italy"), at the workshop: *I costi esterni ambientali derivanti dalla Produzione di Energia* ("The Environmental External Costs related to Energy Production"), organised by Fondazione dell'Ambiente T. Fenoglio", Province of Torino, March 23rd, 2001

RESEARCHERS

Marialuisa Tamborra (co-ordinator), Pietro Caratti, Luca Del Furia, Daniela Mauri, Valeria Papponetti, Dino Pinelli, Roberto Roson, Riccardo Scarpa, Riccardo Tarquini, Valentina Tarzia

VOLUNTARY AND INTERNATIONAL AGREEMENTS

RESEARCH UNIT CO-ORDINATOR:
Carlo Carraro

The unit on voluntary and international agreements investigates and analyses the application of international and voluntary agreements as instruments of company and public policy.

Voluntary agreements in environmental policy refer to undertakings by agents, be it individual firms or collective action on the part of an association, to establish and achieve outcomes beyond the current standards specified by law or regulations. The increased interest in and use of voluntary agreements has stimulated research to look at questions such as: What are the characteristics of voluntary approaches and of the environment in which they are used that are most conducive to their successful implementation? What are the implications of their use in terms of both economic efficiency and environmental effectiveness? Can they be used as substitutes to direct regulation or are they complementary? Are participating firms motivated by consumer demand pressures or the threat of stricter regulation?

International agreements address international and global environmental problems, such as greenhouse effect, the ozone layer, acid rain. International negotiations on these issues are complex processes, involving both political and economic considerations.

The main feature of these agreements is that they are usually signed only by a sub-set of negotiating countries, a fact which could hardly be explained by theoretical tools available in the seventies and eighties. Current research focuses on the analysis of the incentives of economic agents and on the determination of equilibrium configuration. Research addresses the economic mechanisms that induce countries first to sign the international agreement and then to work to expand the number of its signatories, even in the presence of asymmetries and free-riding. Crucial issues are the stability and fairness of the equilibrium outcome.

NEAPOL – NEGOTIATED ENVIRONMENTAL AGREEMENTS: POLICY LESSONS TO BE LEARNT FROM A COMPARATIVE CASE-STUDY
CO-ORDINATOR: *Marialuisa Tamborra*

Funded by the European Commission, DG Research, Environment and Climate Programme

The project, co-ordinated by the Centre of Environmental Economics and Environmental and Management (CEEM) of the University of Ghent, is aimed at elucidating both the specific characteristics of negotiated agreements and the institutional and economic factors that influence their performance. The objective is to produce policy recommendations for the European Union regarding the use of such agreements as policy instruments for the environment. The project has concluded in December 2000.

The final results were presented during the closing conference held in Ghent (30th November – 1st December) where each partner focused on a particular aspect of the

research work. Several discussants both from industry, research and policy spheres intervened contributing to the debate.

The presentations were based on the theoretical report and highlighted some evidence of the hypothesis tested during the case studies analysis: (i) the existence of a favourable policy climate; (ii) the existence of an alternative threat; (iii) the sectoral structure; (iv) the demand structure. Main sessions included: the issue of competition and free-riding; the climate of trust and the existence of a threat; the existence of different policy levels (regional, national and European) on which agreements can be negotiated and interact with other policy instruments; and their study in a dynamic perspective as learning tools. Special attention was given to the overview of the comparative results and the method used for assessing the performance of these instruments.

FEEM has contributed to this project in two different ways: (i) by compiling a theoretical literature survey of the general economic approach to negotiated environmental agreements, (ii) by developing two case studies (the case of the Province of Vicenza and the case of Agip-Unione Petrolifera). In addition FEEM is carrying out a survey in Italy on Local Authorities, industrial associations and a small number of firms, aimed at improving the understanding of the application of VAs in the country.

A book will be published soon by Edward Elgar Publishing Limited as a final output of this project.

More information on the project and the conference can be found at: <http://fetew.rug.ac.be/neapol/Index.htm>

CAVA– A CONCERTED ACTION ON VOLUNTARY APPROACHES

CO-ORDINATOR: Carlo Carraro

Funded by the European Commission, DG Research, Environment and Climate

The use of voluntary approaches (Vas) as environmental policy tools complementing or at times replacing

traditional regulation or fiscal instruments in EU Member States has increased since the late 1980s. However, unlike other instruments such as taxes and tradable permits, forum of discussion between private, public and academic spheres and literature surveying the state-of-the-art are needed in the field of VAs.

CAVA, a concerted action on voluntary approaches co-ordinated by CERNA at the Ecole Nationale Supérieure des Mines de Paris, has tried to fill this gap by fostering communication between researchers and policy-makers in order to improve the quality of research and decision-making. Five areas of research were identified and subsequently five workshops were organised by the partners involved: (i) the worldwide use of VAs: state-of-the-art and national patterns; (ii) the integration of VAs in existing legal systems; (iii) institutional aspects; (iv) the efficiency of VAs and (v) VAs and competition. FEEM, in particular, organised the fifth workshop – on competition – in May 2000. The research focused on identifying the most favourable market conditions in terms of concentration for the adoption of voluntary approaches and assessed the effects of voluntary approaches on market structure, industry concentration and eventually collusion.

The project has now concluded. Final results of the concerted action were presented during a workshop held in Paris on the 1st of February 2001 were 5 Policy Briefs prepared by each partner were discussed.

More information on the project and the conference can be found at:

<http://www.cerna.ensmp.fr/Progeuropeens/CAVA/Index.html>

COALITION FORMATION NETWORK

THE 6TH COALITION FORMATION WORKSHOP – JANUARY 2001

The 6th Coalition Formation Workshop has been held at C.O.R.E., Université Catholique de Louvain, 26th, 27th January 2001.

As in previous events, this year's Workshop has offered a wide variety

of contributions in the theory of coalition formation and related fields. In particular, contribution have focused on the theory of international agreements, on the new research field of network formation and to the game theoretic analysis of political systems. The Workshop has also been an occasion for the responsible scientists of all members of the Coalition Theory Network to meet and plan future activities, both in terms of next years' events and in terms of fund raising. See this edition of the newsletter for further information.

A brief discussion of this year's scientific contributions follows.

The first session has focused on the theory of international agreements. In the first paper, Carlo Carraro and Carmen Marchiori offered an interesting game theoretic analysis of the choice, faced by potentially co-operating countries, between different frameworks of negotiations. In particular, the focus was on the option of linking different co-operation issues; the authors establish conditions under which all countries voluntarily choose issue linkage, and under which this expands the set of co-operating countries.

In the second contribution, Carsten Helm provided a new proof of a result previously obtained by Chander and Tulkens (1997), showing that the core of a quasilinear international agreement game is nonempty and contains the ratio equilibrium of the economy. Helm's main result is that the game induced by this economy is balanced, and therefore possesses a nonempty core.

Parkash Chander turned then to a problem that has been on the agenda of policy makers for the last few years: Climate Change. He presented a model in which each country sets its policy in the absence of international co-operation. His aim is to show existence of equilibrium, and to show that the properties of the static model studied by Chander and Tulkens (1997) carry on to this dynamic environment.

The last paper in the session, by Michael Finus, offered a discussion of the various equilibrium concepts of coalition formation games when applied to an international negotiation

game. The main result of the paper is that if countries are farsighted and if membership in a coalition requires the consent of all existing members, then emissions tend to be lower, and welfare to be higher, in the long run.

The morning session of Saturday 27th focused on the theory of coalitions and network formation. Salvador Barbera and Carmen Bevia studied the possibility of desinging efficient allocation rules in environment in which global decisions must be ratified by local committees. Sylvie Thoron studied the problem of coalition formation when agents have bounded rationality. David Castrillo, Suresh Mututswami and David Wettstein study the problem of the efficiency of economic activities that take place via formation of links and in which agents bid over the surplus created by the formed links. Building on a paper by Currarini and Morelli (2000), they study the subgame perfect equilibria of the link formation game and show that they lead to efficient configurations. The same result is then showed to hold in the contribution by Currarini and Morelli. In their paper, efficiency of subgame perfect equilibria result from the demand game associated with the formation of the network. In their paper, agents bid over absolute demands, and the surplus sharing feature is obtained endogenously.

Networks structures are the topic also of Stefan Ambec and Yves Sprumont's paper, in which the problem of how to allocate river among different locations the scarce resource of water of a river. The main result is that the associated cooperative game is convex and therefore has a nonempty core. The paper also analyses a concept of fairness for this problem.

The last paper on networks is proposed by Francis Bloch and Paul Belleflamme, and studies the possibility of cross ownership among different firms in an oligopoly model. The authors study the structure of equilibrium and efficient graphs applying some recent contribution in the theory of network formation.

Finally, Slavador Barbera concludes the session with his paper (joint with Matthew Jackson) on self-stable

choice rules. The idea here is the following: a self-stable choice rule should be such that it would be collectively chosen if adopted as choice rule. In other words, agents voting on choice rules adopting a self-stable choice rule should choose exactly that choice rule they are adopting. Barbera and Jackson show that self stable voting rules exist under certain assumption.

The last session offered three contributions to the analysis of regional and federal systems. In the first paper, Shlomo Weber and Michel Le-Breton studies the pattern of inter-regional transfers needed to avoid secession. In the second, Ozgur Kibris and Arzu Ilhan study the political economy of tariffs in a world of increasing globalization and interaction between the domestic and international decision makers. Finally, Alain Desdoigts and Fabien Moizeau study the conflicts of interest which may arise in an economy of heterogeneous agents who vote over a level of redistribution. They obtain the counterintuitive result that more unequal economies may redistribute less and not more, as one way expect.

COALITION FORMATION NETWORK

THE 7TH AND 8TH WORKSHOPS TO BE HELD IN 2002 AND 2003

We announce that our application for funding a series of High Level Conferences, in the framework of the European Commission programme *Improving Human Potential*, has been favourably evaluated by the examining commission. The Coalition Theory Network will therefore receive funding for the next two Coalition Formation Workshops to be held in January 2002 and 2003. Here follows a preliminary programme for these two meetings, jointly agreed by all partners of the networks.

The first conference will focus on the latest contributions from Coalition theory on the formation of international agreement. In the first thematic session "Dynamic issues in international agreement", the attention will be focused on the

dynamic and intergenerational issues of international agreements on environmental standards. Since these often concern the regulation of emissions which have a stock nature, i.e., which accumulate over time, one key task and challenge of the theory is to put forward models of negotiations that account for these issues and can serve as a basis for predictions and policy making. In addition, the very nature of the problem brings in equity issues such as the preservation of next generations consumption possibilities, both in terms of private goods, both in terms of environmental quality. Theoretical research should aim at a rigorous analysis of these type of equity issues to enrich and complete the efficiency analysis on which this field of research has typically focused.

The second thematic session "Lobbying, pressure groups, political institutions and international co-operation" will analyse the effect of political institutions in the determination of the incentives of political subjects as a key element for the success or the failure of international co-operation processes. The failure to obtain the commitment of several countries in the recent negotiations on climate change could be interpreted as the effect of political constraints on the choice of national leaders. According to these lines of research, sessions will be dedicated to the presentation of game-theoretical models of political science and to negotiations models in which the political element is explicitly incorporated.

The last session is dedicated to more applied works, particularly on simulations and empirical investigations. This type of research is particularly important in this field, in which mathematical and computational complexities often make policy suggestions a difficult task.

The second conference is dedicated to one of the most relevant issues for modern economic systems: the formation of social and economic networks. Networks are admittedly a major feature of important social and

economic phenomena of the last decades. After a first session dedicated to a relation of the main contribution in the theory of endogenous network formation, the second session will discuss the issue of network relations in the industries of telecommunications, transports, information technologies. The third session will instead focus on trade networks, and on the current trends globalisation. In particular, the transformation of trade patterns and market structures will be studied, with special attention to EU enlargement and perspectives. Contributions highlighting risks and opportunities of the Enlargement not only for “hard markets”, but also for financial and monetary markets will be discussed. This session will be of particular interest for policy decision makers that will be provided with a clear cut of the ongoing transformation processes within the EU. The last session will take a political economy approach to the study of an economic union’s formation. The formation and enlargement of international unions and the emergence of secessionist movements will be analysed by means of models of political competitions and of group formation in the political process.

PUBLICATIONS

- Michael FINUS: Game Theory and International Environmental Co-operation: A Survey with an Application to the Kyoto-Protocol, FEEM Working Paper Nota di Lavoro 86.2000
- Katrin Millock and François Salanie: Collective Environmental Agreements: An Analysis of the Problems of Free-Riding and Collusion, FEEM Working Paper Nota di Lavoro 108.2000
- Katrin MILLOCK: The Combined Use of Taxation and Voluntary Agreements for Energy Policy, FEEM Working Paper Nota di Lavoro 109.2000
- Markus A. LEHMANN: The Impact of Voluntary Environmental Agreements on Firms’ Incentives for Technology Adoption, FEEM Working Paper Nota di Lavoro 110.2000
- Giulia PESARO: Environmental Voluntary Agreements: A New Model of Co-operation Between Public and Economic Actors, FEEM Working Paper Nota di Lavoro 9.2001
- Cathrine HAGEM: Climate Policy, Asymmetric Information and Firm Survival, FEEM Working Paper Nota di Lavoro 10.2001
- Sergio CURRARINI and Marco MARINI: A Sequential Approach to the Characteristic Function and the Core in Games with Externalities, FEEM Working Paper Nota di Lavoro 11.2001
- Rinaldo BRAU, Carlo CARRARO and Giulio GOLFETTO: Participation Incentives and the Design of Voluntary Agreements, FEEM Working Paper Nota di Lavoro 19.2001
- The Coalition Theory Network is about to launch a new on-line journal, with title *Groups, Coalitions and Networks*. The main scope of *Groups, Coalitions and Networks* is ensuring a rapid and widespread communication among members of the scientific community whose work is related to the theory of coalitions and networks formation. Rather than filling a gap in the range of existing journals, our scope is to promote and facilitate the dissemination of new results and of on-going research, which are at an earlier stage than that required for publication on top journals. For this reason, no transfer of copyright will be required for publication. We will nevertheless maintain a tight control on the quality of contribution, requiring that the proposed theoretical results, although possibly partial and/or only perspective, meet the standards of top field journals. This initiative has the medium run objective of creating a common site where discussion and collaboration among researchers in the field can develop, exploiting the wide range of communication possibilities offered by the Internet technology. A Web page will be ready within the next month. Further particulars will be provided in the next newsletter.

SEMINARS AND CONFERENCES

NEAPOL Closing conference, November 30th - December 1st 2000, Ghent - conference organised by CEEM, university of Ghent – Presentation by Rinaldo Brau on the topic “Competition and Free riding” and participation of Marialuisa Tamborra as chairperson.

CAVA final workshop, February the 1st, 2001, Paris – workshop organised by CERNA, Ecole Nationale Supérieure des Mines de Paris – presentation by Carlo Carraro.

RESEARCHES

Carlo Carraro, Rinaldo Brau, Sergio Currarini, Jane Wallace Jones, Carmen Marchiori, Marialuisa Tamborra, Roberta Camera

SPECIAL PROJECT VENICE 21

UNIT CO-ORDINATOR:
Ignazio Musu

In January 1996 FEEM began their “Progetto Venezia 21”, a research programme conceived as a means of providing a technical and scientific contribution to the Local Agenda 21 process set in motion by the Venice Municipality.

The Programme focuses on three broad topics seen as critical to Venice for its Sustainable Development: the institutional setting and the participation of civil society in government, the environment in the lagoon, and the impact of specialized productive activities.

In each of the thematic sectors, Sustainable Development is considered in terms of an integration of economic, environmental and social objectives.

Since the initiation of the programme FEEM has produced a series of publications and hosted a variety of conferences and workshops all concerned with different aspects of Sustainable Development in Venice. Now well established with a life of its own, the programme’s current research includes both on-going projects and new initiatives inspired by the evolving nature of

international research in the field of Sustainable Development.

INTEGRATED COASTAL ZONE
MANAGEMENT IN THE VENICE AREA,
ICZM-VE - PILOT STUDY OF
SANT'ERASMO ISLAND

**CO-ORDINATOR: Carlo Giupponi,
Frédéric Brochier**

The recent international workshop on "The impacts of climate change on the Mediterranean Area", held in Venice by FEEM in December 1999, raised the problem of the high vulnerability of the Venice lagoon system to global changes. The existing complex institutional/administrative context (several bodies are involved in the management and planning of the Venice area), together with the lack of relevant quantitative data, highlighted the opportunity to consider the problem in the context of Integrated Coastal Zone Management (ICZM).

This research project aims to develop an ICZM methodological framework in order to deal with the complex set of social, economic and environmental issues which sector approaches to development have proven unable to address. The methodological framework will be applied and tested on a limited area of the lagoon (the island of Sant'Erasmus). The use of ICZM in facing the socio-economic challenges of coastal planning at a small scale will allow to identify needs for future action at the larger scale of the whole Venetian Lagoon.

The project is developed in collaboration with the CO-RI-LA (*Consorzio per la Gestione del Centro di Coordinamento delle attività di Ricerca inerenti il sistema Lagunare di Venezia*) and consists of two components: (1) theoretical research on case studies and methodologies of ICZM applied in contexts similar to the lagoon; and (2) analysis of the local situation of Sant'Erasmus. The two research streams are designed to produce a general framework including guidelines and indicators for the implementation of the ICZM

procedure and the elaboration of cross-sectoral plans.

The island of Sant'Erasmus, one of the major islands in the Venice lagoon, presents some features that are relevant for the objectives of the project:

- presence of traditional economic activities, such as agriculture;
- ecological importance of its environment;
- presence of typical environmental problems of the Venice lagoon (erosion, salt water intrusion, flooding);
- existence of projects and executive plans for the Island's development;
- presence of specific issues related to the insularity (links and connection to Venice city).

Venice authorities have recently launched a development project that includes works for infrastructure improvements. The project will confront what suggested by ICZM with current actions on island. Agriculture is still commonly seen as the most sustainable land use for the Island of Sant'Erasmus. Nevertheless, many farms have been abandoned for reasons such as the ageing of the population, difficulties in transportation etc. Plans for future development of the "agricultural island" of Venice have to be defined by implementing a multi-sectoral approach taking into account the traditional vocation for agriculture as well as the geographical (e.g. insularity) and economic contexts.

SUSTAINABILITY INDICATORS,
AGENDA 21 INITIATIVES AND PUBLIC
PARTICIPATION (SLAPP)

**CO-ORDINATOR: Valeri Cogan,
Giuseppe Valentini**

FEEM's Progetto Venezia 21 was born in 1996, with the intention of supporting the local Agenda 21 process by providing scientific and technical information. In this project FEEM has focused on three topics: the analysis of problems of institutional nature and the participation of civil society in government processes; the analysis of the state of the environment in the lagoon; the analysis of specialised

economic activities. SLAPP is focused on the first of these topics. In particular, SLAPP has three objectives:

- 1 to define a set of sustainability indicators and develop a 'sustainability barometer' for Venice;
- 2 to draw examples from Agenda 21 processes at national and international levels;
- 3 to encourage public participation in the process towards sustainable development in Venice.

Work undertaken by FEEM since initiating research in 1996 has led to the selection of 47 indicators, classified according to three aspects of sustainability: quality of life, quality of the environment, quality of economic development. Important inputs to SLAPP also come from the participation of FEEM in the EU-funded Concerted Action on Sustainable Communities in Europe (SUSCOM), where FEEM surveyed the state of the implementation of Agenda 21 in Italy. Current objectives include the definition of a final set of sustainability indicators, the development of a 'sustainability barometer' for Venice and the construction of an interactive website that will provide information on the environment, the economy and the society of Venice. The website will also serve as a tool of public participation: quiz and surveys, direct comments, questions and articles and on-line discussion forums will supply a continuous interactive flow of information between the public and private and public institutions.

THE INFRASTRUCTURE OF
SUSTAINABLE DEVELOPMENT

**CO-ORDINATOR: Gabriele Zanetto,
Roberto Roson, Stefano Soriani**

The scientific rationale of the project is to evaluate how the now emerging role of ports as complex nodes in transport networks can contribute to reduce the environmental and territorial impacts of transport activities while promoting socio-economic development of local systems. This goal is of particular

significance for the future of coastal areas in the most developed countries, both with regards to the economic dimensions involved by transport's system evolution (how to foster efficiency in transport activity, how to support local and regional systems to cope successfully with the increasing competition in global markets) and with regard to the problem of avoiding further degradation in very vulnerable environments (estuaries, lagoons, wetlands).

Port activities represent in Venice a fundamental aspect to be addressed by the local community. Port and port-related activities have represented the leading activities in the transformation of the lagoon. For many decades the relationship between port development, linked to traditional heavy industries, and the environment has been characterised by conflicts (water and air pollution, morphological simplification, etc.). More recently, the situation has began to change, due to the increasing importance of the commercial flow in the port throughput, the decreased role of heavy traditional industries and the abandoning of any hypothesis of further spatial development of port sites. The port still plays an important role in terms of jobs and income. In this context, the research intends to investigate whether, to what extent and under which conditions, there are opportunities to develop further the port activity while improving its relationship with the environment in the lagoon.

The project focuses on the recent evolution of transport systems, with particular emphasis on maritime transportation and the changing role of ports in transport networks. Firstly, it studies the most important technological, economic and organisational trends that affect the functions performed by ports. Secondly, it studies how these trends change the territorial and environmental impacts caused by port development. The research combines a theoretical approach with the empirical analysis of the function of the port in Venice.

The study started with a literature review on the changing role of ports in transport networks. The topics

have been addressed with a geographic (in particular transport and urban geography) and economic perspective (transport economics). Then, economic and transport data have been gathered from various sources (ISTAT, Ministero dei Trasporti, Camera di Commercio, Autorità Portuale di Venezia, Interporto di Padova, Interporto di Verona) and complemented by interviews.

PUBLICATIONS

- S. Soriani, Le dimensioni economiche e territoriali dello sviluppo portuale, con riferimento al caso dei porti medi. Quadro di analisi e valutazioni sul caso veneziano, Nota di lavoro 04.99, FEEM.
- G. Dall'Agata, S. Soriani, Il porto di Venezia: retroterra, avanmare, servizi, imprese portuali. Risultati di una indagine empirica, Nota di lavoro 07.99, FEEM.
- R. Roson, Lo sviluppo economico del Veneto è ostacolato da un sistema di trasporti inadeguato? Una lettura dei dati disponibili, Nota di lavoro 01.00, FEEM.
- G. Dall'Agata, S. Soriani, "Infrastrutture e servizi per il traffico marittimo. I risultati di un'indagine sul porto di Venezia", in *Economia e Società Regionale*, n. 1, 2000, pp. 1-34.
- R. Roson and S. Soriani, "Intermodality and the changing role of nodes in transport networks", in *Transportation Planning and Technol.*, Vol. 23, 2000, pp. 183-197.
- G. Dall'Agata, R. Roson, S. Soriani, G. Zanetto, "Medium Size Ports and Inland Transport Nodes' Development in a Context of Regional Change. The Case of Veneto Region", in *Riv. Geogr. Ital.*, 106(1999), pp. 311-334.
- The results of the research will be published soon in a book edited by FEEM.

SEMINARS AND CONFERENCES

A conference was held in Venice on 5-6 May, 2000 on New Ports and Urban Regional Development: the Dynamics of Sustainability

DEVELOPMENT OF IMMATERIAL PRODUCTION IN VENICE

CO-ORDINATOR: *Enzo Rullani, Stefano Micelli, Eleonora Di Maria*

The research investigates transformations related to economic dematerialization processes in the city of Venice. Information and communication technologies (ICT) allow the rapid and cheap transmission of information and knowledge and change spatial relationships. In particular, distances between people, firms and institutions are reduced. Venice, which has been excluded from the most important economic exchanges because of its particular environmental situation, can find in the new ICT technologies an important instrument to promote and to preserve its specificity. The objectives of this project are the following: 1) to describe and study projects and experiments developed in Italian and foreign cities related to information and communication technologies; 2) to study Venice's evolution in the cultural heritage domain, connected with information and communication technologies implementations; 3) to carry out empirical analysis of the impacts of ICT technologies on cultural heritage organisation and exploitation in Venice; 4) to develop policy guidelines.

The project analyses the impact of ICT diffusion within the urban context, with a specific attention to the cultural domain, from both a theoretical and empirical perspectives. A general overview of the literature related to urban dynamics and technological innovation is considered. The research focuses on online experimentation and projects carried out by foreigners and Italian municipalities in terms of civic and community networks. Important attention is given to innovation processes in the cultural sector, with a general analysis of activities and projects implemented by cultural institutions. Empirical research is focused on Venice. A deep quantitative analysis of the immaterial sector has been carried out

with particular attention to the distribution, education, research and other services sectors (firms, employees, revenues, etc.). The analysis has been complemented by direct interviews with the directors of Venetian cultural institutions and Venetian politicians. The Istituto Veneto di Scienze, Lettere e Arti (ISVLA) has participated to the project and co-organised the Conference on “Nuove Tecnologie e Valorizzazione del Patrimonio Culturale”, held in Venice on January 28, 2000.

PUBLICATIONS

- Rullani E., Micelli S. (1997) “La produzione immateriale a Venezia: prospettive e problemi aperti”, (Immaterial Production in Venice: Perspectives and Problems) Research Report 08.97, Fondazione Eni Enrico Mattei.
- Rullani E., Micelli S. (1998) “La produzione immateriale a Venezia: verso un’economia del postfordismo”, (Immaterial Production in Venice: towards a Post-fordism Economics) in Musu I. (ed.) Venezia sostenibile. Suggestioni dal futuro (Sustainable Venice. Suggestions from the Future), Il Mulino, Bologna.
- Rullani E., Micelli S., Di Maria, E. (1999) “Le possibili trasformazioni della città nell’era dell’information and communication technology – Processi di cambiamento urbano e settore culturale” (Possible Transformations of the Cities in the Information and Communication Technology Era – Processes of Urban Changes and Cultural Sector), Research Report 05.99, Fondazione Eni Enrico Mattei.
- Rullani E., Micelli S., Di Maria, E. (1999) “Venezia città dell’immateriale – Contesto culturale a Venezia: condizioni, tendenze e casi di studio” (Venice Immaterial City – Cultural Context in Venice: Conditions, Trends, Case Studies), Research Report 06.99, Fondazione Eni Enrico Mattei.
- Di Maria E. (2000) “From Urban Space to Electronic Network: New Chances for Cultural Institutions in Venice”, FEEM Newsletter n. 1.
- Rullani E., Micelli S., Di Maria, E.

(2000) “Città e cultura nell’economia delle reti” (City and Culture in the The Net Economy), Il Mulino, Bologna.

SEMINARS AND CONFERENCES

- January 21st 1999. “Città dell’immateriale. Venezia e le nuove tecnologie” (Immaterial City: Venice and the New Technologies) by Eleonora Di Maria.
- November 4th 1999. “ICT e cultura a Venezia” (ICT and Culture in Venice) by Eleonora Di Maria
- Participation in the Conference “Suggestions from the future”, organized by FEEM and held on June 5th and 13th 1997.
- Organization with the IVSLA of the Conference “Nuove tecnologie e valorizzazione del patrimonio culturale” (New Technologies and Valorization of the Cultural Heritage), held in Venice, January 28th 2000.

THE COMPETITIVENESS OF THE POST INDUSTRIAL CITY

CO-ORDINATOR *Jan Van Der Borg, Alessandro Costa*

The project analyses the development of special economic clusters, known as “growth sectors”, in some metropolitan systems joined in the Eurocities network. It compares strategies and solutions adopted by these metropolitan systems, in order to find out if there are common dynamics and trends of development and if some of these results can be applied to improve the competitiveness of the Venetian metropolitan system. The project is under its conclusion phase and a working paper is about to be presented to the FEEM Scientific Board. Selected case studies examine the “leisure cluster” in the metropolitan region of Barcelona (Spain), the “medical cluster” in Lyon’s region (France) and the “logistic cluster” in the Randstad region (The Netherlands). To go beyond the European experience, the research also includes an analysis for a possible “environmental meta-cluster” in Sydney (Australia). The

investigation methodology is based primarily on interviews with discussion partners who represent the participating cities. The project benefits from the expertise of European Institute for Comparative Urban Research, Rotterdam (EURICUR) and is expected to be completed approximately at the end of the current year.

SEMINARS AND CONFERENCES

An international workshop involving discussion partners from participating cities and other experts in urban studies will be organised within the next months.

FISHERY IN THE VENICE LAGOON: SUSTAINABLE GUIDELINES RE-EVALUATING THE TRADITIONS.

CO-ORDINATOR: *Patrizia Torricelli, Fabio Pranovi, Piero Franzoi, Angela Granzotto*

Artisanal fishery in the lagoon is a traditional multigear and multitarget activity with a low environmental impact. A new clam was introduced twenty years ago and methods to catch this resource cause high impacts to the lagoon but also provide high income. The original fishery is in decline partly as a result of clam catching. This is causing a loss of traditions, of knowledge and is endangering other species.

The project develops in three stages:

- analysis of the historical aspects of the fisheries in the lagoon, and related activities;
- analysis the current situation. This phase includes the collection of data on: the total catch and value of the main target species in Chioggia and Venezia fishmarkets; the number of fishermen and the type of gear used;
- elaboration of policy guidelines for achieving sustainable scenarios of development where traditional fisheries play a key role. Particular attention is given to the use of economic instruments.

Ecopath, a software for construction and analysis of mass-balance models and feeding interactions or nutrient flow in ecosystems provides the main tool of analysis. Ecopath was

developed at ICLARM the International Center for Living Aquatic Resources Management, Manila, Philippines. The software is designed to help construct a (simple or complex) model of the trophic flows in an ecosystem, to analyze the system, and to study interactions in the system. Its successful application represents a move towards sustainable management of ecosystems.

The historical description of the fishery, the review of the gears in the traditional activities and the review of legislation in the Venice Lagoon are completed. The collection of the data is still going on. Currently, the data include quantity and prices of fish on the fishmarket of Chioggia (1945-1999) and Venice (1992-1999). Data on the number of fishermen working in the lagoon and daily landings are being collected.

PUBLICATIONS

The first working paper on the state-of-the-art of fisheries in Venice lagoon is going to be published.

SEMINARS AND CONFERENCES

Two seminars on typical lagoon aquaculture (valli da pesca) were organised, which provided an historical and current view about this activity.

A seminar on "Ecopath" were organised.

ECONOMIC VALUE OF PRODUCTION ACTIVITIES IN VENICE

CO-ORDINATOR: Agar Brugiavini, Carole Maignan, Riccardo Basso

This project intends to study the basic features of creation and redistribution of the economic value produced in Venice. The attention is focused on the centre of the city, also referred to

as the "historical centre" of Venice, plus the areas which have strong ties with the historical centre and cannot be regarded in isolation (hence including Giudecca, but excluding Murano, Burano and Lido).

Venice's cultural heritage is source of direct and indirect income. The management of museums and other artistic structures provides both a direct and an indirect source of income. It is a well known fact that art cities generate positive externalities on production, but may induce negative externalities on consumption for residents. The tourist demand, service and immaterial production are increasing fast and are sources of additional income. It is of critical importance to find out whether and to what extent the benefits of this developments are compensated by the higher costs incurred by Venetian firms and population to meet the additional demand, in terms of services, structures and maintenance of the cultural heritage. High costs will imply a future withdrawal of activities from the historical centre, an increase of prices on the island and a need for policy to "encourage" economic activities in the historical centre.

The first step of this research has been to create a map of all the economic resources based in Venice. We use data provided by the Chamber of Commerce of Venice, which gives information on the number of firms, their type, the number and type of employees and their location in Venice. This enables us to provide a grid to group firms according to their sector of activity or product market and their geographical location.

The second step is to analyse the cost structure of Venetian firms. After describing the most relevant additional costs for firms in the

historical centre of Venice, we use a questionnaire addressed to a randomly selected representative sample of firms of each type to try to identify and estimate these costs. We also use firms based in Mestre with a similar typology to better understand the cost differential. A first inspection of the results suggests that transport-costs and Stocking-costs are the major cost items for Venetian firms.

The final step is to provide a taxonomy of revenues generated by the different activities in Venice. Taking account of the characteristics of these revenues, we compare them with those of the geographical Venetian counterpart on the main land, i.e. Mestre.

Qualitative and quantitative data regarding the production in Venice and Mestre (types of firms, their size, type of activity and address) have been obtained from the Chamber of Commerce. Other sources of data are used as references (COSES; ISTAT, INPS, Servizio Statistica e Ricerca del Comune di Venezia, Census data).

PUBLICATIONS

The draft of the first working paper is under revision.

SEMINARS AND CONFERENCES

A seminar entitled "Le imprese veneziane: descrizione e analisi dei costi sostenuti" was held in March 2001 in Venice.



In this section of the newsletter we review extensively two policy relevant working papers circulated during the last term in the FEEM series "Note di Lavoro". These reviews were prepared by Enrica Croda.

Water Scarcity: Institutional Change, Water Markets and Privatization

Full title of the paper:

WATER SCARCITY: INSTITUTIONAL CHANGE, WATER MARKETS AND PRIVATIZATION

Series number: 102.2000 - WAT

Authors:

Cesare Dosi and William K. Easter

Affiliation:

Dosi: *Faculty of Economics and Department of Economics, University of Padova*

Easter: *Department of Applied Economics, University of Minnesota*

Key words:

Water resources management, water services, water markets, privatization

The issue:

Many countries are facing a water scarcity crisis and need to make changes in their water policies. This paper reviews the policy options available for the management of water resources. In particular, it discusses the privatization of water utilities and the establishment of water markets, focusing on the experiences of the United States and Europe.

Findings:

The water policy experiences across U.S. states and European countries are very heterogeneous. In addition to the sale of water utilities to private

Review

Water is one of the most important natural resources. It is vital for all living organisms and major ecosystems as well as for human health, food production, and economic development. In the last decades, population growth and urbanization, together with changes in production and consumption, have placed unprecedented demands on water resources. Consequently, several countries are facing a water scarcity problem and need to make changes in their water policies.

This paper reviews policy options for the management of water resources. In particular, it examines the privatization of water utilities and the establishment of water markets, focussing on the experiences of the United States and Europe.

A crucial step in dealing with water policies is the identification of the source of the water scarcity problem. Water scarcity can arise for many reasons. It can arise because the water is not available when and where it is needed, or it is not available in adequate quantity. It could also be that the available water is not of the appropriate quality or that its provision costs more than what people are willing to pay for it. Yet another source of water scarcity may be the lack of proper institutional arrangements and management rules for allocating water between the alternative possible uses. For most of the U.S. and Europe (especially the eastern U.S. and northern Europe), the lack of water is not likely to impose constraints on food production or cause people to change how they use water to meet their basic needs. Rather, these areas are primarily

companies, and to joint ventures, privatization has occurred in the form of either contracts to supply water or concessions to provide management, construction or design services. Water markets have taken different forms too, mostly depending on the different duration of transfer agreements.

Policy implications:

There is no single approach to successfully avert water scarcity. A crucial step in the design of successful water policies requires the identification of the causes of the water problem. Next, the existing institutions should be taken into account. What works in a community facing real water shortage would not work in another community where the issue is the inadequacy of institutions and/or management. However, policy options are available (and several of them are reviewed in this paper).

Useful readings:

- Postel, Sandra, 1999. *Pillars of Sand*, W.W. Norton & Co., New York. Documentation of the worldwide water scarcity problem.
- World Bank, 1993. *Water Resources Management*, World Bank, Washington, D.C. Analysis of the impact of water shortage on the management problems of the sector.
- World Bank, 1994. *Water Policy and Water Markets*, World Bank, Washington, D.C. Collection of papers from a conference on water policy and water markets.

concerned with the quality of their water. On the other hand, sizeable areas in the western U.S. and southern Europe suffer periodic water shortages.

Water policies are limited at the federal level in the U.S., and at the European Union level in Europe. Individual states in the U.S., and, respectively, individual countries in Europe, play a central role. Hence, the ensuing water policy experiences are very heterogeneous. As the E.U. fosters the uniformity of water policies, this state of affairs is likely to change in Europe. However, individual states' policies are likely to continue to play an independent role in the U.S.

In the last decades, the U.S. has witnessed a shift towards privatization all over the country and the development of water markets in some regions. Privatization has increased in recent years in Europe as well. However, although water markets are gaining interest among Europeans, only Spain has taken some steps in that direction.

Given their dry conditions and rapid growth, it is not surprising that water market activity in the U.S. is concentrated in the Western areas. The existing markets however, have different characteristics, mostly depending on the duration of the transfer agreements. For instance, the emphasis in California has been mostly on short-term transfers of water rights. In contrast, markets in Colorado, New Mexico and Utah have focussed on long-term transfers. Privatization has been taking different forms on both sides of the Atlantic. In the U.S., the basic schemes involve selling previously publicly owned water management facilities to private companies, and creating joint ventures, whereby the private and the public sector jointly own a facility. In addition, privatization has often relied

on either contracts for the supply of inputs or concessions for the provision of management, construction or design services. In some cases, private entities design, build, operate and own a water facility for a specific period, and then, at the end of the period, the facility may be transferred to a public utility. In other cases, private entities design, build and operate the facility, whilst the public utility maintains its ownership. In alternative, private entities can design or construct the facility, and then turn over its management to the public sector. In other cases, there is a contract whereby the private entity operates and maintains the facility for a fee. The contract may also concern specific services, like meter reading or billing and collection. A management concession, whereby a private entity manages and supervises the public utility personnel, represents yet another alternative privatization solution. The European experience with privatization varies considerably too. Essentially full privatization of water services occurs in England and Wales, while concessions are more common in France, for instance. Dosi and Easter show that there are no unique answers to dealing with problems of water scarcity. What works in a community facing "real" water scarcity is different from what works where the problem is the inadequacy of institutions and/or water management. Successful approaches to water policies depend on the source of the water scarcity and should take into account existing institutions. There are lessons to be learnt from both the U.S. and European experiences. Moreover, privatization of water utilities and water markets are not mutually exclusive. There is no reason why they could not be used jointly to improve water use and allocation in a given water system.



Kyoto Commitment and Emission Trading: A European Union Perspective

Full title of the paper:

KYOTO COMMITMENT AND EMISSION TRADING: A EUROPEAN UNION PERSPECTIVE

Series number: 7.2001 - CLIM

Authors:

Umberto Ciorba, Alessandro Lanza, Francesco Pauli

Affiliation:

Ciorba and Pauli: *ENEA*
Lanza: *ENI, and CRENoS*

Key words:

Environmental policy, international agreements, Kyoto Protocol, CO₂ emissions, emission trading, marginal abatement costs.

The issue:

Concern about the costs of compliance with the Kyoto Protocol is widespread. This paper estimates the cost of reducing CO₂ emissions from a European Union perspective. The focus is specifically on the flexibility provided by the trading of emission permits as a mechanism to achieve the Kyoto targets at the lowest cost.

Findings:

The costs of compliance with the Kyoto Protocol vary widely among the signatory countries. However, trading of emission permits can greatly mitigate these costs. For instance, the estimated total cost of compliance for Italy varies from about 3.4 billion US dollars if no trading is allowed, to 1.5 billion US

Review

The Kyoto Protocol, which binds developed countries (Annex 1 countries) to cut their greenhouse gases emissions by the period 2008-2012, was signed in 1997. The average reduction amounts to about 5% below the 1990 level, but the specific emission targets vary from country to country. As this issue of the Newsletter goes to press, the new Bush administration has announced its opposition to the agreement. European leaders have reacted by restating their intention to go ahead with its implementation. The next few months will be critical for the survival of the Protocol. Technically, it can survive even without the U.S. joining. However, the U.S. is the world's biggest source of emissions.

One of the issues raised by the U.S. administration concerns the costs of implementing the treaty. Reducing emissions is clearly costly. It requires either the introduction of appropriate technological changes or the reduction of energy consumption itself. In any case, there is a social and economic price to be paid. Moreover, the costs vary widely among the countries involved. In this regard, the Protocol allows for the use of flexibility mechanisms, which can mitigate the cost of compliance for the signatory countries. One such mechanism is the trading of emission permits. Polluter countries can purchase emission permits from other countries that may have more permits than they need because they have already met their Kyoto targets.

This paper estimates the cost of reducing carbon dioxide (CO₂)

dollars if permits are traded in a market open to all Annex 1 countries.

Policy implications:

The introduction of a market for the trading of emission permits dramatically reduces the costs of compliance with the Kyoto Protocol. Most importantly, a very wide market is not necessary for this result. However, opening the market to non-European countries further reduces the costs of emissions abatement from a European perspective.

Useful readings:

- Energy Information Administration, 1999. *Impacts of the Kyoto Protocol on US Energy Markets and Economic Activity*, EIA, Washington, DC. Report on the impact of the Kyoto Protocol on the US economy. In particular, Chapter 7 compares estimates of costs of carbon reduction for the US.
- OECD, 1998. *Economic Modelling of Climate Change*, OECD, Paris. Collection of different studies on the implementation of the Kyoto Protocol.
- The Economist, 2001. "Is the Kyoto treaty dead?", p. 18 and pp. 73-75, *The Economist*, April 13th, 2001. On the consequences of the Bush administration's public abandonment of the Kyoto Protocol.

emissions, which are the main culprit behind global warming. Ciorba, Lanza and Pauli specifically focus on emission permits trading as a means of lowering the costs of compliance for the different countries. In addition, in contrast to much of the academic literature to date, they apply a specific European Union (EU) perspective.

First, the authors estimate the cost for a single country of complying with the treaty. The total abatement cost is calculated as the difference between the cost of attaining the Kyoto required emissions in 2010 (the middle of the 2008-2012 period), and the cost of not taking any specific abatement action. Then, they use these calculations to simulate a market for emission permits by constructing the supply and demands of permits for each country. According to economic theory, it is profitable for a country to abate emissions until the cost of further reducing one ton of carbon is equal to the price of the permit to emit it. If this optimal abatement level is higher than its Kyoto target, the country will be willing to sell permits, and therefore contribute to the supply of permits in the market. Conversely, if the optimal abatement level is lower than the committed target, the country will be willing to buy permits and will contribute to the demand of permits on the market. The market price for emission permits is then derived as the price such that all available permits find a buyer.

Against this background, Ciorba, Lanza and Pauli analyze different scenarios where different combinations of countries participate in the exchange of permits. They first discuss a market restricted only to the EU, then they include Annex 1 countries without the Former Soviet Union (FSU), and finally they include also the FSU. The introduction of a permits trading market dramatically reduces abatement costs. For instance, the estimated total cost of compliance for Italy varies from about 3.4 billion US dollars if no trading of permits is allowed, to 1.5 billion US dollars in the largest market inclusive also of the FSU. The authors also show that setting limits to the quantity of permits that countries can trade would decrease this cost reduction, and that the cost reduction is smaller the higher these limits on sales and purchases are. Importantly, an unlimited market is not necessary for these results to hold. However, opening the market to non-European countries further reduces the costs of compliance with the Protocol for a European country.



Past Conferences 2001

January 26-27, 2001 **Louvain-la-Neuve (Belgium)**

COALITION THEORY NETWORK

Organisation: FEEM, CORE, GREQAM, UAB

February 1, 2001 **Brussels (Belgium)**

**FINAL CAVA WORKSHOP – CONCERTED ACTION ON
VOLUNTARY APPROACHES**

Organisation: CERNA, FEEM and EU DG XII

February 9-10, 2001 **Milan (Italy)**

**THE SOCIOECONOMICS OF CLIMATE CHANGE IN THE
MEDITERRANEAN BASIN: IMPACTS, VULNERABILITY AND
ADAPTATION**

Organisation: FEEM, NRERC, PIK

March 4-6, 2001 **Milan (Italy)**

ANSEA MEETING

Organisation: FEEM

March 8, 2001 **Milan (Italy)**

**e-ITALY. PRESENTATION OF THE FSI (FORUM FOR THE
SOCIETY OF INFORMATION)**

Organisation: FEEM with Italian Government, FSI

March 13, 2001 **Milan (Italy)**

TECHNOLOGICAL INNOVATION AND OIL EXPLORATION

Organisation: FEEM, AIEE, SPE

March 15-17, 2001 **Amsterdam (The Netherlands)**

FINAL EFIEA WORKSHOP

Organisation: FEEM and IVM

March 19, 2001 **Milan (Italy)**

**2001 MEDITERRANEAN ISSUES – USA AND THE MIDDLE EAST
AFTER CAMP DAVID 2**

Organisation: FEEM and Italian centre for Peace in the Middle East



Past Conferences 2001

March 22-23, 2001 **Milan (Italy)**

MULINO MEETING

Organisation: FEEM and European Commission

March 23-25, 2001 **Courmayeur (Italy)**

THE FIRM AND ITS STAKEHOLDERS: THE EVOLVING ROLE OF CORPORATE FINANCE

Organisation: FEEM, CEPR, CeRP, Fondazione Courmayer, CNPDS

April 6, 2001 **Milan (Italy)**

GOOD ECONOMY. ENVIRONMENTAL AND SOCIAL ACCOUNTING: A NEW TOOL FOR FIRMS AND CITIZENS

Organisation: FEEM, Legambiente, Compagnia delle Opere

April 20-21, 2001 **Palermo (Italy)**

SECOND INTERNATIONAL WORKSHOP ON KNOWLEDGE AS AN ECONOMIC GOOD

Organisation: FEEM, The Beijer International Institute of Ecological Economics

May 3-4, 2001 **Toulouse (France)**

4TH TOULOUSE CONFERENCE ON ENVIRONMENT AND RESOURCE ECONOMICS

“PROPERTY RIGHTS, INSTITUTIONS AND MANAGEMENT OF ENVIRONMENTAL AND NATURAL RESOURCES”

Organisation: FEEM, IDEI, INRA

May 11, 2001 **Venice (Italy)**

ECONOMIC VALUATION OF ENVIRONMENTAL GOODS

Organisation: FEEM and CO.RILA

May 17-18, 2001 **Milan (Italy)**

TRADE AND THE ENVIRONMENT IN THE PERSPECTIVE OF THE EU ENLARGEMENT

Organisation: FEEM with EU DG XI



Past Conferences 2001

May 19, 2001

Milan (Italy)

**CFEWE PREPARATORY WORKSHOP- CARBON FLOWS
BETWEEN EASTERN AND WESTERN EUROPE**

Organisation: FEEM and IV

June 1, 2001

Venice (Italy)

GROWTH, ENVIRONMENTAL POLICIES AND SUSTAINABILITY

Organisation: FEEM

June 15, 2001

Genoa (Italy)

**ENERGY SAVING AND WASTE MINIMISATION IN THE
PROCESS INDUSTRY**

Organisation: FEEM with Manchester University and Genoa University

July 2-7, 2001

Venice (Italy)

**EUROPEAN SUMMER SCHOOL IN RESOURCE AND
ENVIRONMENTAL ECONOMICS - ECONOMIC VALUATION
METHODS**

Organisation: FEEM with EAERE and VIU

July, 5-6, 2001

Milan (Italy)

**CFEWE INTERNATIONAL CONFERENCE CARBON FLOWS
BETWEEN EASTERN AND WESTERN EUROPE**

Organisation: FEEM and IVM



Forthcoming Conferences 2001

October, 1-2, 2001 **Venice (Italy)**
CLIMATE CHANGE MODELLING AND POLICIES II

Organisation: FEEM, Stanford University and VIU
Information: eberle@feem.it

October, 2-5, 2001 **Rome (Italy)**
3RD INTERNATIONAL CONGRESS ON ENVIRONMENTAL INDICES AND INDICATORS: SYSTEMS ANALYSIS APPROACH INDEX 2001: QUALITY OF LIFE INDICATORS

Organisation: INENCO Center for International Environmental Cooperation of Russian Academy of Sciences and ANPA Italian Environmental Protection Agency with supporting organization FEEM
Information: farrace@anpa.it
jacomini@anpa.it

October, 6-11, 2001 **Acquafredda di Maratea, Naples, (Italy)**
THE INTERNATIONAL DIMENSION OF ENVIRONMENTAL POLICY

Organisation: FEEM with EU - ESF EURESCO
Information: rauscher@wiwi.uni-rostock.de

December, 3-4, 2001 **Venice or Milan (Italy)**
SCALES OF TRADING LINKING INDUSTRY, NATIONAL AND INTERNATIONAL EMISSION TRADING SCHEMES

Organisation: FEEM and CATEP European Research Network on Emissions Trading
Information: eberle@feem.it

December, 6, 2001 **Venice (Italy)**
EMPIRES AND FRONTIERS FROM MEDITERRANEAN TO THE BALKANS

Organisation: FEEM and Università di Venezia
Information: eberle@feem.it

Past Conferences' Programmes, Papers and Participants

FONDAZIONE ENI ENRICO MATTEI - THE BEIJER INSTITUTE

INTERNATIONAL CONFERENCE KNOWLEDGE AS AN ECONOMIC GOOD

Grand Hotel Villa Igiea, Palermo: April 20-21, 2001

Organisers: Giorgio Barba Navaretti, Partha Dasgupta, Karl Göran Mäler, Domenico Siniscalco

PROGRAMME

• WELCOMING ADDRESS

Karl Göran Mäler, *Director, The Beijer International Institute of Ecological Economics*
Domenico Siniscalco, *Director, Fondazione Eni Enrico Mattei*

• INTRODUCTION TO THE CONFERENCE

Partha Dasgupta, *University of Cambridge*

SESSION 1

GEOGRAPHY OF KNOWLEDGE AND GROWTH

• REMARKS TOWARDS A MODEL OF DIFFUSION OF KNOWLEDGE

Kenneth Arrow, *Stanford University*

Discussant: William Baumol, *New York University and Princeton University*

• EAST IS EAST AND WEST IS WEST

David Landes, *Harvard University*
Discussant: Giovanni Peri, *Università Commerciale Luigi Bocconi*

• DEMAND-DRIVEN KNOWLEDGE CLUSTERS IN A WEIGHTLESS ECONOMY

Danny Quah, *London School of Economics*
Discussant: Francesco Daveri, *University of Parma*

• ENDOGENOUS DISSEMINATION – MARKET INCENTIVES FOR VOLUNTARY TRANSFER OF PROPRIETARY INNOVATIONS

William Baumol, *New York University and Princeton University*

Discussant: Carlo Carraro, *University of Venice and Fondazione Eni Enrico Mattei*

SESSION 2

ARTS AND INNOVATION: ANYTHING IN COMMON WITH SCIENCE AND TECHNOLOGY?

• MARKETS AND INNOVATION IN VISUAL ARTS

Svetlana Alpers, *University of California at Berkeley*

Discussant: Partha Dasgupta, *Cambridge University*

• STATE SUPPORT AND CREATIVITY IN THE ARTS

Bruno Frey, *University of Zurich*

Discussant: Alaknanda Patel, *Baroda University*

• ICONOGRAPHY AND CULTURE IN PAINTINGS

Jack Goody, *University of Cambridge*

Discussant: Svetlana Alpers, *University of California at Berkeley*

SESSION 3

NEW CHALLENGERS FOR SCIENCE AND TECHNOLOGY

• SCIENCE VS. PROFIT IN RESEARCH – LESSONS FROM THE HUMAN GENOME PROJECT

Carlo Carraro, *University of Venice and Fondazione Eni Enrico Mattei*
Alessandra Pomé, *Fondazione Eni Enrico Mattei*

Domenico Siniscalco, *University of Turin and Fondazione Eni Enrico Mattei*

Discussant: Karl Göran Mäler, *The Beijer International Institute of Ecological Economics*

• INNOVATION AND PATENTING IN VITAL DRUGS: HIV AND MALARIA VACCINES

Fabià Gumbau, *Harvard University*; Michael Kremer, *Harvard University*

Discussant: Giorgio Barba Navaretti, *University of Ancona and Fondazione Eni Enrico Mattei*

• INNOVATION AND PATENTING IN SOFTWARE

Jim Bessen, *Research on Innovation*

Erik Maskin, *Princeton University*
Discussant: Alfonso Gambardella, *University of Pisa*

• CONCLUDING REMARKS

Giorgio Barba Navaretti, *University of Ancona and Fondazione Eni Enrico Mattei*



Past Conferences' Programmes, Papers and Participants

THE FONDAZIONE ENI ENRICO MATTEI, IN CO-OPERATION WITH CORILA - CONSORTIUM FOR MANAGING THE COORDINATION CENTRE OF THE RESEARCH ACTIVITIES CONCERNING THE VENICE LAGOON SYSTEM, ORGANISES AN INTERNATIONAL CONFERENCE ON:

ECONOMIC VALUATION OF ENVIRONMENTAL GOODS

**Palazzo Franchetti, Istituto Veneto di Scienze Lettere ed Arti
Venice, May 11, 2001**

In recent years the evaluation of environmental resources has become increasingly important for the project's cost benefit analysis. The growing scarcity of such resources, not traded in the marketplace, pushes towards more efficient valuation procedures capable of evaluating their total economic value. Economic theory has developed various methods to estimate the monetary value of environmental goods including hedonic pricing, travel cost analysis, and contingent valuation. Among these methods, contingent valuation has been widely used to estimate the willingness to pay for a variation, both quantitative and qualitative, of environmental goods.

The aim of this workshop is to define the state of the art of contingent valuation method both for theoretical and operational points of view.

Initially the workshop will be dedicated to illustrating theoretical components of contingent valuation, the basic method and recent advances. During the second part, several applications will be presented to explain how contingent valuation may be extended to the evaluation of natural resources from recreational and environmental points of view. Finally, application of the contingent valuation method will be discussed in the evaluation of social benefits and costs relating to conservation of the Venice lagoon, such as morphological recovery. The aim is to stress providing quantitative information for improving public authorities' decision making process. The premise is that this process could be facilitated by scientific analyses of public and private impacts of proposed interventions.



Past Conferences' Programmes, Papers and Participants

ECONOMIC VALUATION OF ENVIRONMENTAL GOODS

PROGRAMME

- WELCOME

Carlo Carraro, *University of Venice and Fondazione Eni Enrico Mattei, Italy*
 Pierpaolo Campostrini, *Consortium for Managing the Coordination Centre of the Research Activities Concerning the Venice Lagoon System, Italy*

- INTRODUCTION

Carlo Carraro, *University of Venice and Fondazione Eni Enrico Mattei, Italy*

SESSION 1: THE ECONOMIC VALUATION OF THE ENVIRONMENT

Chair: Carlo Carraro, *University of Venice and Fondazione Eni Enrico Mattei, Italy*

- ATTRIBUTE-BASED STATED PREFERENCES: METHODS AND APPLICATIONS, Olvar Bergland *Agricultural University of Norway*

Discussant: Riccardo Scarpa *University of Newcastle, UK*

- WILLINGNESS TO PAY FOR MORTALITY RISK REDUCTIONS: THE EFFECTS OF AGE AND HEALTH STATUS, Anna Alberini *University of Maryland, USA*

Discussant: Donato Romano, *University of Florence, Italy*

- AN ASSESSMENT OF ITALIAN ENVIRONMENT VALUATION STUDIES, Donato Romano *University of Florence, Italy*

Discussant: Paolo Rosato, *University of Trieste and Fondazione Eni Enrico Mattei, Italy*

SESSION 2: THE CONTINGENT VALUATION METHOD: APPLICATION

Chair: Ignazio Musu, *University of Venice and Fondazione Eni Enrico Mattei, Italy*

- INTEGRATION OF ECONOMIC AND ECOLOGICAL INDICATORS OF BIODIVERSITY, Paulo A. L. D. Nunes, Jeroen C. J. M. Van Den Bergh, Peter Nijkamp *Free University Amsterdam, The Netherlands*

Discussant: Carlo Giupponi *University of Padua and Fondazione Eni Enrico Mattei, Italy*

- VALUING LOCAL PUBLIC GOODS THROUGH STATED PREFERENCE METHODS: A MULTI-ATTRIBUTE CHOICE-MODELLING AND CONTINGENT VALUATION STUDY TO VALUE THE ECONOMIC BENEFITS OF TRAFFIC CALMING SCHEMES IN NORTHERN RURAL ENGLAND, Riccardo Scarpa *University of Newcastle, UK*

Discussant: Domenico Patassini *IUAV Institute of Architecture in Venice, Italy*

- RECREATION MANAGEMENT IN THE VENICE LAGOON, Edi Defrancesco *University of Padua, Italy* Paolo Rosato *University of Trieste and Fondazione Eni Enrico Mattei, Italy*

Discussant: Margherita Turvani *IUAV Institute of Architecture in Venice, Italy*

- WARM GLOW AND EMBEDDING IN CONTINGENT VALUATION, Paulo A. L. D. Nunes *Free University Amsterdam, The Netherlands*, Erik Schokkaert *Katholieke Universiteit Leuven, Belgium*

Discussant: Anna Alberini - *University of Maryland, USA*



Past Conferences' Programmes, Papers and Participants

ORGANIZED BY FONDAZIONE ENI ENRICO MATTEI (FEEM)
CO-FINANCED BY EUROPEAN COMMISSION, DG ENVIRONMENT

TRADE AND THE ENVIRONMENT IN THE PERSPECTIVE OF THE EU ENLARGEMENT

Fondazione Eni Enrico Mattei, Milan, Italy
May 17-18, 2001

SESSION I

THE EFFECTS OF ENVIRONMENTAL
POLICY ON TRADE

Chairperson: Marzio Galeotti,
*FEEM and Università di Bergamo,
Italy*

- TRADE, THE HARMONISATION OF ENVIRONMENTAL POLICY AND THE SUBSIDIARITY PRINCIPLE, Charles Perrings, *University of York, UK*

- HARMONIZATION OF ENVIRONMENTAL POLICIES BETWEEN THE EU-15 AND 'NEW ACCESSION' COUNTRIES, Nazmiye Balta, *University of Illinois at Urbana-Champaign, USA*

- TRADE AND THE ENVIRONMENT: LINKAGES IN MULTILATERAL ENVIRONMENTAL AGREEMENTS, Tim Taylor, *Department of Economics and International Development, University of Bath, UK*

- DEVELOPING A EUROPEAN CARBON TRADING MARKET: WILL PERMIT ALLOCATION DISTORT COMPETITION AND LEAD TO STATE AID?, Edwin Woerdman, *Department of Economics and Public Finance, Faculty of Law, University of Groningen, The Netherlands*

- THE KYOTO PROTOCOL: A FLAWED CONCEPT, Richard Cooper, *Littauer Center, Harvard University, USA*

- YOU'RE GETTING WARMER: THE MOST FEASIBLE PATH FOR ADDRESSING GLOBAL CLIMATE CHANGE DOES RUN THROUGH KYOTO, Jeffrey Frankel, *Harvard University's Kennedy School of Government, USA*

- REPORTING ON SESSION I
Chairperson: Marzio Galeotti,
*FEEM and Università di Bergamo,
Italy*
Discussants: Peter Zapfel, *European Commission, DG Environment;*
Matteo Leonardi, *SERVEN, Milano,
Italy*

SESSION II

THE EFFECTS OF TRADE ON THE ENVIRONMENT

Chairperson: Richard Cooper,
*Littauer Center, Harvard University,
USA,* Peter Zapfel, *European
Commission, DG ENV*

- THE USE OF TRADE MEASURES FOR ENVIRONMENTAL PURPOSES – GLOBALLY AND IN THE EU CONTEXT, Alex Vikhyaev, *United Nations Conference on Trade and Development – UNCTAD, Geneva, Switzerland*

Past Conferences' Programmes, Papers and Participants

TRADE AND THE ENVIRONMENT IN THE PERSPECTIVE OF THE EU ENLARGEMENT

- EMBODIED EMISSIONS IN TRADE: ESTIMATING THE ENVIRONMENTAL LOAD DISPLACEMENT OF WESTERN EUROPE, Roldan Muradian, *Universitat Autònoma de Barcelona, Spain*
- CAN ENVIRONMENTAL REGULATIONS BE COMPATIBLE WITH HIGHER INTERNATIONAL COMPETITIVENESS? SOME NEW THEORETICAL INSIGHTS, Savas Alpay, *Department of Economics, Bilkent University, Ankara, Turkey*
- EFFECTS OF THE ENLARGEMENT OF EU ON TRADE AND THE ENVIRONMENT, Xueqin Zhu, *Environmental Economics and Natural Resources Group, Wageningen University, The Netherlands*
- REPORTING ON SESSION II
Chairperson: Richard Cooper, *Littauer Center, Harvard University, USA*; Peter Zapfel, *European Commission, DG ENV*
Discussant: Mikel Insausti, *WWF, Brussels, Belgium*; Nina Poussenkova, *Russian Academy of Sciences, Russia*
- SESSION III
FOREIGN DIRECT INVESTMENT AND THE ENVIRONMENT
Chairperson: Charles Perrings, *University of York, UK*
- CARBON LEAKAGE IN A SMALL OPEN ECONOMY WITH CAPITAL MOBILITY, Roberto Roson, *FEEM and Università di Venezia, Italy*
- FOREIGN AID AND FOREIGN DIRECT INVESTMENT: KEY PLAYERS IN THE ENVIRONMENTAL RESTORATION OF CENTRAL AND EASTERN EUROPE, Matthew Auer, *Indiana University, USA*
- STRATEGIC ENVIRONMENTAL POLICIES IN THE PRESENCE OF FOREIGN DIRECT INVESTMENT, M. Ozgur Kayalica, *Department of Economics, Sakarya University, Adapazari, Turkey*
- DECONSTRUCTING SECTORAL PRODUCTION AND TRADE OPERATIONS TO IDENTIFY ENVIRONMENTAL IMPACTS: THE CASE OF CEEC/EU COKE AND STEEL ACTIVITIES, Jonathan R. Barton, *School of Development Studies, University of East Anglia, Norwich, UK*
- REPORTING ON SESSION III
Chairperson: Charles Perrings, *University of York, UK*
Discussants: Rafael Reuveny, *Indiana University, USA*; Carlo Pettinato, *European Commission, DG Trade*
- SESSION IV:
TRADE, THE ENVIRONMENT AND THE EU ENLARGEMENT
Chairperson: Fabio Zagonari, *FEEM and Università di Bologna, Italy*; Marialuisa Tamborra, *FEEM and Università di Milano, Italy*
- LESSONS FROM THE SOUTHERN ENLARGEMENT OF THE EU FOR THE ENVIRONMENTAL DIMENSIONS OF EASTERN ENLARGEMENT, IN PARTICULAR WITH RESPECT TO POLAND, Onno J. Kuik, *Institute For Environmental Studies, Vrije Universiteit, Amsterdam, The Netherlands*
- CAN CROSS-BORDER POLLUTION REDUCE POLLUTION?, Panos Hatzipanayotou, *Athens University of Economics and Business, Greece*
- HARMONISING ENVIRONMENTAL POLICIES AMONG THE EU AND ACCESSION COUNTRIES BY PREFERRING THE MARKET-BASED INSTRUMENTS, Josef Sejak, *Czech Environmental Institute, Prague, Czech Republic*
- TRADE AND RECYCLING OF USED TYRES IN WESTERN AND EASTERN EUROPE, Pieter J.H. van Beukering, *Institute for Environmental Studies, Vrije Universiteit, Amsterdam, The Netherlands*
- ROUNDWOOD TRADE IN EUROPE: ANY EVIDENCE OF CONSERVATION EFFECTS?, Kari Kangas, *European Forest Institute, Joensuu, Finland*
- REPORTING ON SESSION IV
Chairperson: Fabio Zagonari, *FEEM and Università di Bologna, Italy*; Marialuisa Tamborra, *FEEM and Università di Milano, Italy*
Discussant: Marialuisa Tamborra, *FEEM and Università di Milano, Italy*; Tomasz Zyllicz, *Warsaw Ecological Economics Center (WEEC), Poland*



Past Conferences' Programmes, Papers and Participants

GROWTH, ENVIRONMENTAL POLICIES AND SUSTAINABILITY

Palazzo Querini Stampalia
Venice, June 1, 2000

The problem of environmental protection and preservation is closely linked to the problem of economic and technological development. In fact, starting from the 70's, the economic literature has received contributions attempting to harmonise the paradigms of growth and technological change with sustainability, and to analyse the effects of environmental policies on the economic system and the environment. The workshop offers Italian researchers dealing with this issue the opportunity to meet and enhance the visibility of this theme, establishing the basis of a research network at the national level.

It will be a one-day workshop and the presentations will be organised in two thematic sessions: models of economic growth, environmental constraints, sustainability policies and empirical evidence on the relationship between economic growth and environmental quality.

The first session is devoted to the presentation of models that analyse the sustainability of growth processes submitted to ecological constraints and to the effects of different environmental policy tools on growth. The second session is devoted to empirical contributions that investigate on the existence of the well known environmental Kuznets curve.

INTRODUCTION

Carlo Carraro, *University of Venice and Fondazione Eni Enrico Mattei*

SESSION I

MODELS OF ECONOMIC GROWTH, ENVIRONMENTAL CONSTRAINTS AND SUSTAINABILITY POLICIES

Chair: Carlo Carraro, *University of Venice and Fondazione Eni Enrico Mattei*

- TRANSITIONAL DYNAMICS IN A SIMPLE ENDOGENOUS GROWTH MODEL, Ignazio Musu, *University of Venice and Fondazione Eni Enrico Mattei*; Guido Cazzavillan, *University of Venice*

Discussant: Francesco Ricci, *Carlos III University, Madrid*

- ENVIRONMENTAL POLICIES AND GROWTH WHEN INPUTS ARE DIFFERENTIATED IN POLLUTION INTENSITY; Francesco Ricci, *Carlos III University, Madrid*

Discussant: Lea Nicita, *University of Venice and Fondazione Eni Enrico Mattei*

SESSION II

EMPIRICAL EVIDENCE ON ECONOMIC GROWTH AND ENVIRONMENTAL QUALITY

Chair: Ignazio Musu, *University of Venice and Fondazione Eni Enrico Mattei*

- WHEN CAN WE LEARN FROM THE EXPERIENCE OF THE MOST INDUSTRIALISED COUNTRIES: A NONPARAMETRIC INVESTIGATION OF THE EKC HYPOTHESIS, Salvatore Di Falco, *University of York*

Discussant: Simone Borghesi, *University of Siena*

- DESPERATELY SEEKING (ENVIRONMENTAL) KUZNETS: A NEW LOOK AT THE EVIDENCE, Marzio Galeotti, *University of Bergamo*; Alessandro Lanza, *Eni S.p.A*; Francesco Pauli, *ENEA*

Discussant: Agar Brugiavini, *University of Venice*



Past Conferences' Programmes, Papers and Participants

CFEWE – CARBON FLOWS BETWEEN EASTERN AND WESTERN EUROPE - A PROJECT FINANCED BY THE EUROPEAN COMMISSION – DG RTD UNDER THE FIFTH FRAMEWORK PROGRAMME (EESD-ENRICH, EVK2-2000-00570)

FIRST WORKSHOP

**Fondazione Eni Enrico Mattei, Milan, Italy
July 5-6th, 2001**

Organized by: FONDAZIONE ENI ENRICO MATTEI (FEEM) AND ZENTRUM FÜR EUROPÄISCHE INTEGRATIONSFORSCHUNG (ZEI)

In association with the CFEWE partners: INSTITUTE FOR ENVIRONMENTAL STUDIES, VRIJE UNIVERSITEIT (IVM), co-ordinator of CFEWE; CZECH ENVIRONMENTAL INSTITUTE (CEI); WARSAW ECOLOGICAL ECONOMICS CENTER (WEEC); SCIENCE AND TECHNOLOGY POLICY RESEARCH, UNIVERSITY OF SUSSEX (SPRU); RUSSIAN ACADEMY OF SCIENCES (RAS)

And with the support of: INTERNATIONAL HUMAN DIMENSIONS PROGRAMME ON GLOBAL ENVIRONMENTAL CHANGE - INDUSTRIAL TRANSFORMATION PROJECT (IHDP-IT)

Marialuisa Tamborra, *FEEM and Università di Milano, Italy* and John Maxwell, *ZEI, Germany and Indiana University, USA*

- OVERVIEW OF THE CFEWE PROJECT,
Pier Vellinga, *IVM, The Netherlands*

SESSION I

ENERGY MARKETS, ENERGY SECURITY POLICY AND CLIMATE CHANGE POLICY IN EUROPE: WHAT PROSPECTS?

Chair: Pier Vellinga, *IVM, The Netherlands*

- OVERVIEW OF CLIMATE POLICIES AND IMPLICATIONS FOR RUSSIA, Vladimir Kotov, *RAS and Moscow Business Consulting, Russia*

- ENERGY MARKETS AND ENERGY SECURITY, Alessandro Lanza, *Eni, Italy* (to be confirmed)

SESSION II

THE STATE-OF-THE-ART: DATA AND PERSPECTIVES

Chair: Marc Darras, *Gaz de France, France*

- RUSSIAN DATA AND PERSPECTIVES, Martina Martynova, *Energy Carbon Fund - Russian JSC "Unified Energy System of Russia", Russia* and Mr Hartmann, *Ruhrgas, Moscow office, Russia*

- EU DATA AND PERSPECTIVES, European Commission and William Floyd, *Forward Studies Unit* (to be confirmed)

SESSION III

SCENARIOS FOR THE FUTURE OF CLIMATE POLICY

Chair: T.B.A.



FIRST WORKSHOP

**Fondazione Eni Enrico Mattei, Milan, Italy
July 5-6th, 2001**

- LONG-TERM CLUSTER OF TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT SCENARIOS, Leonardo Barreto, *IIASA, Austria*

- INTERNATIONAL KYOTO MECHANISMS IN RUSSIA: EVALUATION OF ECONOMIC AND EMISSION BASELINE PROJECTIONS, Claudia Kemfert, *Oldenburg University, Germany*

- THE CFEWE FRAMEWORK, Frans Berkhout, *SPRU, UK*

- DISCUSSION ON SCENARIOS:
Chair: T.B.A.

SESSION IV

EU ENLARGEMENT AND ECONOMIES IN TRANSITION

Chair: John Maxwell, ZEI, Germany and Indiana University, USA

- PROSPECTS FOR FURTHER EASTERN EU ENLARGEMENT, Christian Egenhofer, *CEPS, Belgium*

- ENERGY AND SUSTAINABILITY IN CENTRAL EUROPE: A DECADE OF TRANSITION IN REVIEW, Prof. Diana Urge-Vorsatz, *Central European University, Hungary*

SESSION V

ECONOMIES IN TRANSITION AND ENVIRONMENTAL POLICY

Chair: John Maxwell, ZEI, Germany and Indiana University, USA

- RUSSIAN GOVERNMENT INSTITUTIONAL ISSUES FOR ENVIRONMENTAL PROTECTION ACTIVITY, Irina Pletnikova, *All-Russian Research Institute for Nature protection*

- MODERNISATION OF ENVIRONMENTAL POLICY IN EASTERN EUROPE: SUCCESS AND FAILURES IN

POLICY IMPLEMENTATION IN RUSSIA IN THE 1990s, Elena Nikitina, *Russian Academy of Sciences, Russia*

SESSION VI

PRESENTATIONS ON COUNTRY PERSPECTIVES

Chair: Nina Poussenkova, RAS, Russia

- PRESENTATION ON THE CZECH REPUBLIC, Josef Sejàc, *CEI, Czech Republic and Czech governmental representative*

- PRESENTATION ON POLAND, Tomasz Zylicz, *WEEC, Poland and Polish governmental representative*

- PRESENTATION ON SLOVAKIA, Tatiana Kluvànkovà-Oravská, *Institute for Forecasting Slovak Academy of Sciences, Slovakia*

SESSION VII

CLEANER ENERGIES PROSPECTS

Chair: Frans Oosterhuis, IVM, The Netherlands

- NATURAL GAS FUTURES FOR EUROPE AND RUSSIA, G. Greving, *N.V. Nederlandse Gasunie, The Netherlands*

- THE FUTURE OF BIOMASS, Paula Susila, *Stora Enso Forest Consulting, Finland and Andre FAAIJ (discussant), Utrecht University, The Netherlands*

CONCLUDING DISCUSSION

Introduced by: Josef Janssen, University Sankt Gallen, Switzerland; John Maxwell, ZEI, Germany and Indiana University, USA

Chair: Carlo Carraro, FEEM and University of Venice, Italy



Forthcoming Conferences' Programmes, Papers and Participants

3RD INTERNATIONAL CONGRESS ON ENVIRONMENTAL INDICES AND INDICATORS: SYSTEMS ANALYSIS APPROACH INDEX2001: QUALITY OF LIFE INDICATORS

October 2-5, 2001
Rome, Italy

ORGANISED BY CENTER FOR INTERNATIONAL ENVIRONMENTAL COOPERATION OF RUSSIAN ACADEMY OF SCIENCES (INENCO) AND ITALIAN ENVIRONMENTAL PROTECTION AGENCY (ANPA)

SUPPORTING ORGANISATIONS:

ITALIAN PRESIDENCY OF THE COUNCIL OF MINISTERS
ITALIAN MINISTRY OF ENVIRONMENT
ITALIAN MINISTRY OF FOREIGN AFFAIRS
ITALIAN MINISTRY OF UNIVERSITY AND SCIENTIFIC-TECHNOLOGICAL RESEARCH
UN FOOD AND AGRICULTURE ORGANIZATION
UN ECONOMIC COMMISSION FOR EUROPE
ITALIAN NATIONAL HEALTH INSTITUTE (ISS)
RUSSIAN ACADEMY OF SCIENCES (RAS)
ST-PETERSBURG SCIENTIFIC CENTER RAS
NUERTINGEN UNIVERSITY OF APPLIED SCIENCES
INTERNATIONAL COMMITTEE ON ENVIRONMENTAL INDICES (ICEI)
INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS

(IIASA)
INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT (IISD)
INTERNATIONAL SOCIETY FOR ECOLOGICAL MODELLING (ISEM)
INTAS
EUROPEAN COMMISSION - JOINT RESEARCH CENTRE (ISPRA)
FONDAZIONE ENI ENRICO MATTEI (FEEM)
ECOMED
GREEN CROSS RUSSIA

BACKGROUND OF INDEX2001 CONGRESS

The key role of Quality-of-Life Indicators in measuring progress towards sustainable development has been defined as an integral element of the Action Plan known as Agenda 21, the major achievements of the UNCED-Conference in Rio de Janeiro (Earth Summit) in 1992:

"Countries, with the assistance of International Organisations, where

Forthcoming Conferences' Programmes, Papers and Participants

required, should (...) develop, apply and institute the necessary tools for sustainable development with regard to (...) Quality-of-Life indicators covering, for example, health, education, social welfare, state of the environment, and the economy” (Chapter 35).

Setting targets for sustainable development includes formulating action-oriented specifications for desirable quality of life. Quality of life is a complex subject, which has provoked a considerable amount of academic and public debate over its definition and measurement.

Research on quality of life and human needs must often have an interdisciplinary approach. Conventional disciplinary research on dependencies between individuals in time and space should be supplemented with a development of scientific tools for synthesising knowledge. While current research is usually devoted to analysing reality in more detail, policy-makers working with environment and development issues need overviews and integrated knowledge. They must know how different pieces of information are linked to each other in a coherent framework. Here, science should devote more resources to the development of time-space-specific conceptual framework models and tools for impact analysis. These models and tools would also be suited for making the best use of existing knowledge within different scientific fields. With these tools, it will be easier to allocate resources where QOL can be most effectively improved with limited resources.

Therefore, indicators should preferably measure in simple quantitative and qualitative terms

how systems performance over time is related to goals of specific environmental programs and projects and related activities. These goals could be minimum levels or visions.

Although the topic has been studied under the heading of social indicators research, level-of-living or well-being research, no agreement exists over the types of indicators to be used, or the criteria to be incorporated at any particular scale of study. Indeed, some researchers have suggested that a definitive list of dimensions is impossible to achieve.

In part, this lack of agreement may reflect the disparate nature of research about quality of life. The tendency towards a ‘separatist’ approach to the subject - within the fields of economics, sociology, and ecology in academia, and the development and use of indicators for public planning and assessment - is more a function of the lack of a clear conceptual framework for the subject, rather than the lack of interdisciplinary research.

OBJECTIVES OF INDEX2001 CONGRESS

- to discuss approaches to developing a core set of Quality-of-Life Indicators and Indices;
- to examine existing methods of indicator selection and transformation into aggregated indices, including systems analysis, econometrics/statistics, conceptual and computer models;
- to discuss the possible ways to integrate local, national and international efforts in the field of quality- of-life indicators/indices;
- to discuss the level of utilisation in decision-making processes.

CONFERENCE THEMES

Defining Quality-Of-Life (QOL)

Approaches to Monitoring, Measuring and Interpreting Quality-Of-Life:

- Concepts
- Systems Analysis Approach
- Environmental Measures
- Economic Measures
- Social Measures

QOL Models and Decision-Support Systems

Integration of Multi- and Trans-disciplinary Measures of QOL and Setting Targets

Global Change and QOL Indicators

National Scale Application

Community/Local Scale Application

Evolution of Standards

Operational Tools

Utilisation of QOL Indicators in Policy Making Process: Specific Case Studies

Participants are invited to submit abstracts of their papers on these and closely related topics for plenary and parallel sessions, as well as proposing panel discussions and round table themes. The International

Organising Committee will review all applications. The full texts of oral presentations and abstracts of poster reports will be published in the Proceedings of the Congress.



Equilibri 3.2000: Biotechnologies

From the editorial by Alessandro Lanza, Equilibri's editor

Confusion. The first word that one associates with the great theme of biotechnology is confusion. And the media very often do nothing to help us distinguish between molecular biology, transgenic food, Dolly, hunger in the world, the Genoma project and all the rest. As we try to explain in this issue of "Equilibri", the term biotechnology refers to a number of research areas, some of which are more closely focused on economic issues, while others have not achieved this stage yet.

In the former case, the debate is too often characterised by heated discussions that lack the calm required to introduce meditated

arguments. Meditated does not mean non partisan. All of us have opinions based on our way of feeling. Some individuals are more capable than others to select and describe facts as they are. However, we cannot think of an aseptic science devoid of economic, political and social implications.

An excessively politicised attitude, that tends to oversimplify a very complex subject, has to be condemned. Just like technocratic attitudes "Let me do my job" - that limit the access of public opinion to relevant information that must be exposed to the lay public in a comprehensible manner. Society is entitled to evaluate

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BIOTECHNOLOGIES

- Society/The Gene of Society, *by Piero Benedetti*
- Economy 1/A Party with an Uncertain Outcome, *by C. Ford Runge and Benjamin Senauer*
- Economy 2/Produce for Whom? Genetically Modified Organisms and the Destitute of the World, *by Gianfranco Bologna*
- Technologies 1/Genetically Modified Laboratory Animals: Ethical Problems and Management, *by Igor Branchi, Augusto Del Papa and Enrico Alleva*
- Technologies 2/Food for Thought, *by Robert Paarlberg*
- Technologies 3/Transgenic Animals: Victims or Heroes? *by Luigi Aloe, Silvia Aloe and Marco Fiore*
- Food Safety/Biotechnologies and Biosafety, of the Food and Agricultural Organisation (FAO)

STORIES

- The Foreign Debt of Poor Countries, *by Giorgio Barba Navaretti*

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- Debt-Nature Swaps: Finance and the Environment, *by Silvio De Nigris*
- Solid Urban Wastes: A Challenge, *by Marco Percoco and Stefano Cima*

THE SUSTAINABLE ENTERPRISE

- Environmental Certification in Europe, *by Monica Pesce*
- Emission Trading: Advantages and Disadvantages, *by Guido Lo Scambio*

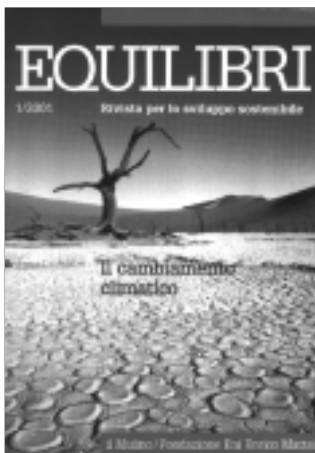
and make mistakes. Political and opportunistic choices must be kept in due account.

Scientists disseminate knowledge and try to explain it in spite of the difficulties of a complex subject;

analysts look at facts and describe them through their lens; non governmental organisations put forth their “biased” opinions: we have tried to provide our readers with this plurality of voices. This

was done not for the purpose of compromise, but to allow everybody to get a clearer idea of an interdisciplinary subject that affects us now and that will increasingly condition our future.

FEEM publications



Equilibri 1.2001: Climate Change

From the editorial by Alessandro Lanza, Equilibri's editor

Three very recent events have attracted the attention of the public opinion. The Intergovernmental Panel on Climate Change (IPCC) has diffused the latest evaluations on the climate, showing that there is growing evidence that the temperature will increase in the near future if concrete reduction measures are not taken. The Panel is a very reliable technical-scientific body and it

makes accurate evaluations. The fact that it states: “The expected warming rate is definitely higher than the changes observed in the 20th century. This is an unprecedented event in the last 10,000 years based on palaeoclimatic data”, should be sufficiently alarming. Statistical data indicate that the average temperature of the Earth in the year 2100 will increase by 1.4-5.8 degrees

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centigrade as compared to the temperature of 1990. This estimate is higher than the 1-3.5 degree change that the IGCC had foreseen in its last evaluation five years ago. The IPCC still states that the temperature increase is the result of human activity linked to the use of fossil fuels.

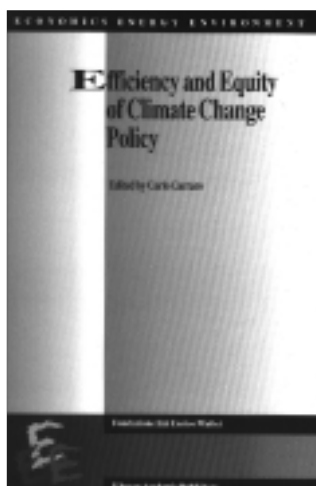
The international political community is not giving an adequate response to this umpteenth documented alarm. Climate negotiations - that must establish

specific rules for the application of the Kyoto Protocol - are in a stalemate. The U.S. administration - although not formally - is leaking the news (which is not surprising) of the possible non ratification of the Kyoto Protocol.

The IPCC, the failure of the Hague Conference and the new, explicit American position have induced us to focus on climate change once again. In this issue there are several contributions that explore the climate topic in detail.

We cannot, however, close these pages without sympathising with all of those who emphasised the criminal and anti-historic behaviour of the Talebanis when the great stone Buddhas were destroyed.

There is no sustainable future, no acceptable coexistence when fanaticism (not necessarily religious fanaticism, but plain fanaticism) takes the upper hand.



Efficiency and Equity of Climate Change Policy

Editor: Carlo Carraro

Publisher: Kluwer Academic Publishers/Series Economics, Energy, Environment, 2000

Affiliation: University Ca' Foscari of Venice and Fondazione Eni Enrico Mattei

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- Integrating Climate Policies in the European Environment: A Policy Report, C. Carraro and A. Goria

Key Words: Climate Change; Climate Economics; Kyoto Protocol; Flexible Mechanisms; Efficiency; Equity

Issue

The Kyoto Protocol has raised almost as many questions as it has solved, and scientific and political arguments have tended to become intertwined in the resultant controversies. In particular, the necessity of short-term climate policies implies that the optimal policy to be implemented is even more controversial. Previous studies have mainly addressed different aspects of climate policy and economic instruments from an efficiency point of view. However, it is widely recognised that equity issues are very important and hardly separable from efficiency ones. As long as greenhouse gas emission policies have been debated, the equitable distribution of the burdens of reducing climate change risks has been a core concern. Currently, both efficiency and equity of different policy proposals are being discussed, without yet achieving the sufficient consensus which would be necessary to adequately implement the Kyoto Protocol. Therefore an analysis of the costs and the benefits of climate change policies from an integrated assessment perspective is

needed, which addresses equity criteria in costs assessment and further identifies the mutual benefits and opportunities of international climate policies.

In particular, this book is aimed at providing the best available scientific and economic evidence on the links between efficiency and equity of climate policy by comprehensively assessing the economic effects of climate change policies. The book gathers 14 papers submitted for discussion at the Second EFIEA (European Forum on Integrated Environmental Assessment) Workshop. Together they provide a good overview of the problems and conflicts that characterise the current debate on climate policies and on the implementation of the Kyoto Protocol in particular. The book is divided into three parts. The first part assesses the costs and benefits of the Kyoto Protocol within both a static and a dynamic perspective. Part 2 explores ways of increasing the efficiency of measures designed to achieve the Kyoto targets. In this context, in particular the role of emissions trading is examined. The third part is devoted to an analysis of the equity implications of differing policy options. Both international and intergenerational equity aspects are dealt with. The concluding chapter of the books attempts to summarise policy perspectives and policy conclusions derived from the articles of this book and the debate at the workshop.

Policy implications

This book emphasises the link between equity and efficiency of climate policy. On the one hand, an equitable policy strategy induces more countries to commit to emissions control, thus enhancing its effectiveness; on the other hand, a cost-effective policy reduces the conflict on distributional issues. By improving the communication between science and policy, important and relevant policy questions can be addressed and new directions for climate policy can be indicated. The main policy implication that can be drawn from

this books requires that strategies in climate change policies should balance equity, efficiency and political feasibility criteria in order to be both practical and effective.

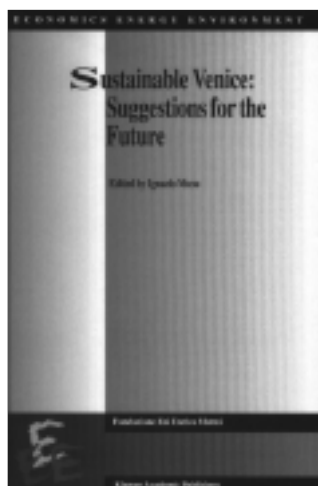
A further consequence of the aspects discussed within this book consists in the importance of policy integration. The outcome of an effective climate policy crucially depends on the actions and interactions of several players in several fields. If correctly understood and managed, these interactions can help to increase the dynamics of the process that may lead countries to effective control of greenhouse gas emissions. Policy integration should take into account the linkages of environmental policies, technology development and diffusion as well as technological co-operation. Within the EU, policy integration across sectors is needed, whereby the focus should be on transport, agriculture and energy. In particular, the integration of transport policies with other sectoral policies and cross-sectoral energy efficiency investments are promoted. Policy integration implies action across groups and policy targets: policies are directed to mould both producers' and consumers' behaviour, on both the supply and the demand sides. To increase the probability of the implementation of such integrated approaches, also equity aspects have to be taken into account when choosing adequate strategies.

Even if a lot of research, both theoretical and empirical, is still missing, the results outlined in this book, if coupled with a careful assessment of the political dimensions of the climate problem, could provide useful indications on what can be achieved and what cannot, thus giving the EU policy makers indications of where and how to concentrate negotiating efforts and economic resources.

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Sustainable Venice: suggestions from the future

Editor: Ignazio Musu

Publisher: Kluwer Academic Publishers/Series Economics, Energy, Environment, 2001

Affiliations: University Ca' Foscari of Venice and Fondazione Eni Enrico Mattei.

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Key Words: Sustainable Development, Local Agenda 21, Venice, The Venice Lagoon, Biodiversity, Urban Sustainability, Sustainable Tourism, Material Production, Immaterial Production, Institutions.

Issue: The 1992 Rio de Janeiro conference on environment and development launched ambitious proposals for sustainable development, compatible with the conservation of the natural environment. The ensemble of these proposals was called Agenda 21. The effectiveness of the policies proposed depends on their impact at the local level as the city is the most significant place in which the daily complexity of the relationship between development and the environment is revealed. In some cities this complexity reaches high levels and the cases become symbolic representations of the intricacy; Venice is one of these cases.

Findings: The research in this volume singles out the critical issues to be tackled when considering the sustainable development of Venice. The issues discussed here are: the fundamental dilemma between conservation of the lagoon as an ecosystem and use as an economic resource; the problems of hydro-geological equilibrium in relation to the scenarios for future urban development; the evolution of territorial models as structures for sustainable development; the role of material production, particularly industrial, in the economic development of Venice; the evolution of tourism and its economic domination of the city; the possibility of integrating Venice into the global network of immaterial production; the institutional aspects of governing a process of urban sustainable development.

Policy Implications: This book emphasises how legitimate future scenarios for a city can only be developed through a broad understanding of the issues pertinent to

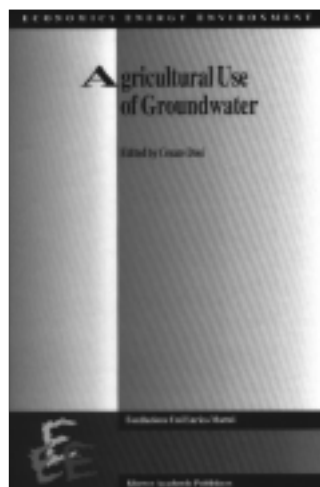
the past, present and future state of a city, combined with an understanding of the cause and effect mechanisms driving or impeding the evolution of environmental, social and economic processes. This essentially equips the decision makers, and those who they are answerable to - the local community - with the knowledge vital to making choices regarding the development of the city and the capacity to place these choices within the framework of sustainable development.

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Agricultural Use of Groundwater - Towards Integration between Agricultural Policy and Water Resources Management

Editor: Cesare Dosi

Publisher: Kluwer Academic Publishers/Series Economics, Energy and Environment, 2001

Affiliation: University of Padova, and Fondazione Eni Enrico Mattei

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Key Words: Water Resources Management, Groundwater, Non-point Sources Pollution, Agriculture, Common Agricultural Policy (CAP), Environmental Policies.

Issue

Conservation and better management of groundwater should be a key ingredient of water policies. This is especially true in those areas, such as many southern European regions, which are most affected by scarcity problems and competition between water user and uses.

Agriculture is an important 'user' of groundwater not only in terms of abstractions, but also in an incidental sense, by altering groundwater quality. Agricultural policies, traditionally directed towards other objectives, are beginning to pay more attention to environmental issues. However, more effective initiatives are required to reduce the pressure upon groundwater resources and to achieve a better integration of agricultural and environmental policies.

This volume has been developed out of three workshops held as part of the EU concerted action SAGA, 'Sustainable Agricultural Use of Groundwater in Southern Europe: Integration between Agricultural and Water Management Policies'. The aim was to get a picture of the interlinkages between agriculture,

agricultural policies and groundwater management, to review policy approaches and instruments for improving management, and to identify further research directions.

Policy implications

Farmers often 'over-exploit' groundwater, either through over-pumping or by incidentally using aquifers as a sink of pollutants. Measures aimed at affecting farmers' behaviour may take different forms, forms that may include mandatory regulation, economic incentives and so-called voluntary approaches. The effectiveness of these measures relies upon a proper understanding of the main features of the interlinkages between farming practices and groundwater quality. For instance, most of the agriculture-related groundwater pollution problems may be labelled as non point-source, which typically involved many agents, geographically dispersed, generating (and/or causing the intrusion into aquifers of) pollutants which, in general, cannot be easily neutralised ex-post through end-of-pipe devices. This makes prevention the most effective, and the only viable option for controlling groundwater pollution. However, the effectiveness and efficiency of policy measures aimed at reducing agricultural impacts can be undermined by the difficulty/impossibility of inferring individual responsibilities from observable groundwater quality changes.

Generally speaking, policy provisions aimed at controlling water pollution from agricultural sources have relied, and still largely rely upon what is sometimes referred to as 'voluntarism', but which can be better described as a 'soft persuasion through subsidisation' approach. Besides being in conflict with the polluter-pays ethics, this approach has not brought about a significant and widespread reversal of pollution trends. This ineffectiveness can be at least partly attributable to the somewhat ambiguous distinction between farmers' environmental services and environmental damage, a distinction which is supposed to provide the legal basis for deciding

whether or not farmers are eligible for compensation for environmentally friendly adjustments. In various EC policy documents, environmental services are defined as the outcome of any adjustment of farming which goes beyond the basic standards of environmental care (reference levels, according to the Commission's terminology). As with any other politically constructed 'property rights' system, this conventional borderline is obviously questionable. What matters, however, is that to be credible and operative, the adopted legal borderline requires a rigorous and unambiguous definition of the reference level in order to assess farmers' compliance with legal regulations, and to have a benchmark for identifying farmers' environmental services to be compensated by society. Particularly in those Member States which have not properly identified and credibly imposed basic standards of environmental care (e.g. failure to implement the Nitrate Directive), the somewhat intrinsically ambiguous distinction between farmers' negative and positive environmental externalities has reinforced the attitude among farmers that they should wait for compensation for any environmentally friendly adjustment of farming. Such a consolidated attitude could make the implementation of cross-compliance measures introduced by Agenda 2000 politically difficult.

Besides a better and more effective integration and co-ordination between agricultural policy and environmental regulation, water resources management could also be improved through negotiated agreements between farmers and water authorities or water companies. In northern Member States such as Germany and the Netherlands, several instructive examples of the potential advantages of co-operative agreements compared with traditional regulatory approaches may be found. However, such agreements are rare in southern Member States, or do not exist at

all. The cultural, institutional and economic reasons for this, and the question of under which conditions such agreements could be established, are of special interest and should deserve more attention when research priorities are identified.

Investigation into research on the environmental impacts of CAP shows a 'northern bias' in the research coverage, with the majority of studies and research projects focusing on northern countries, and much fewer for southern. Research also put stronger emphasis on temperate rather than Mediterranean crops, with water pollution problems by nitrates and pesticides reasonably well covered, but not groundwater supply problem and over-abstraction. Finally, there is a strong emphasis on research into so called 'agri-environmental measures' (e.g. those introduced through Regulation 2078/92) in comparison to other components of the CAP. Although important, these measures (which remain a minor component of the CAP), may draw attention away from the bigger picture.

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83.2000
CLIM

INCOME INEQUALITY AND THE ENVIRONMENTAL KUZNETS CURVE

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In the early 1990s several studies found an inverted-U relationship between environmental degradation and per capita income (the so-called environmental Kuznets curve). Since then, the literature on this subject has grown exponentially trying to overcome the limitations of the previous contributions. Some recent studies have started to question the emphasis on income growth to explain environmental degradation and argued that other explanatory variables should be included in the models beyond Gross Domestic Product (GDP). Among the studies that introduce new regressors,

only few works focus attention on inequality as additional explanatory variable and examine how inequality affects environmental degradation. For this purpose, present empirical studies generally use pooled ordinary least squares (OLS) models as preferred specification getting mixed or conflicting results. Pooling observations, however, disregards the heterogeneity of the countries included in the panel. The aim of the present paper is to show that the results obtained in the literature may heavily depend on the chosen specification and verify how these results change if we adopt a fixed-effect (FE) model that, in our opinion, provides a better description of reality in the present context.

Taking carbon dioxide (CO₂) emissions as environmental indicator, two main results emerge from the analysis. First, the FE and pooled OLS models systematically achieve different or even opposite results. The performed test rejected the hypothesis underlying the pooled OLS model in all estimated specifications, therefore pooled OLS estimations turn out to be biased in the present context. Second, inequality has always a statistically non significant impact on CO₂ emissions in our preferred specification (the FE model). The same results hold if we use a log-linear specification (with variables in logs rather than in levels) and are also robust to alternative inequality measures. Finally, we verify whether inequality has a differential impact on CO₂ emissions in rich and poor countries, which may determine the overall non significance of the inequality coefficient in the panel. For this purpose, we perform a further analysis using a non-linear model and find that the environmental impact of inequality is still not statistically different from zero in the FE specification.

84.2000
KNOW

STRATIFIED OR COMPREHENSIVE? THE ECONOMIC EFFICIENCY OF SCHOOL DESIGN

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Economists recognise the importance of schooling for the production of human capital, which, in combination with other production factors, affects output per head and ultimately economic wellbeing. One reason why an adequate supply of educated workers is important is that it stimulates the demand for skill intensive technologies and skilled labour. The

adoption of new technologies is an endogenous process that responds to economic incentives. One such incentive is the relative abundance of educated labour, that makes the implementation of innovations more profitable. First, educated labour is more flexible. Second, when a new product or process is introduced, there is more to be learned and a greater premium to be reaped from the superior signal extraction capability of educated labour. Educated workers can also substitute for expensive company training when a new technology is introduced. Last but not least, because of the increased uncertainty at times of rapid technical change, better educated workers are better at coping with this uncertainty.

The supply of educated labour depends not only on the average number of years spent at school by the active population but also on school quality and on the way education is organised. Interestingly, educational systems differ greatly across countries. Consider secondary education. Whilst some systems emphasise the development of specific vocational skills, other systems focus on the provision of general knowledge. In some countries (USA, Japan, Britain), general and vocational education are combined in comprehensive schools. In other countries (Germany and the Netherlands) there are different tracks and students are streamed into tracks on the basis of their academic talents.

This institutional variety in the design of schooling systems is the outcome of complex national developments. Institutions have also changed over time. In some countries, most notably in Britain and Italy, equality of opportunity and a negative view of the selection criteria have been considered as the main reasons behind the shift from a stratified system, with schools organised in different tracks, to a comprehensive system, considered to be more suitable for the provision of better social opportunities to students from working class families.

An important question that, to our knowledge, has been overlooked by the literature is whether differences in (secondary) school design have relevant efficiency implications, and how these differences affect aggregate productivity and economic wellbeing. If, for instance, stratified schools are associated to higher efficiency than comprehensive schools, transitions from the former to the latter motivated by equality of opportunity carry a real cost, that needs to be considered.

Another question is whether we can rationalise shifts from stratified to comprehensive systems, that have

occurred in Britain and Italy during the 1960s, as outcomes of a democratic process involving majority voting. The current paper addresses these questions by focusing on a key aspect of secondary school design, the degree of differentiation between vocational and general education.

We start by characterising the main features of stratified and comprehensive schools. In so doing, we assume that schools provide both human capital and signals to firms, that cannot observe individual talents. Next, we use a version of the simple endogenous job composition model discussed by Acemoglu (1999) to study the interactions between school design and the demand for high school graduates. To sharpen our focus on these interactions, we ignore the issues related to school finance and assume that all secondary schools are public, a reasonable approximation of reality.

A key difference stressed in the paper is that, while comprehensive schools admit all individuals, independently of their ability, stratified schools stream into them into different tracks, depending on measured academic ability. When secondary schools are public, the government decides both school design and the allocation of students into different tracks. Assuming that the government cares only about (matching) efficiency, we establish the efficient selection criteria in a stratified system and spell out the conditions that make a stratified system preferable to a comprehensive system on efficiency grounds.

In the long run, government decisions in democratic countries need to be sustained by the approval of the majority of voters. We compare net output maximising government policy with a policy dictated by majority voting, where each household in the economy decides sequentially both on the schooling system and on selection in stratified schools. We show that majority voting can lead to substantially different outcomes. First, the relative size of vocational schools in a stratified system can be higher than the efficient size. Therefore, majority voting imparts an "elitist" bias to stratified schools, by reducing the relative size of general schools. Second, comprehensive systems can be preferred by voters even though stratified systems are more efficient. This latter result provides a rationale for the British and Italian experiences of the 1960s.

85.2000

KNOW

THE COLLEGE WAGE GAP IN 10 EUROPEAN COUNTRIES: EVIDENCE FROM TWO COHORTS

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In several OECD countries wage inequality and wage differentials across different groups of workers by education and age changed significantly over the last decade. Two leading explanations have been offered to account for the observed changes in relative wages: one story has emphasised the role of market forces and the evolution of (relative) supply and demand; another story has stressed the role of labour market imperfections and institutional arrangements. The former approach focuses mainly on demographic changes, adverse shifts in supply and demand for products, skill-biased technological change, and the increased globalisation of trade. The latter approach advocates the importance of trade unions, of collective bargaining practices and of product and labour market regulations.

Changes have had different impact on younger and older cohorts. Card and Lemieux (2000), for instance, use data on workers of different age groups to show that in the US much of the rise in the college-high school wage gap can be attributed to changes in the relative earnings of younger college-educated workers. They also show that this shift in the structure of returns to college graduates shares a common pattern in the UK and Canada, where educational wage differentials have risen for younger men while remaining stable or even declining for older men.

While there is an extensive literature investigating the evolution of the college wage gap in the North American and British experiences, relatively little is known about the (continental) European experience. We believe that a better understanding of the European case is interesting not only in itself, but also because the countries involved show a relatively high degree of variation in the evolution of relative prices and quantities for different skills and exhibit significant institutional diversity.

In this paper we use data for two cohorts of individuals to study the recent evolution of the college wage gap in 10 European countries and highlight both

common trends and country specific differences. We focus on cohort data for two reasons, first to disentangle composition effects from genuine changes in relative wages; and second to ask whether the patterns in the dynamics of the college wage gap documented for the US and other Anglo-Saxon countries also apply to the rest of Europe.

This study uses a unique data set that comprises two cohorts and 10 European countries from the early to mid 1980s to the mid to late 1990s. We believe that our contribution to the existing literature is twofold: first, and most obviously, we offer a broad European perspective to the recent evolution of the college wage gap; second, we exploit the rich institutional variation of European labour markets to correlate the levels and trends in the college wage gap with the levels and changes in European labour market institutions. We find evidence of significant cross country differences in the level and dynamics of the gap. There is also evidence that both the level and the growth of the college wage gap significantly differ between cohorts. Estimated growth turns out to be negatively correlated to changes in relative supply and positively correlated with the long run rate of productivity growth. Institutional changes also matter, and we find that countries that have experienced a decline in union density, in the centralisation of the wage bargain and in employment protection measures have also had a faster growth in the college wage gap.

86.2000

ETA

GAME THEORY AND INTERNATIONAL ENVIRONMENTAL CO-OPERATION: A SURVEY WITH AN APPLICATION TO THE KYOTO-PROTOCOL

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The game theoretical analysis of international environmental problems has received increasing attention in recent years. This is not surprising. Game theory analyses the interaction between agents, formulates hypotheses about their behaviour, and predicts the final outcome. Therefore, game theory is particularly suited to analyse the incentive structure of international environmental problems. Central questions which can be investigated with this method are: Under which conditions will an international environmental agreement (IEA) be signed and ratified? On which reduction targets will the negotiators agree? How many and

which countries will sign an IEA? Will the agreement be stable? Which measures may be used to stabilise an IEA?

The game theoretical literature has provided many insights to these questions in recent years. In particular, it has provided many results which help to explain the difficulties of establishing effective and efficient co-operation. However, the game theoretical analysis of international environmental problems has also been criticised for abstracting from too many practical problems and being based on very specific assumptions. Therefore, it is argued that game theoretical analyses do not capture many important aspects of international pollution problems, derive no general results and are therefore ill-suited for policy analyses and recommendations. This paper tries to qualify this critique by pointing out important results, how they have been obtained and which aspects have to be treated in future research. It proceeds in four steps.

In a first step it explicitly lays out the fundamental assumptions underlying the analysis of international environmental problems (chapter 2). The need for co-operation and the problems of co-operation are defined. Though co-operation brings about welfare gains, three central constraints are identified which IEAs face in reality. a) Agreements must be individual rational, that is, each country must gain compared to the status. Since countries have different interests, the design of an IEA must take possible asymmetries into consideration. b) Agreements suffer from free-riding. Even though all countries may gain under an IEA, they are even better off by free-riding. Consequently, IEAs must be designed such that the free-rider incentive can be neutralised. c) Agreements must be reached by consensus. Since participation in an agreement is voluntary, governments often agree on the smallest common denominator. Empirical evidence is presented

which stresses the importance of these restrictions in international negotiations.

In a second step the paper summarises important findings and adds some new insights which help to explain the difficulties of co-operation and discusses measures to establish co-operation. Chapter 3 looks at measures to avoid asymmetric welfare distributions and to enforce an IEA. Important issues include: credible sanctions, monetary and in-kind transfers, issue-linkage, monitoring and the time preference rate of agents. Chapter 4 discusses policy instruments in global pollution control and chapter 5 summarises the results on the formation of coalitions. In a third step, the results of

chapters 3, 4 and 5 are critically reviewed. On the one hand, open issues with respect to the theoretical analysis are characterised. On the other hand, practical problems which are not covered by theory are mentioned and evaluated as to their effect to influence policy recommendations. In a fourth step, the theoretical results and the derived conclusions of chapters 3 to 5 are applied to the analysis of the Kyoto-Protocol (chapter 6). It is shown that the theoretical results are helpful in explaining and evaluating this IEA. Chapter 7 briefly characterises open issues for future research.

87.2000

CLIM

CLIMATE CHANGE SCENARIOS FOR THE MEDITERRANEAN: A BASIS FOR REGIONAL IMPACT ASSESSMENT

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General circulation models (GCMs) are complex, three-dimensional computer-based models of the climate system developed from numerical weather forecasting models. They can only be run on the most powerful computers which are currently available, but are considered to provide the best basis for estimating future climates that might result from anthropogenic increases, primarily due to the burning of fossil fuels, in the atmospheric concentration of CO₂ (usually referred to as the enhanced greenhouse effect or global warming) and sulphate dust particles (aerosols). Thus they provide the best basis for the construction of climate change scenarios, which should not be viewed as predictions or forecasts of future climate, but as self-consistent pictures of possible future climate. Output from GCMs cannot, however, be directly used in many assessments of the environmental and economic impacts of global warming because of their relatively coarse spatial scale (typically they provide information on a grid with a resolution of only 300 km). Furthermore, confidence in the reliability of GCM output tends to decrease moving from the global to the regional spatial scale, and from the annual to the monthly and daily time scale. In order to overcome these problems, climatologists have developed various techniques for 'downscaling' from the coarse GCM scale to the finer spatial scale (such as a river basin) required for impact assessments.

Two general categories of downscaling

approaches can be identified: model-based and statistical. The first approach involves nesting a finer-scale Regional Climate Model (with a typical spatial resolution of 50 km) within the coarser GCM. This approach is considered to have good long-term potential, but is still subject to a number of technical problems. The second approach, statistical downscaling, requires the identification of quantitative relationships between the observed large-scale and regional climate, which are then applied to large-scale GCM output. It has the advantage of requiring fewer data inputs and computing resources than the model-based approach and was, therefore, used by the Climatic Research Unit to develop climate scenarios as part of the European Commission-funded project on Mediterranean Desertification and Land Use (MEDALUS).

Two types of rainfall and temperature scenarios were developed for MEDALUS. First, scenarios for the Mediterranean region as a whole were constructed using a Geographical Information System to

interpolate GCM output to a 1 km by 1 km grid based on information such as height above sea level, distance to the sea, and latitude/longitude. Second, scenarios at the river-basin scale were developed for study regions in southeast Spain and southern Italy based on changes in atmospheric circulation patterns. The latter scenarios have the advantage of providing self-consistent daily temperature and rainfall time series, but only for a limited number of sites in each study region. The gridded scenarios provide information for the whole Mediterranean, but only at the mean seasonal level. The MEDALUS scenarios illustrate the problems and uncertainties associated with the construction of climate-change scenarios. In particular, they are constrained by the underlying reliability of the GCM output. Thus further improvements in GCMs are needed before fully reliable scenarios can be constructed.

88.2000

CLIM

TAX REFORM AND THE ENVIRONMENT IN DEVELOPING ECONOMIES: IS A DOUBLE DIVIDEND POSSIBLE?

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In the past decade, environmental economists have responded to the

challenge of designing economically acceptable and politically feasible environmental tax policy by arguing that under some circumstances, a 'green' tax may contribute more than merely environmental benefits. A major innovation has been the observation that in addition to reducing pollution, the revenue raised by a green tax may make possible the revenue-neutral reduction of other distortionary taxes. According to these arguments the environmental benefit ('dividend') of the green tax is augmented by an economic 'dividend' in the improved efficiency of the taxation system; accordingly, this is frequently referred to as the 'double dividend' argument. Critiques of the double dividend thesis point to a range of conditions under which imposition of a green tax, such as a tax on carbon emissions, might actually result in an increase, not a reduction, in the distorting effects of some taxes. The existence and magnitude of any double dividend is thus an empirical question.

In this paper we reconsider the likely effects of environmental taxes and of the environmental effects of tax reform in the specific context of a small trade-dependent developing economy. We contend that while a double dividend from environmental taxation can never be assured, the range of conditions for its existence and efficacy in such economies may be considerably broader than the current literature appears to imply. Finally, we argue that in industrialising economies, the greatest scope for improvements both in environmental quality and the efficiency of the tax system may arise less from the imposition of explicit green taxes than as a side-effect of the reform of existing tax systems. We identify trade policy as a key area in which tax reforms - specifically, tariff liberalisation - could generate additional environmental benefits.

In contrast to a typical tax on production or factor use, tariff policies promote production in targeted domestic industries. Tariffs apply to individual commodities or industries, so to increase a tariff is typically to increase the overall distortion of the tax system, and also, in the case of polluting industries, to increase the production of emissions. Conversely, tariff reduction means lower production and emissions in those industries, with the net revenue result dependent on the original form of the trade policy instrument and the effects of liberalisation on output in protected and other sectors. It is intuitively clear that under some circumstances, tariff reduction or other forms of policy liberalisation in such highly distorted tax

systems could deliver environmental quality improvements in addition to reduced excess burden- the double dividend.

The paper concludes with a brief illustration based on data from Thailand, in which it is shown that the most polluting manufacturing industries are also among those most highly protected by trade policy. Of course, environmental quality gains achieved as a result of trade liberalisation will occur at the margin, meaning that major reductions in growth rates of most forms of pollution will still require direct interventions and other forms of policy action. Nevertheless, it seems that a double dividend from trade liberalisation is a very real possibility with the kinds of policy reform currently becoming popular in developing countries.

89.2000

SUST

GREEN ACCOUNTING AND MATERIAL FLOW ANALYSIS ALTERNATIVES OR COMPLEMENTS?

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Opinions on how to measure the interactions among environment and economy differ: environmental economists attempt to put a monetary value on the loss or impairment of environmental services as a first step towards "internalising" these "externalities" into the budgets of households and companies. Most ecological economists and environmentalists, on the other hand, reject the "commodification" and pricing of the environment, advancing physical indicators of the environment or sustainable development. Physical indicators, however, do not have the integrative power of monetary aggregates generated in environmental accounting systems, and policy makers prefer highly aggregated indices to get an overall and comparable view of environmental and economic concerns.

Rather than contributing to the proliferation of ad hoc indicators the paper addresses the physical-monetary dichotomy by focusing on two systematic approaches which appear to become international standards for development and analysis. They are the physical Material Flow Accounts (MFA) developed by Wuppertal Institute, and the physical and monetary System of Integrated Environmental and Economic Accounts (SEEA) of the United Nations.

The following discusses some of the pros and cons of both physical and monetary approaches, with a view to linking or combining them. The answer to the question of getting physical or monetary will be: both!

90.2000

SUST

THE NAMEA AS VALIDATION INSTRUMENT FOR ENVIRONMENTAL MACROECONOMICS

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Since 1994, the annual national accounts publication in the Netherlands has been extended with a National Accounting Matrix including Environmental Accounts (NAMEA) and from 1995 onward together with a Social Accounting Matrix (SAM).

The NAMEA extends the national accounts with a system of environmental accounts and indicators and could be regarded as a satellite accounts system. The SAM contains sub-classifications for the households sector (types of households) and wages and salaries (types of employees) and provides as such an integrated system of labour accounts, economic accounts and income distribution accounts. These two systems are built on one similar framework, the so-called National Accounting Matrix, which facilitates comparability and consistency between social, economic and environmental statistics and subsequently integrated analysis of these data.

At present, a consistent time-series of NAMEAs for the Netherlands is available for the years 1986-1992 and another one for the years 1993-1997. These NAMEAs cover the extraction of crude oil and natural gas resources as well as data on six types of environmental degradation problems: greenhouse effect, ozone layer depletion, acidification, eutrophication, waste and wastewater. On the highest level of aggregation each of these environmental themes are monitored with the help of summary indicators which are defined and embedded in a detailed system of environmental accounts.

In 1994, the Commission of the European Communities launched a work programme co-ordinated by Eurostat that resulted in the availability of NAMEAs on air emissions in most EC Member States. A further comparability of applied methods and data sources is currently being investigated.

The integration of environmental statistics and the national accounts in the NAMEA requires several adjustments of

environmental statistics. In this respect specific attention is given to the demarcation of the economic system versus the natural environment, the consistent allocation of pollution data to production and consumption activities and the importance of aggregated environmental indicators.

Finally, various applications are presented which vary from simple comparisons of macroeconomic and environmental performance indicators, the application of these indicators in the environmental analysis of products and international trade and subsequently the use of the NAMEA system in more comprehensive modelling exercises. Finally, the paper sums the analytical advantages of the compatibility between the NAMEA and the SAM.

91.2000
SUST

ON THE ART OF AGGREGATING APPLES & ORANGES

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Sustainable Development is a philosophical concept - it is difficult to find somebody who is against SD, but it is equally difficult to find a consensus on what exactly constitutes "Sustainable Development". Some interpret it as "sustainable economic growth", for others it means "leave the Earth exactly as we found it one hundred years ago". It is the art of politics to satisfy the needs of all societal groups, and the concept SD may have helped us feel that we share at least some common beliefs.

However, translating SD into real politics requires an operationalisation - which proves to be almost impossible, given the diverging views of societal actors. Indicator systems that integrate all common policy questions under the heading of a "Policy Performance Index" (PPI) may help to structure the debate, and to give all relevant interests, from economists to ecologists, an adequate voice in the public democratic debate. The paper starts from the assumptions that:

1. scientific debate has managed to give us a fair description of the physical system (i.e. through the "Limits to Growth" model of Meadows et al.; or Global Warming models);
2. economic debate has matured over time (teaching us, for example, how to "get the prices right" through an Ecological Tax Reform);
3. that the bottleneck for a real breakthrough towards sustainability is thus neither scientific uncertainty nor

lack of economic wisdom, but rather our inability to get the acceptance of politics for the recipes that have been developed by scientists and economists.

Real changes of politics and better decisions can only happen if we manage to convince the voters that Sustainable Development is not just an abstract philosophical concept. Practical experience with an "Urban Policy Performance Index" which has been published in Italy now for five years (see http://esl.jrc.it/envind/esu_test/index.htm) suggests that indicators can play an extremely important role as the interface between science, politics and the ordinary citizen.

The urban level experience in Italy will be confronted with index development at national level, in particular the Human Development Index (produced by United Nations Development Programme, UNDP), the Environmental Sustainability Index (developed by the World Economic Forum in collaboration with Yale Center for Environmental

Law and Policy and the Center for International Earth Science Information Network at Columbia University - see The Economist,

January 29th 2000, p. 138), and the ongoing work of the Consultative Group on Sustainable Development Indices (CGSDI) at the Canadian IISD (see also <http://iisd1.iisd.ca/cgsdi/default.htm>).

Finally, the idea of a non-monetary Policy Performance Index (PPI) will be confronted with ongoing efforts to monetise environmental damages, as applied for example by the UN SEEA. Monetisation studies use either the Damage Cost (DC - used by the GARP and ExternE projects) or the Avoidance Cost (AC - used by the GreenStamp projects) approaches. The paper concludes that the well-known AC-DC paradigm - "marginal costs must equal marginal benefits" - can be extended from pollution to "Policy Performance" in its widest sense, and can be expressed in non-monetary terms, too.

92.2000
SUST

LAND COVER ACCOUNTING IN THE CZECH REPUBLIC

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This paper presents the methodological basis and the empirical results of Land cover accounting in the Czech Republic. From an accounting point of view, what is imperative is to be able:

- to establish land cover classifications with clear ecological, biophysical and

socio-economic significance;

- to establish links from Land Cover categories to categories of economic activity, and
- on this basis, to establish quantitative correlations (and, where possible, causal linkages) between changes in economic activities and changes in land cover.

The ideal for spatial inventory purposes, would be to simultaneously attribute to each spatial unit a classification in terms of land cover and type of economic activity. However, this descriptive data would still not be sufficient to derive changes in land cover from changes in economic activity type (or vice versa). This highlights the central challenge for the collection and exploitation of spatial data - the effective linking of the disaggregated geographical data with the categories of economic activity data (sectoral production, services, and household consumption) as it is collected in the usual national accounts.

The work presented here has explored prospects for exploiting it as a dimension of integrated economic (sectoral) and environmental (quality and quantity) accounting. This meant not only to establish a representation of significant land cover changes, e.g. pressures (flows), but also to look at ways of reliably linking such changes to economic trends and environmental performance indicators over time.

The empirical and statistical results of the study show that there is not a tight one-to-one correlation between land cover categories and economic activity type. For statistical purposes, a "coefficient matrix" can be constructed which specifies the share of each economic activity type for a particular land cover category. In practice, some categories of land cover, especially for built-up areas, pose difficulties, but a reasonably satisfactory coefficient matrix has been obtained. Future work on scenario modelling will allow to link Land Cover Accounting and conventional economic statistics categories within a single scenario or forecasting framework.

93.2000
SUST

VALUING DAMAGES FOR GREEN ACCOUNTING PURPOSES: THE GARP II APPROACH

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As countries become richer, a heightened interest in the environment comes from

two sources. Individuals have a greater concern for the quality of the ambient environment, as more pressing needs are satisfied. At the same time the pressures on that ambient environment increase, with a higher loading of pollution from transport, power, industry and household consumption.

Most work on environmental accounting to date has been carried out almost exclusively in physical units, with little attention paid to the economic implications of the environmental changes. At the same time, it is clear that there is an economic dimension to the changes. The environment provides an economic function and it is at our peril that we ignore that function. But, in drawing up traditional measures of economic activity, such as Gross Domestic Product, that is precisely what we do. We do not take account of damages done to the stock of natural capital, nor of the losses of welfare that economic activities cause through increased pollution.

In response to these concerns, a literature has developed on the monetary value of environmental changes caused by economic activity. This literature has several strands. One looks at the depletion in mineral and renewable resources and asks whether conventional measures of GDP have paid enough attention to this depletion (references here). If a country is maintaining its level of economic activity by running down its mineral resources but is not fully replacing them with alternative income generating assets, then its present level of welfare may be unsustainable. A second examines the expenditures undertaken by citizens in protecting themselves from the consequences of increased pollution. These so-called 'defensive expenditures' are subject to some controversy. Should we deduct them from measures of national income? Some argue that if money is spent on such items, and it used to be spent on things that directly gave welfare, then society is indeed worse off. The problems lie in knowing what the relevant point of comparison is, and identifying and measuring these expenditures. Nevertheless this is an important area of work and much remains to be done to achieve satisfactory systems of accounting for defensive expenditures. The third area of work relates to the damages caused by the pollution. Can that damage be measured in money terms? If so, how much is it worth? And how do the values of the damages compare to other measures of economic activity, such as GDP or National Wealth?

This paper reports on a project book that focuses on the second and third issues

raised above, specially the third. Its point of departure is a study by researchers in Germany, Italy, the Netherlands and the UK, and published as a book (Markandya and Pavan, 1999)¹. This research attempted was to use spatially disaggregated data on measures of pollution to derive economic damage estimates for those pollutants. The objective was to see what could (credibly) be done at a national level, what was the degree of uncertainty in the estimates and whether it was possible to make inter-country comparisons of damages within the European Union. The project also looked at whether these measures could be constructed on a routine basis, so that the task of preparing them could be handed over to statistical offices.

garpi considered only airborne pollutants, where a spatially disaggregated analysis was undertaken focusing on different receptors (such as human health, crops, the built and natural environment). Inevitably, the coverage and approach were not fully consistent. The degree of spatial disaggregation varied by country, as did the availability of data on pollution concentrations and estimates of stocks at risk. In spite of these difficulties, the experience of the first phase confirmed that it is possible to make monetary estimates of the impacts of pollutants on human health, materials and crops with some credibility, although considerable further work is required before these tasks can be carried out routinely and in a comparable format for all countries. Health impacts accounted for the greatest damages, particularly chronic mortality from exposure to particulate pollution. Assessing damages incurred by forests and ecosystems proved much more difficult due to both a lack of appropriate data and the underlying complexity of the natural systems. Some estimates of global warming damages were presented that reflected the limited consensus among certain sections of the scientific research community. The full set of initial estimates was presented in numerous academic and policymaking fora and stimulated considerable discussion.

To develop the research further it was recognised that the coverage of existing impacts should be extended as far as possible across the study countries. This is important for policy-making within the EU, where cross-country resource allocation and regulatory decisions have to be taken. Second, damages need to be attributed to sources, since this is an essential linkage if the approach is to have real policy relevance.

Third, other forms of pollution media need to be investigated such as damages to water and land.

Progress has been made in all of these areas and it is the purpose of this paper to report the main results and to compare this methodology with an alternative that is also popular, namely the GREENSTAMP approach.

94.2000

SUST

GREEN NATIONAL ACCOUNTING: SYNTHESISING AND EXTENDING THE WELFARE BASED AND SUSTAINABILITY-STANDARD BASED APPROACHES

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The existing system of Green National Accounting is based on adjusting the UN's System of National Accounts (SNA) to account for the welfare effects of environmental damage, and the effects on future productivity of natural resource depletion. This paper examines the theoretical foundations of this system. It notes that the assumptions underlying these foundations, in particular the assumption that the economic goal is to maximise the present value of the flow of welfare over time, have led to green national income measuring welfare-based income, which may exceed sustainable income.

We review two major approaches to estimating green national income. The first, the GARP approach, provides satellite accounts for the values of environmental damage. The GARP approach aims to estimate the net welfare that is generated by economic activity; this welfare-based measure can be compared with the national income of a Nation. This approach has been criticised because it does not measure sustainable income. This has been addressed by a sustainability standards-based approach, first suggested by Hueting and developed and applied by the GREENSTAMP project. This involves calculating the economic output compatible with meeting environmental sustainability standards.

Each of these approaches delivers policy-relevant information and has advantages that the other lacks. The welfare-based GARP approach contributes to a measure of the true net welfare generated by economic activity, and provides the information required to identify the socially efficient level of environmental protection (the level beyond which the costs of reducing environmental damage outweigh the benefits). The GREENSTAMP approach provides

information on the costs of reaching sustainable standards.

These distinct advantages suggest that the two approaches could be fruitfully combined. We outline ways in which the approaches could be synthesised. The first is a “sustainability-constrained GARP approach”, which would use the GARP approach to measure the net welfare that would be consistent with meeting identified efficiency and sustainability standards. The second is a “welfare-extended GREENSTAMP approach”, using economic modelling to estimate the output compatible with adhering to sustainable and efficient environmental standards. The third approach is a “welfare-extended Huetting approach” which would deduct from current output the estimated costs of meeting sustainable and efficient environmental standards. An analysis of empirical results obtained using both the welfare based and the sustainability standards based methods is provided, in order to assess their comparability.

The current revisions of the UN System of Environmental and Economic Accounting are briefly described; it is noted that the most appropriate means by which to synthesise the welfare-based and sustainability standards-based approaches will depend on the outcome of these revisions in terms of the valuation approach that is favoured.

95.2000
SUST

TOWARDS A TYPOLOGY OF “ENVIRONMENTALLY-ADJUSTED” NATIONAL SUSTAINABILITY INDICATORS: KEY CONCEPTS AND POLICY APPLICATION

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The practice of estimating ‘environmentally adjusted’ macro-economic aggregates should not only be rooted in appropriate economic theories, but should also aim to ensure the potential of the ‘adjusted’ aggregates to offer aid to policy makers (i.e., to provide answers to questions posed). Apart from the variety of technical matters relating to estimation methods and data available, there are two broad theoretical considerations for indicator pertinence. The first is the way that the indicators relate to underlying notions of (current and future) societal well-being. The second is the way that they address the openness of the national territory to the rest of the world.

In this paper, a structural perspective on sustainable development is presented which allows classification of two broad

families of ‘environmentally-adjusted GDP’ for a national economy. The first type of adjustment centres on accounting conventions, through a change in the system boundary, an enlargement of the scope of national accounting to include specified categories of environmental assets. We call this an ‘Aggregate Indicator of the Change, during the Current year, in the economic Assets of the Nation’ (AICCAN for short). The second is based on hypotheses of adjustment of the economy itself, that is, an ‘adjusted economy’ with a new pattern of production processes, levels of production and consumption activity, technologies employed, etc., which respects specified environmental performance standards. We call this a ‘greened economy GDP’ (geGDP for short).

To highlight the complementarity of these two measurement concepts, the notion of the ‘Monetisation Frontier’ is introduced. This is the line that separates between two zones of natural wealth - on the one side the resources and assets that are valued from the point of view of their potential conversion into commercially priced goods and services (trees into wood products, for example), on the other side the assets that are valued from the point of view of their roles as in situ services as sites, scenery, scientific interest and ecological life-support in complement to human economic activity.

It is explained how the two types of indicators - AICCAN and ‘geGDP’ - address respectively these different roles of natural capital and, as such, respond to distinct (but largely complementary) policy questions. Their respective places in the orientation and evaluation of sustainability policies are outlined. Finally, a set of further issues for indicator pertinence are raised, relating to the degree of openness of the national economy and the national territory to the rest of the world (including direct and indirect ecological services) taking account and, also, the contribution of social and community capital to societal welfare.

96.2000
SUST

TOWARDS AN ENVIRONMENTAL ACCOUNTING FRAMEWORK FOR THE EU

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This paper focuses on environmental accounts work at Eurostat (the EU’s Statistical Office and a Directorate General of the European Commission).

Work at Eurostat is summarised, likely future directions outlined, and numerical summary results are presented. Environmental accounts are portrayed as including a range of physical and monetary accounts and statistics that are tied to the core system of national accounts so as to provide a comprehensive economic-environmental dataset and to support indicator derivation and analyses. This set of environmental accounts includes: physical and monetary flow and asset accounts for subsoil assets, forests, land and water resources; physical flow accounts describing the use of water, energy and materials, emissions to air and water as well as waste generation in a NAMEA (National Accounts Matrix including Environmental Accounts) framework; economy-wide material balances; and economic accounts describing environmental expenditure, environmental taxes, environment industry and environmental employment. For many of these areas compilation handbooks have been or are being made and practical pilot accounts completed by European countries. Monetary valuation has a role in this work but valuation of environmental phenomena and changes in the environment is not a particular focus of official statistics so far. This is because conceptual and interpretation problems render results of valuation less useful in a statistical (i.e. ex post) macro-economic perspective, and because of the lack of primary data needed for valuation (money values as well as quantitative and qualitative physical information).

97.2000
SUST

NEW DEVELOPMENTS IN ENVIRONMENTAL ACCOUNTING AT ISTAT

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Istat has worked to develop the discipline of Environmental Accounting in Italy since the end of the 80s; all projects carried out over time are consistent with international frameworks and programmes while taking into account the guidelines and priorities set at the national level. The degree of development of the different projects shows considerable variation, with three being more advanced and close to the stage of regular data production. This paper describes, for each of them, the methodology used and the progress made so far.

The purpose of the first advanced project, described in § 2, is the collection of data on environmental protection expenditure

(EPE) by General Government; as definition and classification of environmental expenditure, Istat adopts those of the Environmental Protection Expenditure Account (EPEA), belonging to the EU SERIEE system of satellite accounts. Of the possible methods for collecting the data recommended at the European level, the option adopted by Istat is to analyse the budget accounts of general government: this analysis involves scrutinising each item of expenditure included within each account, in order to establish, using all available information, whether that specific item complies with the EPEA definition and, if so, how it is to be classified. The budget accounts approach carries with it two main shortcomings that Istat counteracts by specific solutions.

The second project aims at collecting EPEA-consistent data on environmental protection expenditure by Corporations; the method adopted in this case is direct data collection by means of specific questions addressed to companies. Paragraph 3 describes how different options of data collections were examined, and explains how, finally, the only available option was to conduct the first statistical survey in Italy on business expenditure for environmental protection within the context of the 1999 Intermediate Census of Industry and Services. On the basis of this experience future plans are discussed, highlighting some problems that have to be solved in order to meet the Community statistical requirements on this subject.

Finally, paragraph 4 summarises the work aimed at the production of NAMEAs (National Accounting Matrix Including Environmental Accounts) in Italy. The NAMEA is a statistical information system that ranks very high on the agenda of environmental accountants in the EU. Its appeal stems from the fact that the framework allows to compare existing monetary data - for example on production and consumption activities - with existing physical data, such as the environmental pressures caused by the same activities. However, in order to be fit into a NAMEA the statistical data used in the environmental module need to be consistent with the structure of the economic module. The work required to ensure consistency is described in the paper with reference to the Italian case. Istat produced in 1999 a first Italian NAMEA for the year 1990; as environmental data it includes emissions of six air pollutants caused by 52 economic activities as well as households' consumption, and the direct intake of 4 resources from nature by economic activity.

98.2000

CLIM

REACHING NATIONAL KYOTO-TARGETS IN GERMANY BY MAINTAINING A SUSTAINABLE DEVELOPMENT

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This paper investigates the sustainability of the German economy when reaching the Kyoto emissions reduction target. We use a special intergenerational discounting technique which actually takes into account intergenerational peculiarities in an overlapping generations modelling framework which leads to completely different statements than using the same model with a conventional discounting method. By applying this discounting technique sustainable growth paths of all economic variables can be reached with respect to overall welfare units at the expense of currently living ones. Their contribution to the achievement of "sustainability" can be interpreted as an application of an intertemporal polluter pays principle, where (negative) intertemporal externalities are - to a large extent - avoided. This is not only fair from a normative viewpoint, but also efficient due to the internalisation of today's occurring external costs with respect to climate change.

99.2000

CLIM

AN ASSESSMENT OF THE EU PROPOSAL FOR CEILINGS ON THE USE OF KYOTO FLEXIBILITY MECHANISMS

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The Kyoto Protocol is the first international environmental agreement that sets legally binding greenhouse gas emissions targets and timetables for Annex I countries. It incorporates emissions trading, joint implementation and the clean development mechanism. Because each of the Articles defining the three flexibility mechanisms carries wording that the use of the mechanism must be supplemental to domestic actions, the supplementarity provisions have been the focus of the international climate change negotiations subsequent to Kyoto. Whether the supplementarity clauses will

be translated into a concrete ceiling, and if so, how should a concrete ceiling on the use of the three flexible mechanisms be defined remain to be determined. At the June 1999 Sessions of the Subsidiary Bodies of the UNFCCC, the EU has put forward a proposal for concrete ceilings on the use of flexibility mechanisms. Given the great policy relevance to the ongoing negotiations on the overall issues of flexibility mechanisms, this paper has provided a quantitative assessment of the implications of the EU ceilings with and without considering the however clause. It takes the year 2010 as representative of the first commitment period 2008-2012, is based on compilation of the national communications from 35 Annex I countries to the UNFCCC, and covers all six greenhouse gases considered under the Protocol.

Our results suggest that if the bottom line of the EU proposal were that at least 50% of greenhouse gas emissions reductions must be achieved via domestic actions for the Annex I countries as a whole, the EU demand will be met because the aggregate allowed acquisitions in 2010 from all three flexibility mechanisms under the two alternatives are well below 50% of the difference between the projected baseline emissions and the target in 2010. However, the EU proposed restrictions to each country vary, in some case even substantially. Under either of the two alternatives, the US is not allowed to acquire more than one third of the difference between its projected baseline emissions and the target in 2010. On the other hand, the EU proposal allows, in percentage terms, some countries, particularly its member countries, to undertake a significant amount of acquisitions.

Using the model based on marginal abatement costs of 12 regions, we have then analysed the economic effects of the EU proposed concrete ceilings both on Annex I countries and on non-Annex I countries. Such an analysis has clearly shown that although the US and Japan are firmly opposed to such a restriction, they tend to benefit more from it than the EU which strongly advocates such ceilings. On the other hand, the EU benefits much more with such a restriction than without it, whereas the US, Japan and the former Soviet Union are made worse off in comparison with the no limits case. Given that the EU proposal restricts the total demand for permits and thus reduce the market price of permits, it should thus come as no surprise that such restrictions on the use of flexibility mechanisms are not beneficial to developing countries too because they restrict the total financial flows to developing countries under the

CDM. Moreover, our results have shown that the EU ceilings with the however clause have the more loosening effects on the US, Japan, the former Soviet Union and developing countries than the EU ceilings without such a clause. However, it should be pointed out that the importance of the clause depends crucially on how well a verification procedure might work in real practice. In this present study, we simply assume ideal conditions that the amount of domestic abatement to be verified could be demonstrated without costs. Consequently, the however clause relaxes the otherwise very restrictive limits on the use of flexibility mechanisms. However, in real practice, because the counterfactual baseline emissions are never actually observed, verifying any domestic abatement that reduces emissions below the counterfactual baseline emissions will be subject to technical and political disputes. This needlessly increases transaction costs. If, as seems likely, the verification procedure in practice falls considerable short of the ideal, then the extent to which the however clause can bring down the cost of meeting the Kyoto commitments will become very limited. In the worst case, it could even make the however clause's promise of relief just illusive.

100.2000
KNOW

ITALIAN POLICY TOWARDS COOPERATION IN R&D

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The Italian system of innovation shows some specific features. On the one hand, there is a clear gap between Italian expenditures in R&D and those of most industrialized countries. On the other hand, Italy shows a good level of technological dynamics carried out by SMEs especially in traditional sectors. S&T policy to promote innovative activity covers a considerable share of R&D expenses and in the last decade some incentives for cooperative R&D have been introduced in Italy. Public policy favoring research was mainly focused on mature technologies and scale intensive sectors (chemical industry, steel-making industry, and carmakers) until 1980. A major reform was adopted in 1982 (Law 46), which provided new instruments to implement a policy for innovation and research. The

new tools were directed either to applied research or to create prototypes at a pre-competitive stage or to promote co-operation in both basic and applied research.

In terms of policy for R&D co-operation, a coherent set of tools to support co-operation and joint ventures among firms and between public research centers and firms has not been set up yet. However, in the last decade Italian firms and research centers/universities have been actively involved in the programs financed by the European Commission. Furthermore, S&T policies are not only related to the promotion of innovative activity, especially at the cooperative level, but also to technological effects on market competition and Intellectual Property Rights (IPR). Italian Antitrust policy is rather young in Italy, it was implemented in 1990 and it is based on artt.85 and 86 of the Treaty of Rome. Italian legislation on IPR has incorporated European legislation. Both competition policy and intellectual property rights are complementary means of promoting innovation, technical progress and economic growth to the benefit of the consumer and the whole economy. A specific legislation has not been established yet, but some common principles have been derived on the basis of existing cases. The analysis proposed shows that there are no specific features discouraging or encouraging the creation and the performance of RJVs.

101.2000
KNOW

INFORMATION SHARING, RESEARCH CO-ORDINATION AND MEMBERSHIP OF RESEARCH JOINT VENTURES

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This paper examines which firms from a heterogeneous pool are more likely to join together and form a research joint venture (RJV). It differs from previous contributions as it introduces a set of realistic hypotheses on the characteristics of research co-operation and information sharing. Research paths can be substitute or complementary. This affects the nature of and consequently the gains from co-operation. If research is substitute, then firms co-operate so as to avoid duplication of research costs. If research is complementary, then firms co-operate so as to exploit synergies. In the first case

they will just use one lab, in the second one they will co-ordinate the activities of two labs.

Previous contributions assume that firms do not share information voluntarily if they do not co-operate. In this paper we assume that this is the case only when firms' products are substitute. If firms' products are complementary there may be gains in sharing information also under non co-operation. This eliminates the gains from co-operation arising from information sharing and it goes against the presumption that co-operation in R&D should come as a spin-off of vertical integration. This result provides a strong rational explanation of why firms competing in the production of substitute products carry out RJVs co-operatively. The empirical analysis is carried out on a sample of RJVs formed under the Eureka programme and supports these theoretical predictions. We test whether and how product market characteristics and the organisation of research influence the probability of pairs of firms forming RJVs. We find that couples in RJVs predominantly produce substitute products.

The paper also carefully explores the role of asymmetries in costs between the two firms. It shows that under given circumstances the incentive to form RJVs is higher when asymmetries between pairs of firms are in their intermediate ranges. Asymmetries are also important with respect to the characteristics of the regions where the firms are located. It is found that most pairs of firms forming RJVs are based in Northern European regions with relatively close levels of GNP per capita.

These results have important policy implications. The finding that there is a genuine scope for research co-operation between potentially competing firms, provides a strong rationale for competition policies allowing for this type of agreements.

There are also important concerns about the location of research activities. As far as research is characterised by strong localised externalities, RJVs would then lead to a concentration of research activities in few locations within the EU. Indeed, our results show that most firms getting together are based in Northern countries rather than in Southern ones and, perhaps more importantly, in countries with a similar level of development as measured by GDP per capita. Thus, the involvement of firms based in peripheral areas is small.

In contrast, we find that RJVs may succeed in reducing differences in efficiency at the firm level. Asymmetries are on average large in couples that form

RJVs. Yet, we find some, not extremely robust, evidence that asymmetries are lower for firms that get together than for firms that don't. In this respect, RJVs seem to foster research linkages between small and large firms (high and low cost firms) and to reduce asymmetries.

Although our results may partly be biased by the criteria of accession and the geographical distribution of the Eureka programme, the RJVs analysed in this paper can to a large extent be considered as market driven. In other words the set of RJVs forming under the Eureka programme is not expected to differ substantially from those that would form under market incentives. Our results therefore provide an ideal benchmark for studying the impact of EC support programmes to RJVs that do indeed change severely the market incentives for RJV formation.

102.2000

WAT

WATER SCARCITY: INSTITUTIONAL CHANGE, WATER MARKETS AND PRIVATIZATION

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A number of countries face water shortages because they need to make some basic changes in their water management. Policy options do exist. Most of them share the objective of treating water and water services as an economic good, by regulating private inefficient appropriation of open-access resources, and by making the demand for water less independent of users' willingness to pay for it.

The aim of this paper is to provide an overview of these policy options by illustrating their rationale and possible caveats. We begin by stressing the importance of improving countries' social capital (i.e., institutional arrangements and management rules for allocating water between competitive uses). We then concentrate on some economic approaches to improving water management, i.e., the establishment of water markets and the privatisation of water utilities, by focussing on experiences and on-going developments in the United States and the European Union.

One of the important reasons why countries are exploring economic approaches to water resources management is the potential economic and environmental benefits from doing

so. However, there are no unique answers to dealing with problems of water scarcity. What works in a community facing "real" water scarcity will be different from one where the problem is inadequate institutions and/or management. Thus problem identification and designing solutions in relationship to existing institutions are important in dealing with water issues.

For most of the U.S. and Europe the lack of water is not likely to be a major constraint to food production or cause people to change how they use water to meet their basic needs. Yet, the persistent geographical water imbalances, the increasing importance of quality issues, the competition between traditional water uses and instream uses, and a reconsideration of the role of the public sector, raise serious questions regarding the traditional approaches to the operation and management of water services. Future water availability may well depend on how fast both regions pursue policies to improve water management, including the introduction of water markets and the privatisation of water utilities.

103.2000

WAT

CONTROLLING GROUNDWATER POLLUTION FROM AGRICULTURAL NONPOINT SOURCES: AN OVERVIEW OF POLICY INSTRUMENTS

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Whilst there have been improvements in surface water quality due to reductions in point source discharges, pollutant emissions from agricultural diffuse sources have shown little change, and EU maximum groundwater concentrations of nitrate and certain pesticides are frequently exceeded.

The purpose of this paper is to provide a review of policy instruments aimed at controlling pollution from agricultural diffuse sources, and compare their pros and cons. The review also includes a description of instruments introduced though recent reforms of the European Common Agricultural Policy (CAP), reforms aimed, inter alia, at integrating environmental protection into policies traditionally designed to achieve other objectives.

The major results of this review may be summarised as follows. Firstly, a major barrier to the implementation of effective policy measures is the lack of information about the nature, extent, and social costs

of groundwater pollution from diffuse sources. Public consciousness of agricultural impacts upon groundwater quality has to be raised to the same level as for pollution problems such as surface waters impairment due to effluent discharges from large and readily identifiable point sources. As long as those suffering from pollution are unaware of the short/long term costs of groundwater contamination, there will inevitably be a political bias in favour of polluters who oppose effective policy measures.

Secondly, policies aimed at controlling pollution from agricultural sources have usually relied, and still largely rely upon what is often referred to as "voluntarism", but which can probably be better described as a "soft-persuasion-though-subsidisation" approach. Besides being in contrast with the polluter pays ethics dominating other environmental policies, this approach has not brought about a significant and widespread reversal of pollution trends.

Finally, there is a clear need for better and more effective integration and coordination between agricultural policy, water resources management and environmental policy provisions. Integrating groundwater protection objectives into CAP will, in practice, involve an ability to match agricultural policy more closely to environmental conditions by taking into account location differentials, and by tailoring policy provisions to the impact upon groundwater of alternative farming practices, rather than to the socio-economic status of farmers.

Rather than coming up with new Europe-wide specific measures, what is needed is a clearer European framework specifying the principle for a "division of labour" between CAP and environmental policy provisions, and between payments and regulation related to positive and negative externalities of agricultural production.

104.2000

KNOW

ON DEBT NEUTRALITY IN THE SAVERS-SPENDERS THEORY OF FISCAL POLICY

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**LUISS G. Carli and Università del Molise*

Can intragenerational heterogeneity across households invalidate debt neutrality in the long-run?

While we expect the answer of the layman to be yes, the theoretical doctrine provides a negative peremptory answer.

The layman's view is based on the idea that government debt, by altering the

intragenerational distribution of resources, may exert permanent effects on consumption and labour decisions, and therefore on physical capital and output.

The doctrinal view, instead, stems from some recent contributions which show that long-run debt neutrality invariably holds in various macroeconomic frameworks that consider household heterogeneity. See, for example, Carmichael (1982), Aiyagari (1989), Evans (1991), Daniel (1993), Elmendorf-Mankiw (1999), Smetters (1999) and Mankiw (2000).

These articles, despite the different models employed, provide an explanation of debt neutrality that ends up with the same basic mechanism: in a world of differentiated degrees of altruism, the discount rate of the most patient households pins down the long-run interest rate, therefore making capital stock independent of government debt.

In this literature, however, two aspects have often been emphasised. First, government debt provokes large long-run redistributive effects across households and therefore neutrality is accompanied by an increase in inequality. Second, intragenerational heterogeneity matters for short-run debt nonneutrality as large transitional effects on aggregate demand occur, due to a momentary failure of the equivalence between debt and lump-sum taxes.

This paper develops a simple intertemporal optimising model of capital formation to investigate the issue of debt neutrality and non-demographic heterogeneity with two main tasks. The first is to find out if the layman's view is theoretically correct. In particular, we want to establish whether by relaxing some restrictive features of the models employed in the literature debt neutrality still holds or the income redistribution brought about by government debt is able to produce irreversible real effects. The second related task is to explore explicitly the short-run effects of debt manipulations.

The model is based on the "savers-spenders" theory of fiscal policy formulated by Mankiw (2000). According to this theory, there are two types of agents in the economy: individuals who consume and accumulate capital on an intertemporal basis, i.e. the "savers", and individuals having a short-time horizon who cannot accumulate any wealth and consume only the current after-tax income, i.e. the "spenders". This framework is studied under the hypothesis of endogenous labour-leisure choices.

We discover that government debt is in general nonneutral in the "savers-spenders" model when we allow for

endogenous labour decisions. The violation of Ricardian neutrality is obtained because government debt through its financing scheme, i.e. lump-sum taxes levied on every agent, accomplishes a redistribution of income across Barro-Ramsey and Keynesian individuals, leading to irreversible changes in consumption, labour supply and consequently capital stock. If plausible values of taste parameters are considered, higher debt is associated with lower aggregate labour and capital stock. The hypothesis of endogenous labour choices, however, is a necessary, but not sufficient, condition for the nonneutrality of a debt-for-tax-swap policy. In fact, capital stock invariance arises when labour supplies are endogenous, but agents have the same tastes. This result suggests that there are two dimensions of heterogeneity that matter to have debt nonneutrality. The conventional one is related to the distinction between savers and spenders. The second type of heterogeneity, instead, considers differences in tastes among agents for the consumption-leisure trade-off.

The second finding is that, when debt nonneutrality occurs, the dynamic effects of debt are large for some variables, like consumption of savers, labour and factor prices; other variables, like consumption of nonsavers, aggregate demand and output may exhibit a moderate variability. It is not necessarily true, as pointed out by several papers that support long-run Ricardian equivalence, that public debt has large transitional effects on aggregate demand.

Finally, we show that also the introduction of the hypothesis of time-recursive preferences into the "savers-spenders" model with inelastic labour choices can invalidate debt neutrality.

105.2000
SUST

INTERMODALITY AND THE CHANGING ROLE OF NODES IN TRANSPORT NETWORKS

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Intermodality is characterised by the combination of different technologies into a unified transport process. This paper aims to relate the emerging intermodal logic (that is, the combined transport by rail, truck, sea vessel or barge under a particular contractual scheme) to the changing functions performed by the transport nodes. As a point of fact,

technological innovations and organisational arrangements which are at the basis of the emerging intermodal era are also producing dramatic changes in the way transport nodes work and operate within the transport system.

To this end, we consider first under what conditions intermodal technologies may prove to be superior to traditional transport modes. A simple economic model is used to highlight that, if transshipment costs are kept sufficiently low in relative terms, some consumers will prefer intermodal transport to other modes.

The main way to achieve this market potential is by standardising loading and unloading operations; for example, through the adoption of containers. This also implies that heterogeneous goods can be more easily combined together into single shipments, and that economies of scale in the transport system can be exploited in different ways. In some nodes, like ports, warehouses have been used to stock products and raw materials, but the economic advantage of having large quantities transported and subsequently stored is reduced when intermodality is available.

Considering that the determination of the level of inventory stock is an intertemporal optimisation problem for a firm facing a demand variable over time, a model shows how intermodality may induce a firm to adopt just-in-time strategies (that is, zero level stocks).

As storage functions are progressively reduced, the role played by the nodes within transportation networks is substantially changed. This is especially evident in the recent evolution of seaports and in the organisation of maritime transport. The changing role of seaports and the major consequences arising from the emerging intermodal and network logic are subsequently analysed, as an example of a more general phenomenon affecting also other means of transport.

106.2000
CLIM

DOES S. KUZNETS' BELIEF QUESTION THE ENVIRONMENTAL KUZNETS CURVES?

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In the 1970's the limits to growth argument was that pollution is an inexorable by-product of industrialisation and that increasing material affluence will entail a decreasingly attractive world. Since the early nineties some economists

argue that this view could be excessively pessimist since it neglects the possibility of changes in technology, education, economic and political structure which might mitigate the environmental problems. Taking into account the fact that with economic growth, society could react and possibly resorb environmental difficulties leads to position like Beckerman (1992) who says that everything will work out fine in the end "There is clear evidence that although economic growth leads to environmental degradation in the early stages of the process, in the end the best-and probably only-way to attain a decent environment in most countries is to become rich".

Recent theoretical literature (see Vogel 1999) recognises the importance of the distribution of income through efficiency and equity in the provision of environmental quality but little attention has been paid to the link between Environmental Kuznets Curve and the original Kuznets curve. Simon Kuznets (1955) postulates that income inequality increases and then decreases during the process development. This is precisely the starting point of our study. Suppose that conditions are met to provide an EKC, i.e. that when income exceeds a threshold, pollution starts to decrease. What is the new pattern for pollution, if we consider not only changes in average income but also changes in income inequality according to the Kuznet's inverted U-shaped hypothesis?

Research into the causal effects of income inequality on environmental policy is scarce and limited to empirical studies. Torras and Boyce (1998) provide a reduced form specification of the EKC in which income inequality is included as a regressor, and find ambiguous support for their hypothesis that income inequality reduces environmental quality.

In order to highlight this possible ambiguous effect of income inequality, we consider a simple environmental model where the income inequalities follow a bell curve. In this case we show that EKC is not necessarily a bell curve. It could be an "environmental camel curve" i.e. a curve with two humps. Our result is based on a public good model of the provision of environmental quality. In this type of model, environmental policies are a way to diminish inequality.

Improving environmental quality is in fact an in-kind transfer, in terms of welfare. Such a policy, obviously, is more appropriate for a high income country. We have this case in mind, and our result is consistent with the estimations of Taskin and Zaim (2000) for a sample of rich countries (OECD).

107.2000

CLIM

EU AND BIODIVERSITY CONSERVATION IN TROPICAL COUNTRIES

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Biodiversity loss is currently felt to be one of the key environmental issues facing the planet, as exemplified by the signing of the Convention on Biological Diversity in Rio de Janeiro in 1992. Biodiversity conservation is a particular concern in a number of areas where levels of biodiversity and/or endemism are particularly high, or where the threats to biodiversity are most pressing. These areas fall disproportionately within developing tropical countries, which often lack the means to protect them effectively. This paper looks at the efforts of EU countries to promote biodiversity conservation in such areas, within the framework of the Rio Convention.

The paper examines both official government policies and the work of NGO's and academic institutions, comparing and contrasting the two different approaches. When looking at official government policies, it is apparent that there are no common EU policies, and that the extent of work undertaken varies greatly between countries. While a few projects are specifically focused on biodiversity conservation, more often biodiversity concerns are incorporated into environmental projects with broader aims. A positive development is the establishment of research partnerships between European and developing countries, which should help encourage future conservation efforts. In terms of geographical coverage, there is no systematic effort to target the most biodiversity rich countries. In some cases there is an effort to do so when possible, or to target particularly rich or important areas within the countries that are receiving aid. In most other cases however, targets for aid spending are chosen predominantly according to geo-political factors.

The other way in which EU countries are helping with biodiversity conservation abroad is through a more "informal" framework, which includes the work of NGO's, universities, research centers and other non-governmental institutions. While the two frameworks overlap (for example, aid projects funded by government agencies are often implemented by non-governmental institutions such as universities), some important differences emerge. In particular, projects run by NGO's and

academia are more likely to specifically focus on biodiversity conservation, and they are more likely to target biodiversity hotspots. A large number of projects focus on inventory and research rather than outright conservation, but in these form the essential building blocks for more comprehensive conservation efforts.

There is also a tendency for NGO and university sponsored conservation efforts to involve a grass-roots approach to conservation.

While a general EU approach to biodiversity conservation abroad is lacking, and while some countries are almost inactive in this field, the work undertaken by others is encouraging. The differences between official policies and the work of non-governmental institutions are not unexpected, as they reflect the priorities and limitations of each institution. With a little more time to define a common approach to biodiversity policy abroad between all the EU countries, the combination of official and "non-formal" approaches may prove to be a very effective mechanism to help preserve global biodiversity.

108.2000

VOL

COLLECTIVE ENVIRONMENTAL AGREEMENTS: AN ANALYSIS OF THE PROBLEMS OF FREE-RIDING AND COLLUSION

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Collective Environmental agreements (CEAs) refer to agreements negotiated between a group of polluting firms and a public regulatory body. These agreements specify a target for global emissions, with the sharing of emission reductions being determined privately by the firms. Furthermore, they do not specify any explicit sanctions in case the target is not met.

Such agreements are more and more common and have been encouraged by the European Commission as alternatives to more constraining regulation, such as an emission tax. This paper analyses some of the difficulties associated with CEAs, notably free-riding, collusion, and burden-sharing among polluters.

The paper is structured as follows: First, we analyse to what extent free-riding poses a threat to CEAs. Second, we propose some mechanisms to control free-riding, and thus enhance the

effectiveness of environmental agreements. Finally, we obtain some results about the negative effect of CEAs on the competitiveness of the sector in which they are used.

The first part of the paper shows how the threat of future taxation can be an effective means of preventing free-riding if firms do not discount the future too much. The analysis identifies the factors that determine the effectiveness of a CEA, and shows the importance of combining a CEA with for instance individual emission quotas. We then introduce uncertainty about the environmental damage and show that if firms are risk loving, the effectiveness of a CEA is lower than an emission tax equal to expected damage.

What can be done to limit free-riding? The second part of the paper shows how cooperation on a secondary activity can strengthen the cooperation on emission reductions, and deter free-riding. This secondary activity can involve positive benefits, for instance, the sharing of production facilities in agriculture, or be of a negative character in the form of collusion on output price. The existing literature has raised concerns about collusion (Brau and Carraro, 1999) and we propose a simple manner of formalising the impact of collusion on the effectiveness of a CEA.

The third and concluding part of the paper explores the issue of burden-sharing of the collective abatement target. We show that a CEA can help firms to co-ordinate on a reduction of quantity and a consequent price increase. Our results are related to recent work by Lehmann (1999), also implying that CEAs may act as a means of cartelisation by industry benefiting from higher prices.

The paper thus provides some cautionary advice against the use of CEAs compared to emissions taxation.

109.2000
VOL

THE COMBINED USE OF TAXATION AND VOLUNTARY AGREEMENTS FOR ENERGY POLICY

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Denmark introduced a carbon tax unilaterally in 1993. Currently, some energy-intensive firms can opt out of the standard carbon tax payments by signing a voluntary agreement with the Danish Energy Agency. The voluntary agreement comprises an energy audit and a set of energy efficiency investments to be

undertaken by the firm in return for a lower carbon tax rate. This paper shows how the combined use of emission taxation and voluntary agreements can work as a mechanism to deal with asymmetric information between the regulator and industry about companies' actual emissions. The model shows how the regulator can offer firms to voluntarily enter into agreements to undertake energy audits allowing better information on actual emissions. Energy audits are costly, however, so the number of firms entering into such agreements has to be weighed against the benefit of better information enabling a better targeting of policy. The analysis therefore distinguishes itself from earlier work on voluntary agreements by incorporating the transaction costs of voluntary agreements (including the cost of an energy audit but also other costs of concluding the agreements).

The analysis shows that the efficiency of the scheme depends on the transaction costs related to the agreements, the environmental damage cost, and the responsiveness in the firm's emissions to the proposed measures following the energy audit. The model cautions that it is feasible that the firms signing voluntary agreements are energy-efficient firms, benefiting from an implicit subsidy for energy efficiency investments that would have been undertaken anyway.

110.2000
VOL

THE IMPACT OF VOLUNTARY ENVIRONMENTAL AGREEMENTS ON FIRMS' INCENTIVES FOR TECHNOLOGY ADOPTION

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The paper analyses the impact of voluntary agreements and other regulatory instruments on firms' incentives to adopt cleaner and more efficient technologies. It takes a viewpoint of political economy and argues that bargaining incentives result when industry can fight planned regulation in the political arena. It presents a model in which a regulator and an industry representative negotiate over which regulatory instrument to apply with which stringency. Depending on the parties' respective position in the political contest, voluntary agreements or other (negotiated or mandatory) policy instruments are implemented.

Policy instruments differ in their impacts on firms' profits and market shares, which yield different incentives for technology adoption. A commitment of the regulator

to exclusively use emissions taxation is shown to never increase welfare in equilibrium, although, within the model, it is the only instrument that can ensure the first-best allocation and generates the adequate incentives for technology adoption. When the regulator is ready to implement a voluntary agreement, incentives for technology adoption are lower than possible under given welfare, but are possibly traded against more stringent environmental regulation. Overall, however, bilateral voluntary agreements are always welfare-neutral. In consequence, the analysis gives a rationale for traditional command-and-control regulation via mandatory standards, but expresses scepticism with respect to bilateral voluntary agreements.

1.2001
SUST

SHOULD DIESEL CARS IN EUROPE BE DISCOURAGED?

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The paper analyses positive and normative aspects of the tax treatment of diesel and gasoline. We start with a comparison between different EU countries of the market share of diesel cars. This is put in relation to the differences in the tax treatment. We show that the relative share of diesel cars can be explained principally by tax variables. The next section examines the theoretical prescriptions for the relative taxation of diesel and gasoline cars. Three aspects are analysed: pure tax efficiency, environmental damage and the link with the use of diesel by trucks. The final section of the paper uses an applied general equilibrium model to assess the welfare effects of revenue-neutral changes in the vehicle and fuel taxes on diesel and gasoline cars. This model integrates the different government objectives: raising tax revenue, environmental goals, transport policy goals and income distribution concerns.

The main result of the paper is that it is difficult to justify the present favourable treatment of diesel cars in the European Union. It is shown that a revenue-neutral shift, which consists of discouraging diesel cars and of favouring gasoline cars via a change in ownership taxes, can generate important welfare gains. This is explained by two reasons. First, even when the different external costs of the two car types are not considered, welfare can be improved by shifting taxation from gasoline to diesel cars. The tax on gasoline car use is very high in

comparison to that on diesel car use. Reducing it makes it possible to achieve large welfare gains which are only partly undone by the distortions created by the higher diesel tax. Secondly, the environmental costs of diesel cars are much higher than those of gasoline cars. Diesel cars have high emissions of particulate matter, which have a high social cost.

2.2001
SUST

THE DECISION MAKING PROCESS IN DEFINING AND PROTECTING CRITICAL NATURAL CAPITAL

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The concept of Critical Natural Capital (CNC) is a general reference concept derived from the implementation of the strong sustainability criterion aimed at the formulation of environmental protection policies. It does not consider the decisional process as a negotiating process involving different actors and stakeholders. The actual formulation of environmental protection policies is instead the result of a negotiating process in which different interests take part and possible conflicts may occur. This paper presents the steps characterising the decision making process related to the definition of environmental policies by means of three case studies for Italy.

The work is organised in five sections. After the introduction in Section 1, Section 2 presents a summary of the measures aimed at determining and preserving the Critical Natural Capital in Italy; the section shows that air, water and arid and semiarid areas have been much less considered as CNC in relation to other natural resources. In order to understand the reasons for such a lack of homogeneity in the level of protection of natural stocks and ecosystems, section 3 investigates the decision making process for three cases studies: the atrazine standard definition in Northern Italy, the designation of protected areas at national level and the voluntary agreements on petrol composition. The examples reported show that economic interests, institutional conservatism, lobbying and negotiating capacities of the various conflicting actors affect the decision making process on CNC definition and/or protection much more than the implementation of the strong sustainability criterion and the clear definition of general priorities in environmental policies. Sections 4 and 5 present a general framework to describe the iterative process employed in CNC

definition and the problems connected to the implementation of the CNC concept in practice.

3.2001
CLIM

GREEN TAX REFORMS IN A COMPUTABLE GENERAL EQUILIBRIUM MODEL FOR ITALY

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This paper studies the effects of green tax reforms within a model of the Italian economy. This model encompasses 30 production sectors, 6 classes of consumers and the most important taxes of the Italian fiscal system. The database for this model mainly derives from the Input-Output table of Italian economy for the year 1990, integrated by other statistics.

The aim of the paper is to assess the effects of tax reforms on total emissions of some pollutants and on consumers' real income. The paper begins with an introduction on the motivations behind the work followed by a section describing the model and its features. Section 3 presents the results of the proposed reforms while section 4 is devoted to sensitivity analysis, which is necessary to test the robustness of the results. A final section summarises the most important findings and discusses some further extensions of the model.

All proposed tax reforms consist of an increase of the tax burden on the energy sector implemented, either through an increase in the revenue of the unit tax on all transactions, or by introducing a tax only on final demand of energy products. Additional revenue from these tax increases is employed to reduce, either the personal income tax rates or the social security contributions on employees paid by firms: in both cases compensation is operated so as to keep public expenditure constant in real terms.

A feature of the paper is its focus on the effects at a national scale, in contrast with a now enormous literature on global environmental pollution.

A thorough assessment of each proposed tax alternative should take into account both the effects on emissions and on consumers' real income. In a sense the paper does not give unambiguous answers: increasing the tax on all transactions and reducing social security contributions is beneficial to all consumers, except the poorest, but has a poor performance in emissions' reduction since it is the least effective in reducing emissions of some pollutants and

increases emissions of others; on the contrary the introduction of a tax on final demand compensated by a cut in personal income tax rates is the most effective alternative in reducing emissions but causes a decline in consumers' real income.

Given these findings the paper may be of some interest for a policy maker interested in the troublesome trade-off between emissions' reductions and real income losses for consumers and may help in defining weights to attach to contrasting objectives.

4.2001
CLIM

GREEN TAXES: ENVIRONMENT, EMPLOYMENT AND GROWTH. A COMPUTABLE GENERAL EQUILIBRIUM ANALYSIS FOR ITALY

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In the 1970s and 1980s environmental policies in industrialised countries were mainly based on traditional command-and-control approaches. The end of the 1980s saw a surge of interest in economic instruments. In 1987 the report of the World Commission for Environment and Development emphasised the role of economic instruments in environmental policy. In the context of the European Communities in 1993 Delor's White Paper on Growth, Competitiveness and Employment highlighted the possible positive macro-economic implications of such an environmental policy: switching taxation from goods (labour) to bads (pollutants) would increase labour demand and reduce the European unemployment level.

A vast literature has emerged around this idea of a possible "double-dividend": a first dividend in terms of reduction of environmental pollution and a second dividend in terms of welfare improvement from reduction of existing distortionary taxes. In particular, a strand of research focused on the possible positive effects on employment when green tax revenues are recycled to reduce wage taxes. Nonetheless, theoretical research and modelling attempts have so far proved to be inconclusive (Ekins, 1999). The judge on the "double-dividend" issue is still out. However, many studies have indicated that at least a small dividend exists, suggesting that the interest of policy makers should remain and further research effort is needed.

A weakness of previous research lies in the fact that it has so far considered simply taxes on an idealised theoretical

pollutant or carbon taxes (Pezzey and Park, 1998; Bosello et al, 1998). Only more recently, some papers have analysed taxes on SO₂ and NO_x emissions (Hill, 1998; Hill, 2000).

In this paper, we try to measure the potential interactions between green taxes on a variety of pollutants. Using a CGE model for Italy, we simulate scenarios of progressive reduction of emissions for 13 polluting substances. It is shown that the introduction of a tax targeted to one single pollutant decreases emission also for other pollutants, and that the growth rate of the economy is not sacrificed. When green taxes revenues are recycled to reduce wage taxes, a positive employment double dividend emerges.

5.2001

CLIM

TAX REFORMS AND ENVIRONMENTAL POLICIES FOR ITALY

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Production and consumption generate pollution. Taxes, by changing relative prices, influence the level and composition of economic activity, hence of polluting emissions. Taxes can then be used to improve environmental quality. On the contrary, however, taxation distorts the economy, as the price paid by the buyer and the one received by the producer of a good or service differ. This determines a loss of efficiency.

We build a dynamic model of the Italian economy which considers both the structure of production and consumption and the generation of pollution. Within this framework, we analyse the tax system in 1992 and find that it is far from optimal. Without changing the total level of taxation, there are opportunities for realising tax reforms which change the tax structure and composition and reduce distortions. We simulate two possible tax reforms, keeping into account also the effect on polluting emissions. Unfortunately, the environmental effect is negative.

We then design a tax reform with a specific environmental purpose, a reduction of the emissions of sulphur oxides, nitrogen oxides and carbon dioxides by 10% in every future period with respect to a base-case scenario in which no policy is realised. This reform improves environmental quality. Furthermore, real GDP increases. However, our welfare index shows that consumer utility decreases. Once again, the effects on the efficiency of the economic system and the one on pollution

have opposite signs. In order to determine the net welfare effect of these reforms, it would be necessary to evaluate the welfare effect of environmental quality and to understand how this influences consumer utility.

Section 2 introduces the problem. Section 3 analyses the structure of commodity taxation in Italy in 1992 and shows that tax rates were far from uniformity. Section 4 introduces our estimates of the marginal cost of the public funds collected through different forms of taxation. Italian values are particularly high and very differentiated, which denotes an inefficient structure of taxation. Section 5 explains some of the characteristics of the model. Section 6 describes the base-case scenario. Section 7 simulates two possible tax reforms: the behaviour of some key economic variables and of polluting emissions is presented graphically in Appendix 3 and 4. Section 8 explains how the production of pollution is modelled and the reason why the above reforms have negative environmental effects. Section 9 describes the environmental tax reform (graphics are presented in Appendix 5). Section 10 concludes.

6.2001

ETA

ENVIRONMENTAL FISCAL POLICY IN AN ENDOGENOUS GROWTH MODEL WITH HUMAN CAPITAL

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Environmental externality correction needs a public intervention. Environmental tax is an instrument that public policy makers have to solve environmental degradation problems. Environmental taxation was often studied in a microeconomic approach related to partial equilibrium. Until recently, environmental tax was analysed in a macroeconomic perspective, where general equilibrium models with environmental externality is the canonical framework.

To justify environmental tax, one can study its impact on economic growth. In this paper, we try to contribute to the literature on the dynamic effects of environmental tax. We consider an endogenous growth model where growth's engine is the human capital accumulation. We introduce pollution as a flow that depends on physical capital stock and affects the agent's welfare function.

We also assume that the time endowment can be endogenously allocated between

work, schooling and leisure. The numerical approach used in this paper allows us to establish a positive relation between environmental tax and long run growth rate. We show that an environmental tax change induces different trade-offs. On the one hand, firms initiate a factorial substitution process that progressively neutralises the crowding-out effect caused by pollution abatement.

On the other hand, households substitute education time for leisure. These effects finally combine into a higher long-run growth rate. In a final step we evaluate the welfare cost induced by the environmental tax rate variation. We have made a clear difference between the total welfare cost and that associated with the short run dynamics. Measuring these different welfare costs caused by the environmental tax impact on growth emphasises both a sizeable welfare cost in the short-run and the overall welfare benefit in the long-run. We show that the magnitude of the short run cost is an increasing function of leisure's weights in utility.

7.2001

CLIM

KYOTO COMMITMENT AND EMISSION TRADING: A EUROPEAN UNION PERSPECTIVE

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**Eni, CRENoS

This work aims to contribute to the understanding of the economic consequences of the implementation of the Kyoto protocol, the international agreement on greenhouse gas emission reduction. In particular, we focus on the emission trade flexibility mechanism: the opportunity of buying and selling emission permits from those countries which reduce their emission below their commitment.

Whilst it is clear that reducing greenhouse gas emission implies a positive cost, at least for some countries, determining the price to be paid (by each country in order to satisfy its commitment) is not a plain issue.

Moreover, it is also clear that the costs vary widely among the countries involved, in fact this makes emission trading convenient, but, again, quantifying the trade remains a controversial issue.

In this work the cost of abatement per tonne of carbon is evaluated by reversing an estimated "carbon demand" function (where the carbon demand is the quantity

of carbon contained in all fuels demanded by the system and a suitable mean of their prices is the "price of carbon").

Using the cost curves computed separately for each country we can simulate the market of emissions and obtain, for each country, the traded quantity as well as the total cost paid for domestic abatement net of price of permits traded. This analysis was performed in different scenarios corresponding to the participants in the market and the limitations in using emission trading.

In the existing economic literature on emission trading we could not find any paper in which all countries involved in the protocol were considered as separate market actors as we did. In particular, EU is either treated as a single entity or EU countries are considered separately, but the market is limited to Europe. This level of detail allows us to draw some conclusions on the redistribution of income among market participants related to the trading system.

8.2001
MGMT

GLOBALISATION IN MARITIME TRANSPORTATION: COMPETITION, UNCERTAINTY AND IMPLICATIONS FOR PORT DEVELOPMENT STRATEGY

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This paper deals with the changing status of seaports. The port industry itself has been evolving as a result of technological change, deregulation and environmental considerations. However, because ports are intermediate points in transport chains, linking ocean and coastal shipping with road and rail modes, they have been particularly vulnerable to profound developments that have taken place on both land and water. Globalisation, containerisation and logistics are transforming the freight industry and are bringing about uncertainty in the port industry. Over the last twenty years or so, the ability of ports to manage and control their activities has diminished. The result is that port planning is extremely difficult, and inter-port competition has been heightened in unanticipated ways.

The paper provides a brief overview of the changes that impact on the port industry from within and without. It is demonstrated that the shipping lines now play a dominant role in the shaping of trade flows and traffic routing. For the most part they are in positions to determine the success or failure of

seaports and exert enormous influence on port operations.

It is suggested that the responses by ports to these challenges have tended to be reactive, in which port authorities have sought to upgrade facilities without any clear strategic goals. This has led to an overcapacity in port infrastructure, which in turn has helped the shipping lines play one port off against another. An example of the recent bidding war between the ports on the East Coast of North America for the services of a major carrier is given. Other approaches are presented, alternatives that require port authorities to become more pro-active. It is suggested that they must undertake critical and realistic assessments of which markets and what trades they wish to serve, and work to establish much closer relations with other stakeholders in these specific niches. In particular, it is suggested that they must insert themselves more fully in logistical chains. It is only through partnerships that ports will be able to succeed in providing superior value-delivery to their customers, and thereby assuring a greater degree of control over their futures.

9.2001
VOL

ENVIRONMENTAL VOLUNTARY AGREEMENTS: A NEW MODEL OF CO-OPERATION BETWEEN PUBLIC AND ECONOMIC ACTORS

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The diffusion of voluntary agreements can be considered as the result of the innovation of environmental policies based on a new style of interaction between public and private actors. As the environmental problems' complexity increases, an evolution of interaction model occurs.

A change in the interaction forms also implies a change in the ways actors face problems and consequently in the ways they think and act. The resulting policy implementation structure is an effect of the participation and co-operation degree of a number of actors (public bodies at the national and local level, economic actors, citizens and environmental associations etc.). And it is also a consequence of the nature of actors and of actors' roles and resources into the decision-making process.

The literature on environmental policy innovation shows in a clear way that the use of voluntary agreements and their real capability to produce relevant effects are strictly linked to the innovation paths of

environmental policies, policy styles and policy networks. In this paper we will focus our attention on the evolution of the model of interaction between public and economic actors as the key element to evaluate voluntary agreements' effectiveness in reaching policy targets. The effectiveness analysis proposed refers to the instrument's capability to effectively create new policy communities and networks and to the conditions under which the networks can operate and develop effective decision-making processes.

This choice of analysis also reflects the need to better understand the recent evolution in the use of voluntary agreements in Italy, where at the end of 1998 the Italian Government decided to use voluntary agreements as an important instrument to achieve the national commitments for the Kyoto Protocol. The recent experiences show that the first obstacle to an adequate use of these kinds of instruments in Italy is still the actors' difficulty to interact in this new way and to understand the conditions and constraints of such a system.

In the first part of the paper (par. 2 to 4) we will outline the evolution path of environmental policies which characterises the emergence of voluntary agreements as a new model of interaction and we will present a short survey on the current debate on effectiveness.

In the second part (par. 5) we will present the recent Italian experience.

We will shortly outline general problems relating to the use of voluntary agreements until now and underline the new problems we are facing for the agreements which are in the negotiation phase as a tool for reaching Kyoto commitments.

10.2001
VOL

CLIMATE POLICY, ASYMMETRIC INFORMATION AND FIRM SURVIVAL

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This paper aims to compare the welfare effect of different domestic climate policy instruments under asymmetric information when the authorities seek to secure the survival of a specific firm. Survival of some companies may be of importance to social welfare because they are located in regions where the potential for establishing alternative business can be limited, at least in the short term. It is a well-known result from economic theory that emission taxes lead to a cost-effective distribution of abatement across polluters.

However, if the authorities want to ensure the survival of a specific firm, it may need to design policy instruments that reduce the firm's cost of complying with an emission tax regime. The climate policy instruments considered in this paper are tradable emission permits with distribution of free permits, emission taxes in combination with a fixed subsidy, and two types of voluntary agreements. Throughout the paper I assume that the firm has private information about its abatement costs.

It has been discussed in the literature and also suggested by politicians, that certain industries could receive pollution permits free of charge in order to limit their costs and hence prevent the industry from shutting down production. In section 4.1 I show that distributing free tradable permits does not secure the survival of the firm as long as the permits are distributed unconditionally. This result corresponds to the conclusion drawn by Frech (1973). However, I show in section 4.2 that the authorities can secure the survival of the firm under an emission tax/tradable permit regime by giving the firm a sufficiently large subsidy/number of permits contingent on continued production.

In section 4.3 I consider voluntary agreements (VA) as policy instruments that can be used to prevent a shutdown. I assume in this paper that if the firm does not accept the VA it will face the same emission tax/tradable permit regime as the rest of the economy. Furthermore, I assume that the authorities have all the bargaining power in the sense that they offer a take-it-or-leave-it agreement to the firm. However, the authorities know that if the firm does not accept the VA, it implies that it will find it more profitable to close down production, than to pay an emission tax. The firm's reliable threat of shutting down production if the voluntary agreement is too harsh sets restrictions on the "take-it-or-leave-it-offer". I show in section 4.3.1 that a voluntary agreement where the authorities set a specific abatement target can prevent a shutdown but leads to lower welfare than the use of emission taxes in combination with a fixed subsidy. However, I finally illustrate in section 4.3.2 that a voluntary agreement designed as a menu of abatement contracts increases social welfare compared to an emission tax regime.

The abatement levels specified in the abatement contracts can be perceived as non-tradable permits. An argument for the use of emission taxes is that the firm internalises the social cost of emissions and hence chooses the cost-effective abatement level. This system ensures that,

even though the authorities do not know anything about the firm's abatement cost, the firm will choose a cost-effective abatement level. However, cost-effective abatement may imply that the firm shuts down its production. When the authorities seek to ensure survival of the firm, the asymmetry of information about the firm's abatement cost is costly for the authorities. In such a case, the authorities increase social welfare by forcing the firm to choose ex ante between different contracts specifying different combinations of abatement levels and financial transfers, rather than giving the firm a fixed financial transfer and leaving the firm to choose its abatement level.

11.2001

ETA

A SEQUENTIAL APPROACH TO THE CHARACTERISTIC FUNCTION AND THE CORE IN GAMES WITH EXTERNALITIES

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In many cooperative situations, players (or coalitions of players) who decide to violate an agreement or a treaty can act by directly choosing new strategies to their convenience, leaving the remaining players to face the new strategies as a fait accompli, and optimally react to them. This is not the case, for instance, of international agreements in which countries who disagree with some proposed joint policy must leave the agreement table. In this case, the disagreement of these countries is publicly monitored by all, and the new situation in which deviating countries act on their own is common knowledge in the continuation of the cooperation game. Other relevant cases, however, do not share the same timing and structure of deviations. If an environmental agreement is already in action, for instance, countries can deviate by simply not complying with its prescriptions. In this case, deviations are monitored only once they are implemented in terms of strategies (e.g., higher pollution levels). Similarly, firms deviating from an industrial cartel can simply set lower prices, and thereby exploit larger market shares, with the remaining firms of the cartel optimally reacting to the new prices much as Stackelberg followers.

In this paper we formally explore this possibility by defining coalitional possibilities of players as their payoff in the sequential game in which they act as leaders. We show that if the game is such

that best responses are everywhere positively sloped (as, for instance, in the price, or Bertrand, competition game), there always exist cooperative strategies which are immune from such deviations. Formally, the core of such games is nonempty. We also show by means of a Cournot oligopoly example, that when the condition for nonemptiness is not satisfied, the sequential structure of deviation can help to select reasonable allocation in games with large cores.

12.2001

ETA

INFLATION AND WELFARE IN AN OLG ECONOMY WITH A PRIVATELY PROVIDED PUBLIC GOOD

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This paper studies the welfare effects of inflation when a public good is privately provided by economic agents without any government intervention. This case refers to situations such as donations to charities, funding of political parties, pollution abatement, willingness to pay taxes. In all these cases, the incentives to enjoy the public good without paying the cost of producing it are responsible for an inefficiently low equilibrium level of the public good. We show that positive inflation rates can help mitigate this inefficiency by increasing the incentives to provide the public good. In particular, since in equilibrium agents provide the public good only in the first period of their life, the distortion of prices in favor of the first period caused by inflation shifts real resources from consumption in the second period of life to consumption and public good provision in the first period of life. Intuitively, agents substitute savings in monetary terms - made less remunerative by inflation - with expenditure in the first period, when the public good is provided. In equilibrium, the resulting level of public good increases and, with it, welfare.

This kind of result suggests that the design of optimal monetary policy should take into account the possible (positive) effects of inflation on the decentralized actions of agents when these actions are responsible for widespread externalities in the economy. An important case is the private formation of human capital: higher inflation rates could induce agents to invest more in education in response to the decreased return to savings, with positive effects on welfare when private education is inefficiently low.

13.2001
KNOW

GLOBALISATION AND TRADE: A "NEW ECONOMIC GEOGRAPHY" PERSPECTIVE

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This paper surveys the most recent contributions in the area of location theory. Particular emphasis is given to the 'arm wrestling' between increasing returns to scale (IRS) and transportation costs (TC) in determining the choice of location faced by firms. IRS make agglomeration sustainable as a balcanisation of the production structure turns out to be more costly than a concentrated one. TC move in the opposite direction as servicing dispersed markets from one single location does not allow any transportation costs saving.

The main results of the 'New Economic Geography' (NEG) approach to International Trade are presented in order to shed light on some shortcomings and point out new issues so far neglected by the literature. The goal is that of analysing how the propensity of firms and workers to cluster together changes as countries/regions become more integrated, in order to understand large-scale agglomerations within the European Union (EU). Will economic integration lead to a higher or lower degree of industrial concentration? That is, will this relocation take form of the movement of particular industries, a process of regional specialisation, or a shift in the entire economic centre of gravity of the Continent? To what extent the lack of international labour migration across EU countries can both postpone and weaken the process of agglomeration?

The results are strictly dependent on the attitude of workers to move across national borders as well as on other key-parameters such as the share of expenditure in manufactures, the elasticity of substitution among differentiated goods and the trade costs level. In the presence of interregional mobility of goods and factors (especially labour), the process of location develops a two-stage pattern. As long as transportation costs remain high, entrepreneurs organise production in different countries/regions in order to service dispersed local markets. As economic integration is intensified the world experiences pecuniary externalities (i.e. externalities that depend on market interactions rather than on physical proximity, the latter being technological externalities), and both workers and firms tend to agglomerate. In this scenario the

prices of factors and local goods rise where geographic concentration occurs. If most goods and factors of production are importable from other regions, the above-mentioned price-rises represent a further centripetal force encouraging the phenomena of immigration. Conversely, if workers are adverse to interregional movements, or some non-tradable goods, like houses, are important for consumers, the agglomeration process experiences a 'third-stage'. A further reduction in trade costs (i.e. a deeper stage of economic integration) increases the importance of spatial wage and price differences in deciding on a firm's location whilst the weight of pecuniary externalities decreases. The conclusion is a new dispersion toward the less-developed and more peripheral regions that once again makes manufacturing sectors spatially dispersed.

Introduction approaches the topic giving some insights on the market interactions, namely backward and forward linkages, generating pecuniary externalities. Sections 2 and 3 review the main results of the New Trade Theory (NTT) and the NEG: namely, in section 3 we survey the main contributions of NEG, assuming workers to be at first inclined and later on adverse to interregional migration. In the fourth part, several shortcomings of the NEG literature are discussed in order to point out new directions for further research and for studies applied to the EU.

14.2001

ETA

QUASI OPTION VALUE AND IRREVERSIBLE CHOICES

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In this paper we are concerned with optimal investment decisions when dealing with land allocation problems. The aim is to compare development versus conservation opportunities in the presence of environmental resources. We emphasise the fundamental importance of flexible modelling, compared to traditional discounted cash flows approaches, in order to capture irreversibility. We stretch a model, firstly developed in Coggins and Ramezani (Coggins & Ramezani, 1998), to focus on a set of decision problems that are particularly relevant in the European context, where decision makers are more concerned with land recovery expenditures and conservation efficiency rather than with wilderness area preservation. Conservation, as well as development, projects imply irreversible investments and operative costs. "Time

matters most when decisions are irreversible. And yet many irreversible decisions must be made on the basis of incomplete information (Bernstein, 1996)". In the model we include two sources of uncertainty affecting the different allocation decisions: environmental and economic uncertainty. The former is related to the unpredictable environmental and ecosystemic effects deriving from development as well as from conservation actions; the latter is concerned with the volatility affecting market prices. Moreover, we take explicit account of how uncertainty interacts with the two types of irreversibility: sunk costs associated with investment in developing decisions, including environmental and social costs due to environmental degradation, as well as sunk costs associated to environmental regulation and conservation. The valuation procedure involves both decision analysis techniques and option pricing theory (Dixit & Pindyck, 1994), (Smith, 1995) and enables us to compute the Quasi Option Value, of environmental projects that, though requiring commitment to an initial investment, are characterised by partial flexibility.

The flexibility of the model allows us to cover realistic cases, especially when the analysis is focused on minimising environmental expenditure. The output of the model can be helpful in promoting environmental and economical rationale choices and, at the same time, it is quite easy to be understood by non technical users.

In section 1 we introduce the main features of the problem and give some literature review of the topic. In section 2 we introduce the analytical framework and we start dealing with market uncertainty, in section 3 we develop the model to include environmental uncertainty. Section 4 is devoted to a sensitivity analysis of critical initial values and to a numerical analysis, and in section 5 we give some conclusions.

15.2001

CLIM

DESERTIFICATION AND LAND DEGRADATION IN MEDITERRANEAN AREAS: FROM SCIENCE TO INTEGRATED POLICY MAKING

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Possible climate change in the Mediterranean may be expected to have an important impact on the physical, environmental, social and economic systems of the region. Socio-economic

and environmental systems in the region are already stressed, and climate change may be expected to exacerbate the situation. Activities are typically concentrated in the coastal zone. This results in competition for space and conflicts of interest, and causes stress on both terrestrial and marine ecosystems. If changes in climate should occur, or if other non-local events, such as changes in the world trade regime, should affect the region, the effects will not be evenly felt. Some economic or demographic sectors will be affected much more dramatically than others and some parts of the Mediterranean may experience a positive impact, while others will be negatively affected, or perhaps not affected at all. Climate change, for example, could reduce the amounts of precipitation in particular areas and directly affect the agricultural sector, but secondary effects would be felt throughout the entire economy. Economic difficulties would in turn affect population growth through, for example, changes in rural-to-urban migration. These economic and demographic changes would then have impacts on land use. Unless we understand these linkages and their spatial implications, we may compromise the future of the land and of the people who depend on it.

Planners and policy makers that are to design policies for mitigating the consequences of climate change face a very difficult task: the world they must deal with is complex, interconnected, and ever-changing. They need tools to understand the impacts and 'knock-on' effects of their own decisions and of decisions made by others. The development of policies to combat land degradation, desertification and / or sustainable water management all pose the problem of dealing with geographical systems in which natural and human factors are thoroughly intertwined. And, geographical systems are in many respects the most complex phenomena that we confront, because they constitute the nexus of physical, ecological, and human systems. To be usefully understood, they must be treated as an integrated whole - but also in their parts, and in detail, since many of the most important interactions among their components take place locally. The problem of understanding the possible impacts of climate change immediately poses the question of how to deal with this complexity, because impacts are experienced at all scales from global to local, and the causal chains through which they propagate are both multifarious and characterised by numerous feedback loops.

In this paper we present a Decision Support System (DSS) built to support policy makers in the design of policies aimed at combating land degradation and desertification in the Mediterranean at the local and regional geographical level. It addresses these problems before decisions are made. This system is built on top of a computer simulation model representing the decision domain in an integrated manner. The model is fully graphical and interactive: it presents itself to the user as consisting of maps which draw and re-draw themselves as scenarios develop. Users can investigate different policies by specifying agricultural, environmental and economic conditions and allowing the model to calculate the maps that represent their likely impacts through time. The DSS runs on a state of the art PC and hides all its technical complexity from the user, thus, he can fully concentrate on the contents of his analysis.

The DSS is developed as part of the EU-research project MODULUS, the aim of which it is to re-use and integrate scientific material obtained from complementary EU-Climate and Environment projects, and to make this material available to policy makers and planners in a useful and usable manner. The resulting integrated model represents in a detailed manner aspects such as: climate and weather, hill-slope hydrology, surface hydrology, sub-surface hydrology, plant growth, natural land cover and vegetation dynamics, agricultural land use and farmers decision making, and non-agricultural land use. Typically a region modelled will comprise a watershed of about 40 by 40 km. The model will produce results at a resolution of 1 ha and for a time horizon of 25 years. Some of the models will run at time the very detailed time steps set by the frequency and intensity of the rainstorms (minutes), while others will run at time steps of 1 year.

The prototype system has been applied in the Argolida (Greece) and the Marina Baixa, Alicante (Spain) regions. It can be used for investigating land-use management policies, and competition for natural resources such as water. However, the DSS is designed in such a manner that it can be applied rather easily in other Mediterranean regions where similar conditions prevail.

This is a new type of scientific venture which needs the involvement of potential end-users to make this tool of practical use outside the academic community. In the MODULUS project a number of workshops were organised demonstrating the tool to small groups of experts and potential users and asking for advice and guidance about how best to develop it in

the future. However, much more interaction with the end-users will be required in order to fine tune the instruments to their exact needs and working methods.

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16.2001

SUST

MEASURING PROGRESS TOWARDS SUSTAINABLE DEVELOPMENT IN VENICE: A COMPARATIVE ASSESSMENT OF METHODS AND APPROACHES

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Sustainable development can be defined as "to provide for the needs of the present generation without compromising the abilities of future generations to meet their needs". A world summit was organised in Rio de Janeiro (1992) to discuss how this could be achieved at the global level. A set of guidelines was produced, "Agenda 21: Blueprint for Sustainable Development", and this stresses the importance of action at the local level since this is the level closest to the people. It suggests that communities develop a set of locally chosen objectives on which a plan for action should be formulated, and this entire process is known as 'Local Agenda 21'. It is then important to measure progress towards these goals and sustainable development.

Local Agenda 21 is particularly difficult in Venice due to the complex and unique environmental, social and economic issues and the extremely precious cultural, artistic and historic heritage. Work has been carried out by the Fondazione Eni Enrico Mattei to define a set of sustainability indicators in order to measure progress to sustainable development. This paper builds on this by discussing the strengths and weaknesses of sustainability indicators in general and comparing this with four other approaches to measuring progress such as to propose a methodology for Venice.

The strengths and weaknesses of each approach are discussed in turn, and this is followed by an assessment of the applicability of each of these to Venice in light of the specific characteristics of the city and its people. Finally, a methodology for measuring progress towards sustainable development in Venice is proposed and some general conclusions are drawn.

It is suggested that a suitable approach would be the selection of a new set of sustainability indicators, based largely on the existing set but also including indicators from other sources such as to be comparable with data from other cities. Secondly it is suggested that the ecological footprint be adapted to Venice as this is a useful approach for encouraging public interest and participation in Local Agenda 21. The former is carried out as part of the paper, and a new set of indicators is proposed based on the Driving force-Pressure-State-Impact-Response framework developed by the European Environment Agency. The second option would require further work and contact with other organisations, however it is believed that this would be a worthwhile task.

17.2001
SUST

PUBLIC PARTICIPATION IN LOCAL AGENDA 21: A REVIEW OF TRADITIONAL AND INNOVATIVE TOOLS

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Public participation is central to a successful Local Agenda 21 process. It is important such that policy-makers can benefit from the local knowledge and creativity of stakeholders, and that stakeholders gain trust in the decision-making process. The degree of public participation within a given community is highly variable, depending largely on local characteristics and the history of participation.

Many tools exist to encourage interest and facilitate participation and there is a wealth of existing literature on the various approaches, however what appears to be lacking is a concise overview and comparative assessment of the strengths and weaknesses of these methods. This is the scope of this paper.

For this purpose, methods have been broadly divided into 'traditional' and 'innovative' techniques, the former referring to those which have been tested and applied on a relatively frequent basis, the latter to newer techniques, often relying on the latest technologies.

All methods, both traditional and innovative, are subject to a number of common weaknesses. These include issues such as resource availability (e.g. time and money), language barriers, trust and commitment. More specifically, whilst traditional methods benefit from having been tested more frequently and therefore revised and developed, they generally require face to face contact in

the form of meetings or seminars. This does increase enthusiasm in the process, however all participants must be present at the same time and at the same place, which may limit participation from some stakeholders. Innovative techniques frequently overcome this problem by creating 'virtual' meeting spaces, flexible in time and space. These are therefore beneficial in reaching a large number of people, often at a lower cost. The main disadvantage of these techniques is that whilst the use of computers and the internet is growing rapidly, there are still sections of society with limited or no access.

Significant progress has been made over recent years in relation to the development of methods of public participation. However since every community is unique, there is no single 'best practice' applicable to all communities. Instead, each community must develop a tailor-made methodology, and in order to reach the wider community it is suggested that a combination of techniques is used. In the future, it would be helpful if a systematic method for analysing the applicability of methods to a given community were developed, however at this point in time it is necessary instead to base an assessment on case studies and theoretical analyses, as is done in this paper.

18.2001
CLIM

SCHUMPETER AND THE RISE OF MODERN ENVIRONMENTALISM

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Joseph Schumpeter is well known for his work on technological innovation. He did however also present some interesting theories on 'societal and political entrepreneurship'. These entrepreneurs try to launch a political idea just like normal businessmen try to sell new consumption goods. We analyse this theory and wonder whether it can explain the rise of modern environmentalism.

In *Capitalism, Socialism and Democracy* (CSD, 1942), Schumpeter presents his paradoxical thesis that capitalism will destroy its own foundation, not by failure but by its success. He argues that the emergence of unfavourable circumstances will activate strong opposition from social critics and intellectuals. In the paper, we focus on environmental aspects that can explain part of this social criticism. Considering the recent growth in national and international environmental legislation and the subsequent emergence of rather vague ecological concepts like

sustainable development and the precautionary principle – both challenging economic growth – one could argue that modern environmentalism is one of the most powerful forces that will further impact capitalism as we know it. Did Schumpeter foresee this evolution and what are the mechanisms that did lead to this situation? We discuss aspects of Schumpeterian issue entrepreneurship and relate these to theories on the emergence of environmental regulation, the expansion of environmental organisations, the use of new instruments in environmental policy and pro-active business strategies. Where possible, recent developments in climate policy, acid rain policy and biotechnology policy are integrated in the analysis.

19.2001
VOL

PARTICIPATION INCENTIVES AND THE DESIGN OF VOLUNTARY AGREEMENTS

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In recent years, voluntary agreements (VAs) have become a common policy instrument for the achievement of some given environmental targets. The expression VAs usually means a series of "commitments from polluting firms or industrial sectors to improve their environmental performance" (Lévêque, 1997). These commitments can take the form of unilateral commitments, which are environmental improvement programmes undertaken by firms themselves and communicated to their stakeholders; public voluntary schemes, which are programmes developed by some public bodies to which participating firms can only agree with; negotiated agreements, which are contracts between the public (national, federal or regional) authorities and industry.

All the previous categories of VAs have been widely studied in the recent environmental economics literature. However, the frameworks adopted for analysing the environmental and economics effects of these policy tools have usually been that of considering a bargaining process between an industry representative and a public regulatory body - which can end up with or without the signing of an agreement - on the one hand, and a situation in which a single firm unilaterally can decide to undertake a voluntary initiative on the other hand.

This paper focuses on a few aspects of this process to which the theoretical

literature has generally paid secondary importance, i.e. the likely interactions between the different firms in the industry when they decide if to adhere to a VA. As a matter of fact, these interactions are important because when an agreement is signed, by an industry representative or by a group of firms in the industry, single firms are aware that the benefits which a single firm gains by adhering to a VA often are such as to be partially appropriable by the other firms in the industry which do not adopt any VA. If that is the case, each firm can rationally expect to gain these benefits from the VAs undertaken by their competitors. As a consequence, an agreement which would have granted a net advantage to the industry as a whole fails to be signed.

A behaviour like that is a case of a more general phenomenon usually referred to as “free-riding”, which takes place when there is need for the provision of a public good, i.e. a good which possesses the characteristics of no rivalry and no excludability in consumption. The lack of co-ordination leads not to provide a good or service which, if offered, would have implied a net benefit for each single individual.

The usual solution for the co-ordination problems related to the supply of public goods is governmental intervention. However, the recent literature on the emergence of international agreements on global commons (Carraro and Siniscalco, 1993; Barrett, 1994 and many others) has shown that, even in the presence of pure public goods, a number of agents – in that literature sovereign countries -may decide to pay the cost of providing the public good (technically, they form a coalition within which the burden of providing the public good is shared). These studies, therefore, show that from a theoretical viewpoint the hierarchical solution is not the only one available in these cases. On the contrary, it seems that room exists for “voluntary” solutions.

As a matter of fact, this framework is also suited for the analysis of the large number of VAs which have been undertaken in Europe and throughout the developed countries over the last years in spite of the presence of apparent incentives to free-ride. In this respect, this paper develops a theoretical model for the analysis of those VAs (which we label “coalitional”) that, when signed, display some beneficial effects on the whole industry. More in detail, we focus on “pre-emptive VAs”, i.e. those VAs which indirectly reduce expected production costs because they reduce the probability of facing a (more costly) direct regulatory regime (e.g. Segerson and Miceli, 1998).

Both the firm and the regulator viewpoint

of a coalitional VA, in particular the conditions under which at least some firms sign the VA and the policy design issues (i.e. the ways by which the regulator can design the VA in order to increase both the number of signatories and its economic and environmental effectiveness) are analysed in the paper.

The results obtained support some important conclusions. First, VAs cannot emerge in the case of a pure public good, i.e. when the characteristics of no excludability are such that all firms in the industry benefit in the same way from the abatement by the signatory firms. Second, even in the case when the benefits accruing from the adoption of a VA are partially excludable, the regulator which bargains or proposes the VA has to impose a minimum participation constraint to ensure that the VA will be signed by at least some firms. Third, a VA with a minimum amount of regulation (i.e. a minimum emission reduction level) implies a net social benefit with respect to a VA in which firms are free to set their optimal – in their own view – abatement level.

20.2001

ETA

DYNAMIC LABOUR DEMAND WITH LUMPY AND KINKED ADJUSTMENT COSTS

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In this paper we analyse the firms’ employment decisions over time in the presence of fixed and linear costs of adjustment. We consider a dynamic structural model in which, in each period, firms face a choice of whether to vary the labour input or to postpone the adjustment to the future. Since the optimising response in the presence of non strictly-convex adjustment costs may be inaction, the appropriate representation of the firm’s choice process is a discrete decision process in which the control variable is restricted to a countable set of alternatives; in our case the firm decides whether to vary the number of employees or to postpone adjustment to the future avoiding paying fixed and linear hiring and firing costs. We derive a standard marginal productivity condition augmented by a forward-looking term which takes into account the future alternatives of adjustment or non-adjustment that firms face as the result of the presence of fixed and linear adjustment costs. This forward-looking term summarises the departures from the static first order condition resulting from

firms’ rational anticipation of future adjustment.

We estimate the model using a panel dataset of more than 3000 Italian firms. Italy has often been regarded as an extreme case in which the regulatory burden of hiring and firing has imposed a major constraint on employers’ decisions with regard to their desired level of employment. Estimation underlines the importance and significance of non-convexities in the costs of adjusting employment. This is consistent with numerous prior studies of the Italian labour market. We have found clear evidence for both linear and fixed costs by estimating the augmented first order condition, although this only permits quantification of the linear cost component. We estimate linear costs to be of the order of 35% of average unit labour costs. We also estimate a structural model drawn from the literature of discrete decision processes, which allows us to estimate the level of fixed costs. We find that fixed costs amount to 3.65 times average unit labour costs.

21.2001

ETA

EMPIRICAL REPRESENTATION OF FIRMS’ EMPLOYMENT DECISIONS BY AN (S,s) RULE

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Recent studies on dynamic labour demand emphasise the importance of non-convex components in the structure of hiring and firing costs in the form of either fixed or kinked adjustment costs. In the case of a fixed cost, employment change tends to be concentrated in a single-period, so that firms avoid paying this cost too frequently. Moreover, firms only make those changes in the labour input which are justified by sufficiently large departures of desired employment from their most recent choice of the number of employees. The adjustment process is lumpy and intermittent: in the face of a shock, a firm may decide that it is optimal to maintain the same number of employees and to postpone adjustment to the future; a type of behaviour described as an (S,s) rule. In labour demand, a two-sided (S,s) rule may be defined as the following: if the number of employees is above (below) or equal to a critical threshold ID (IU) then the firm decides to reduce (increase) employment to its desired level L^* , otherwise it leaves it unchanged - superscripts U and D indicate upward and downward adjustment respectively. Hence, there is a

zone of non-adjustment delimited by the two critical values ID and IU . The (S,s) rule implies a specific ordering of choices: downward adjustment, non-adjustment and upward adjustment with the decision of inaction lying crucially in the middle. In this paper we investigate the conditions under which we may represent empirically firms' intertemporal employment decisions in the presence of lump-sum adjustment costs as an (S,s) rule. We consider the case of labour demand with fixed adjustment costs. Our model provides a general empirical framework within which one may test the (S,s) model. We find that, within a microdata framework, if a decision rule is to specialise to an (S,s) rule, two sets of restrictions must be satisfied: 1) the distribution of the choice-specific error terms must collapse to become univariate; 2) the coefficients relating to upward and downward adjustment must be of opposite sign with a constant of proportionality equal to the proportionality coefficient which links the variances of the choice-specific errors. If the former condition holds but the latter condition is violated, other (perverse) orderings of the three choices, incompatible with the standard (S,s) rule, are possible.

22.2001

ETA

WHAT DO WE GAIN BY BEING DISCRETE? AN INTRODUCTION TO THE ECONOMETRICS OF DISCRETE DECISION PROCESSES

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In this paper we analyse methods which allow us to estimate and identify the sources of censoring in dynamic models. We explicitly take into account the existence of corner solutions by considering a discrete-time-discrete-choice dynamic structural model. The availability of microeconomic datasets allows us to focus on decisions at the individual level and directly exploit the information contained in the corner solutions. Longitudinal datasets, which record cross sections over time, show that often agents do not respond to observed changes in the variables relevant for their decision making, even when these are of a large magnitude. We show how a discrete decision process (DDP) represents a natural framework within which to analyse agents' behaviour when optimal inaction generates censoring in observed decisions. Indeed, censoring in this context is simply the result of the

possibility that an agent may find that the optimal choice is "doing nothing" and postpone economic decisions to the future. A discrete decision process is characterised by a control variable which only takes a finite number of values. Some problems are naturally discrete, such as the optimal engine replacement or job the search problem in which the individual decides whether or not to accept a job offer. Other problems may be described very efficiently by a discrete decision problem. This is clear in the case of fixed costs of adjusting inputs which imply the discrete decision of whether or not to vary the production factor. There is a fundamental methodological difference between discrete choice and continuous choice models. In the former class of models, choice can be varied continuously and the net effect of a marginal change on costs and benefits helps to characterise the optimal decision: for example, concavity of the objective function, implies that the solution to a first-order condition fully characterises the optimal choice. In the latter class of models, when we deal with a finite number of choices, the value of taking each choice must be compared with the others, so optimal behaviour is characterised in terms of inequalities. Modelling the choice set as finite implies that people with similar but not identical situations might make the same choice. The foundations of the structural analysis of discrete choices are to be found in the work of the most recent Nobel laureate D. McFadden.

23.2001

PRIV

OPTIMAL PRIVATISATION DESIGN AND FINANCIAL MARKETS

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Michel Guillard*

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In this paper we present a stylised economy in which individuals want to smooth consumption of two types of good (private and public) across different states of nature. Public good provision is assumed to be initially not diversified across these states of nature. An efficient tax system removes this problem, always ensuring public good financing. With efficient taxation, we show that privatisation might only have financial effects, depending on the scheme selected (sale of public assets vs voucher distribution).

But without efficient taxation, we show that there is always an "optimal privatisation mix", composed by (i) some voucher distribution, in order to adjust the

size of the public sector to the desired amount of public good; (ii) some sale of public assets, whose revenues are invested in a diversified portfolio, in order to smooth public good provision across states of nature. Our results are also discussed in order to take into account a possibly lower efficiency of the government as a shareholder.

Compared to the existing theoretical literature on privatisation, our approach is original. Unlike most authors, we do not initially impose assumptions on a lower productivity of the public sector. Besides, this is one of the first papers considering these issues in a general equilibrium context. However, some recent works have suggested this idea of privatisation as a way of allocating risks across members of the economy. Our approach is also related to the financial and macro-economic literature on incomplete asset markets and risk-sharing as well as to the literature on asset trade under uncertainty. The paper is organised as follows. First, we present our theoretical framework. Second, we introduce and compare alternative privatisation designs in this set-up. Third, we assume that the government has at disposal an efficient tax system, and focus on financial and real effects of privatisation. Finally, we treat the case without taxation and derive the "optimal privatisation mix".

24.2001

KNOW

BEYOND NATIONAL INSTITUTIONS: LABOUR TAXES AND REGIONAL UNEMPLOYMENT IN ITALY

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ISAE, Rome, *University of Calabria,

Cosenza, ****University of Padua

A popular explanation of the observed differences in the behaviour of the rate of unemployment across European countries focuses on the interaction of negative shocks with national institutions. These institutions include employment protection measures, the unemployment benefits system and the degree of centralisation of the wage bargain. In a recent example of this approach, Daveri and Tabellini show that the impact of labour taxes on the rate of unemployment depends on the national institutions regulating wage bargaining. In particular, they argue that the impact of higher taxes is lower in countries where bargaining is either decentralised (Anglo-Saxon countries) or very centralised (Scandinavian countries). Most continental European countries have wage

setting institutions that lie between these two extremes: in these countries the negative impact of an increase of labour taxes on unemployment is highest.

In this literature, the empirical evidence is based on comparisons of aggregate data across countries. Moreover, labour market institutions have a national dimension. A key feature of unemployment in some continental European countries in the 1980s and 1990s (most notably Italy and Spain, but also Germany), however, has been the high dispersion of regional unemployment rates. To explain this dispersion the "institutions by shocks" approach needs either to emphasise regional shocks within the same country, or to rely on the presence of asymmetric regional responses to aggregate shocks interacting with national institutions, or finally to acknowledge the importance of regional institutions.

By regional institutions we mean labour market institutions that are either region-specific or that are not equally important across regions. In this paper we study two such institutions, the wage drift and the hidden economy, and show how their uneven distribution within a country can affect the relationship between changes in regional labour taxes, a typical labour demand shock, and regional unemployment. Our empirical study focuses on the Italian experience. We believe that Italy, with its high regional unemployment dispersion and rising labour taxes, provides an interesting case study for the problem at hand.

In spite of similar national labour market institutions, we show that the relationship between unemployment and labour taxes in Italy varies significantly across groups of regions and is stronger in the highly industrialised North than in the underdeveloped South. This result has the somewhat unpleasant implication that labour tax cuts have, *ceteris paribus*, a proportionally higher impact where unemployment is perceived to be less of a problem.

A key source of variation in the regional responsiveness of unemployment to changes in labour taxes is that regional gross wages in the North increase more than in the South in response to a hike in labour taxes. We explain the higher sensitivity of gross wages in the North both with composition effects (between industrial sectors) and with regional differences in the relative importance of the wage drift and of the hidden economy (within industrial sectors), two relevant regional labour market institutions.

Regional differences in wage setting affect regional employment (and unemployment) both directly and indirectly. By means of a simple exercise,

we show that the estimated regional differences in the elasticity of private employment (and unemployment) to changes in labour taxes can be fully accounted for only if the regional capital stock also adjusts in response to these changes. The economic mechanism at work is the following: an increase in labour taxes that raises wages and labour costs reduces profits and private investment, thus affecting capital accumulation. Since capital and labour are complements in production, employment is negatively affected not only directly by the increase in labour costs but also indirectly because capital accumulation declines.

25.2001

ETA

LOCATIONAL COMPETITION UNDER ENVIRONMENTAL REGULATION WHEN INPUT PRICES AND PRODUCTIVITY DIFFER

Klaus Conrad*

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It is argued in the literature that differences in environmental regulations are an important factor in industrial location (industrial flight hypothesis). This hypothesis is derived from an extension of the Heckscher-Ohlin model of comparative advantage. Since companies can avoid regulations by locating abroad, free trade erodes the independence of a country in implementing an environmental policy. This exerts a strong pressure towards lax regulation in order to signal a pollution haven to producers. Especially in the theoretical literature, multinational firms seem to base their direct foreign investment decision or plant location upon the stringency of environmental regulation in other countries (developing countries or Eastern Europe). The environmental regulation intensity is expected to be a significant determinant of competitiveness and causes industrial flight from developed countries. The argument is that stringent environmental standards cause high costs of production, leading to a decline in competitiveness, and ultimately in market share, jobs and investments. In countries with persistently high unemployment, threats of job losses and of plant relocation can be very powerful and helpful for opponents of a strict environmental policy. However, a broad consensus has emerged in the empirical literature that regulatory differences (with some exceptions) have, at best, a negligible impact on industrial location. Studies attempting to measure the effect of environmental regulation on

net exports, overall trade flows, and plant location decisions have produced estimates that are either small or statistically insignificant. These results emerged from studies by Jaffe et al. (1995) and Adams (1995) which review the empirical evidence.

We therefore will specify a model which permits the option to relocate but in which governments will not set environmental taxes or standards such that firms will choose this option. In this model location decisions do not only depend on regulatory differences, but also on differences in factor prices, in the quality of the labour force, access to markets, differences in corporate taxes or in the provision of infrastructure. Governments know these factors which can affect business location decisions and they also know that it is rather unlikely that firms will move to another country for the only reason of taking advantage of relatively lax environmental standards.

The purpose of this paper is to introduce international productivity gaps into a model on relocation decisions and to show that there is

plenty of room for strict regulation if countries are not too similar in terms of productivity and factor price differences. With productivity gaps between countries, it is hopeless to lure business into another country by providing low environmental standards. In our special model, governments might exploit the cost advantage of their domestic firms to a certain extent by adding an environmentally motivated regulatory burden, but they will set this burden low enough such that it will not cause firms to relocate existing plants. Therefore this model is in line with a study by Bartik (1988) who found that air and water pollution control expenditures, costs of compliance, and allowed particulate emissions all have an insignificant effect on plant location decisions.

26.2001

PRIV

SOURCES OF PERFORMANCE IMPROVEMENT IN PRIVATISED FIRMS: A CLINICAL STUDY OF THE GLOBAL TELECOMMUNICATIONS INDUSTRY

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It is by now well established that the privatisation of state-owned enterprises (SOEs), especially those privatisations

effected through public share offerings, generally leads to improvements in the financial and operating performance of divested firms in both developed and developing countries. It is far less clear why privatisation improves performance, and academic research has thus far made little progress in disentangling the separate effects of competition, regulation, and ownership structure on the performance of privatised companies. We attempt to provide answers to these questions by examining the most economically significant and politically sensitive industry being privatised in the world today—the national telecommunications monopolies.

While our study follows in the spirit of earlier telecom privatisation studies, we make two important new empirical contributions. First, we present the first multi-national examination of privatisation-related performance changes for telecoms using the Megginson, Nash and van Randenborgh [MNR] (1994) methodology for comparing mean (univariate) performance measures in the pre- versus post-privatisation periods. Since this has emerged as the most commonly employed methodology for examining privatisation's impact on the performance of divested firms, using this technique allows us to directly compare the results of telecom privatisations to those documented for other firms. Second, we perform the first panel data estimation of the effects of telecom privatisation and regulation using firm-level data, rather than just country-level information. Employing observations for individual companies allows us to examine the firm-specific sources of any performance changes documented. In particular, we can study how ownership and regulatory changes impact the output, profitability, efficiency, investment, employment and leverage levels of privatised telecoms.

We examine the financial and operating performance of 31 national telecommunications companies fully or partially divested via public share offering over the period November 1981 to November 1998. The study is restricted to share issue privatisations (SIPs) for reasons of data availability—since only these generate comparable, publicly available pre- and post-privatisation financial information. We first build a dataset using balance sheet data for a seven-year period around the privatisation dates including various measures for profitability, output, efficiency, employment, capital expenditure and leverage. This dataset

also incorporates national measures of telecom service levels, such as number of

lines in service, and controls for making cross-country comparisons possible (GDP per capita). We perform univariate comparisons of the pre- versus post-privatisation performance levels of these firms using the standard MNR univariate testing procedure. We then run panel data estimations to explain performance over time in terms of ownership changes and structural changes due to regulatory reforms occurring during the study period.

Beginning with conventional pre- versus post-privatisation comparisons, we find that profitability, output, operating efficiency and capital investment spending increase significantly after privatisation, while employment and leverage decline significantly. However, these univariate comparisons do not account for separate regulatory and ownership effects (retained government stake), and almost all telecoms are subjected to material new regulatory regimes around the time they are privatised. We examine these separate effects using both random and fixed-effect panel data estimation techniques for a seven-year period around privatisation. We verify that privatisation is significantly related to higher profitability, output and efficiency, and with significant declines in leverage. However, we also find numerous separable effects for regulatory, competition, retained government ownership and foreign listing (on U.S. and U.K. exchanges) variables. Competition significantly reduces profitability, employment and efficiency after privatisation while creation of an independent regulatory agency significantly increases output. Mandating third party access to an incumbent's network is associated with a significant decrease in the incumbent's investment and an increase in employment. Retained government ownership is associated with a significant increase in leverage and a significant decrease in employment, while price regulation significantly increases profitability. Major efficiency gains result from better incentives and productivity, rather than from wholesale firing of employees and profitability increases are caused by significant reductions in costs—rather than price increases. On balance, we conclude that the financial and operating performance of telecommunications companies improves significantly after privatisation, but that a significant fraction of the observed improvement results from regulatory changes—alone or in combination with ownership changes—rather than from privatisation alone.

27.2001

CLIM

CLIMATE CHANGE IMPACTSON THE MEDITERRANEAN COASTAL ZONES

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In this paper climate change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and occurs in addition to the natural climate variability observed over comparable time periods.

Features of the Mediterranean region include a high diversity of environments, strong north-south socio-economic contrasts and rapid demographic, social, economic and ecological changes. In the climate change context the Mediterranean basin is regarded as being highly vulnerable to changes in climate related factors and can be used as a scaled down model to monitor climatic and environmental changes and to assess impacts and vulnerability to such changes. The main objective of this paper is to examine the potential impacts of changes in climatic conditions and in related variables, which could affect Mediterranean coastal areas, as well as to identify potential response measures which could reduce the vulnerability of coastal systems and enhance their adaptability.

The paper is structured as follows. The first section provides an introduction to the climate change issue, past trends and projections of future climate at the global scale. The second section presents the main features of the Mediterranean basin and some relevant regional projections of future climatic variables. An increased temperature is expected globally over the basin on the order of 2-4°C by 2100, with higher increases over land in the summer season. This increase will be accompanied by rising sea levels which depends locally on lands movements and which will directly threaten parts of the Mediterranean coasts. Changes in precipitation, moisture availability and in the frequency of extreme events are also expected, but the reliability of projections are limited by a high uncertainty.

The third section focuses on the key probable impacts on the Mediterranean coasts. Different coastal systems - such as islands, deltas, estuaries, coastal wetlands and coastal cities - are addressed and bio-physical impacts and socio-economic implications are surveyed. Main impacts of concern include increased erosion - in particular currently threatened and unstable coastlines, permanent inundation

of low-lying coastal areas, increased risk of flooding, loss of wetlands and saltwater intrusion into freshwater systems. Most vulnerable systems include wetland areas such as the Camargue or the lagoon of Venice, large deltas (Nile, Po, Ebro, Rhone), small islands (Rhodes and Malta), sandy coasts and arid or semi-arid lands. In addition socio-economic implications will be more severe in North Africa and the Eastern Mediterranean countries where demographic pressure, desertification and poverty are major problems. Further to this point, the paper highlights that climate change will affect the Mediterranean through the exacerbation of current non-climatic issues – population growth, coastal urbanisation, overexploitation of resources - and will increase the Mediterranean vulnerability. Finally the most likely impacted sectors will be the agriculture and water resource management.

The final section provides some conclusions and identifies some strategies of adaptations and directions for future research aimed at improving our ability to predict and assess the local impacts of climate change in the region. Facing the challenge of coping and adapting with climatic changes, the paper underlines the requirement of integrating mitigation programmes and adaptation strategies in a broad scheme of Integrated Coastal Zone Management (ICZM).

28.2001

ETA

COMMENTS ON THE INVESTMENT-UNCERTAINTY RELATIONSHIP IN A REAL OPTION MODEL

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***Department of Economics, University of Padova and Fondazione Eni Enrico Mattei*

The real option model to investment decision proposed by McDonald and Siegel in their seminal paper published in the Quarterly Journal of Economics n.101 of 1986, considers an expenditure on a capital-investment project that shares two important characteristics: (1) the expenditure is irreversible (at least partially), and (2) the investment decision can be delayed, i.e. the investor has the opportunity of waiting for better information concerning the profitability of the project. Under these assumptions, the investment opportunity is seen as a contingent claim, in the specific a perpetual call option, on the value of the project which, providing that the project does not enlarge the opportunity set

available to investors in the capital markets, can be priced using a replication argument. McDonald and Siegel show that the investment option will be exercised when the value of the project exceeds a critical threshold which is determined endogenously in the model and that this trigger value is greater than the direct cost of the project. Furthermore, they show that this trigger depends, among other things, on the uncertainty of the project and satisfies the condition that it is higher the higher is the variance of the project. This has led to the conclusion that an increased uncertainty has a negative effect on the investment (see for example the Dixit and Pindyck's book, Investment under Uncertainty, Princeton University Press, 1994).

However, since a higher volatility not only increases the trigger value but always results in wider variations of the project value, we propose computing the "probability that investment will take place", i.e. the probability that the trigger value will be reached in a specified time, as a measure of the overall effect of uncertainty on the investment decision. Varying the instantaneous variance of the project, an increase (decrease) in this probability has a positive (negative) effect on investment.

The investment decision is modelled as an American call option and the equilibrium condition is simply based on the equality between the risk adjusted expected rate of return and the cost of carry of the investment. We also assume that for a non-traded asset, such as a capital-investment project, there is a constant rate of return shortfall (like a dividend yield) between the equilibrium return on a similar traded financial asset and the project's actual growth rate.

The analysis shows that the shape of the probability of investing in response to changes in the project uncertainty crucially depends on which market parameters are called to restore the asset price equilibrium condition. In particular, if we assume the dividend yield as the exogenously fundamental market parameter, than the effect of an increase in uncertainty on the probability of investing relies on the sign of the cost of carry, and in particular it is positive for moderate values of uncertainty only when the cost of carry is positive. On the contrary, if we rely on the capital asset pricing model to evaluate the project price of risk, we get a moderate increase in the probability of investing only when the project price of risk is considered the fundamental market constant. In all the other cases the relationship is always negative.

29.2001

KNOW

ABSOLUTE RISK AVERSION AND THE RETURNS TO EDUCATION

*Giorgio Brunello**

**Department of Economics, University of Padova, Feem Milan, IZABonn and CESifo Munich*

It is well known that the estimation of the returns to education is difficult both because of measurement error and because unobserved ability can affect both educational choice and the returns to education. One of the strategies used to deal with this problem consists of selecting instrumental variables, that are correlated with schooling but not with earnings (conditional on schooling). The typical instruments used in the literature are school reforms, family background variables and smoking. An alternative is to use data on twins. In this note I add to the current list an additional candidate, the absolute degree of risk aversion. I start by showing in a simple static model that risk aversion affects in a natural way educational choice by influencing the marginal utility of schooling. Perhaps one reason why this variable has not been used so far is that it is difficult to measure risk aversion in survey data. I use the 1995 wave of the Survey on the Income and Wealth of Italian households and previous work on these data by Guiso and Paiella (2000) to measure individual absolute risk aversion in a sample of 1373 married Italian male household heads. This variable is then used as an instrument for education in a standard Mincerian earnings function. In line with most of the current literature, I find that the gap between IV and OLS estimates is substantial.

30.2001

CLIM

MEETING THE KYOTO TARGETS: THE IMPORTANCE OF DEVELOPING COUNTRY PARTICIPATION

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The Kyoto Protocol incorporates emissions trading, joint implementation and the clean development mechanism (CDM) to help Annex I countries to meet their Kyoto emissions targets at a lower overall cost. However, to what extent their compliance costs can be lowered depends on the scope of the market of tradable permits. This paper aims to investigate the implications of progressively broadening the scope of the

market from no emissions trading to full global trading. We start with the no emissions trading case where each Annex I country must individually meet its Kyoto target without any trading of permits across countries. Next, we consider a case where trading of emissions permits is limited to Annex I countries only. We then expand the scope of the market to include all the non-Annex I countries but China. To investigate the role China plays in bringing down Annex I countries' compliance costs, we further broaden the market to include China into full global trading. Finally, we undertake a sensitivity analysis to examine the implications of alternative EU baseline emissions for both Annex I countries and non-Annex I countries as well as for the market price of permits.

Our results show that if each Annex I country were required to individually meet its Kyoto target without any trading of permits across countries, Japan and the US would face much higher compliance costs than the EU. For this reason, trading would lower their costs substantially. Moreover, the gains of these two countries increase by very big margins as the market expands from Annex I trading only to full global trading. In the mean time, the EU benefits greatly in the Annex I trading case from taking otherwise very little domestic actions in the no trading case and generating more permits for sale. But, as the market expands to include China and other non-Annex I countries, the gain of the EU reduces because the international price of permits becomes closer to its autarkic marginal abatement cost. However, because the US and Japan have much more influence on the overall gain of the OECD than the EU does, the gain of the OECD as a whole increases as the market expands.

While the OECD countries enjoy the gains from the inclusion of developing countries, the expansion of the market is beneficial to developing countries too. If trading of emissions permits were broadened to include China, the OECD would gain 10% more than without the inclusion of China. Such a gain would become even larger if there were a sharp discrepancy between the Kyoto target and the EU baseline projection as our sensitivity analysis suggests. In the mean time, such an expansion would not only provide China for additional financial resources, but also help to bring down its baseline CO₂ emissions by a big margin.

By contrast, the gain of the former Soviet Union tends to decrease as the market expands. This is mainly because the inclusion of low-cost carbon abatement options from China and other non-Annex

I countries on the supply side depresses the market price received for its sold permits. The potential conflict of interest between the former Soviet Union and non-Annex I countries may have influence on future expanding trading to non-Annex I countries, thus underlining the importance of establishing clear rules of procedure about admitting new entrants before emissions trading begins.

Finally, our sensitivity analysis shows that the low EU baseline projection restricts the total Annex I countries' demand for permits and thus depresses the market price of permits. Consequently, in percentage terms, the gains of Japan and the US as importers of permits on the basis of the low official EU baseline projection would be overestimated in comparison with the case of the high EU emissions baseline, whereas the gains of the Former Soviet Union as exporters of permits and of developing countries as suppliers of the CDM credits would be underestimated. Instead of being an exporter of permits in the case of the low official EU baseline projection, the EU becomes an importer of permits in the case of the high EU baseline. Thus, in the latter case its gain increases as the market expands in contrast with the exactly reverse trend in the former case.

31.2001

ETA

AN INFORMATION-THEORETICAL ANALYSIS OF BUDGET-CONSTRAINED NONPOINT SOURCE POLLUTION CONTROL

*Jonathan D. Kaplan**, *Richard E. Howitt***
and

*Y. Hossein Farzin***

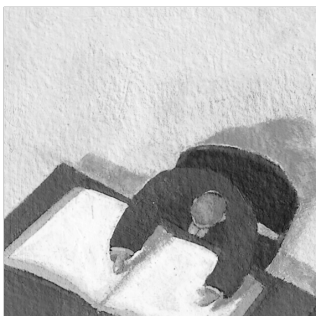
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***Department of Agricultural and Resource Economics, University of California, U.S.A.*

Nonpoint source (NPS) pollution control is primarily an information problem, and as such, modelling NPS pollution control requires that the role of information and learning be explicitly specified and addressed in the model. Another complication to NPS control is the budgetary restrictions that often limit the extent of NPS pollution control. These financial limitations have implications for pollution control in general and in the United States particularly, where the federal government spends \$3 billion annually to control NPS water pollution, yet reports that the public control of NPS pollution was limited by a lack of financial resources. The analysis of NPS pollution control is further complicated by

the statistical nature of NPS pollution data. In any given period, there are more polluting sources than observations (i.e., an undersized sample). This statistical problem of estimating with an undersized sample, sometimes referred to as an ill-posed data problem, makes traditional statistical approaches inappropriate and requires that a new approach be employed.

This paper analyses budget-constrained, nonpoint source (NPS) pollution control with costly information acquisition and learning. To overcome the inherent ill-posed statistical problem in NPS pollution data the sequential entropy filter is applied to the sediment load management program for Redwood Creek, which flows through Redwood National Park in northwestern California. We simulate the dynamic budget-constrained management model with information acquisition and learning, and compare the results with those from the current policy. The analysis shows that the manager can reallocate resources from treatment effort to information acquisition, which in turn increases overall treatment effectiveness, and reduces sediment-related damage.



Rapporti sullo sviluppo sostenibile

Rapporti sullo sviluppo sostenibile

FEEM now circulates a new Series of working papers in Italian (*Rapporti sullo sviluppo sostenibile*) focused on the issue of sustainable development. The target leadership of the Series is the general public and the papers are therefore non technical.

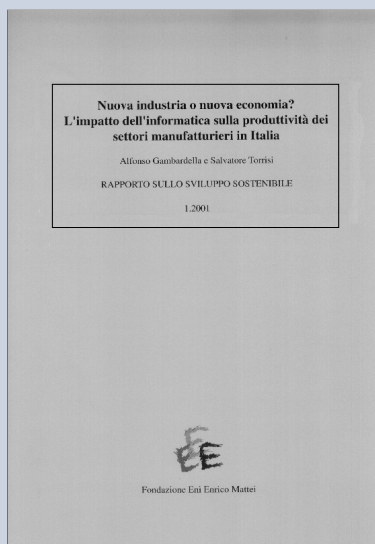
1.2001

NUOVA INDUSTRIA O NUOVA ECONOMIA? L'IMPATTO DELL'INFORMATICA SULLA PRODUTTIVITÀ DEI SETTORI MANIFATTURIERI IN ITALIA

Alfonso Gambardella* e Salvatore Torrisi **

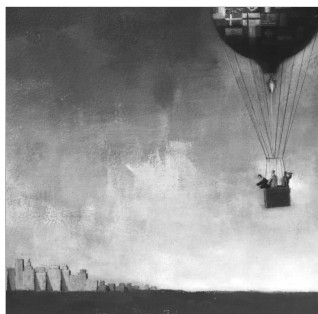
*Scuola Superiore Sant'Anna, Pisa

**Università di Camerino, Camerino



This paper analyses a sample of 3,525 Italian manufacturing firms with the aim of estimating the

impact of Information & Communication Technology (ICT) and skills on total factor productivity and employment. The paper compares the effects of ICT in different industries and macro-sectors (i.e., science-based, supplier dominated, specialised suppliers and scale intensive sectors). The results confirm that ICT are a general-purpose technology in that its productivity gains tend to be diffused across different using sectors, including traditional ones. However, there are significant intra-industry differences among firms in the use of ICT. Moreover, ICT-intensive firms show higher employment growth rates compared with less ICT-intensive firms. In general, our results show that the differences across firms in the propensity to invest in ICT are more important than differences between sectors. This suggests that the traditional distinction between high tech and low tech sectors becomes blurred in the 'new economy'. This also points out the importance of growth and competitiveness policies centred on enterprises rather than industries or 'technological filière'.



EAERE-FEEM-VIU SUMMER SCHOOL IN RESOURCE AND ENVIRONMENTAL ECONOMICS

ECONOMIC VALUATION METHODS

Venice, 2nd-7th July 2001

The European Association of Environmental and Resource Economists (EAERE), the Fondazione Eni Enrico Mattei (FEEM) and the Venice International University are pleased to announce their 2001 European Summer School in Resource and Environmental Economics for postgraduated students. *Economic Valuation Methods* will be the theme of this year. The School will be held from 2nd to 7th July at the VIU Campus in Venice.

PROGRAMME

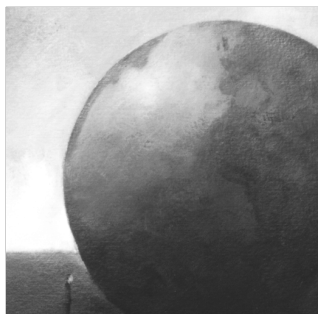
In the six days of intensive lectures and seminars, experienced researchers will give survey lectures focused on topics such as non-market valuation; contingent valuation; choice experiments; travel cost and other indirect methods; valuation and the policy process. Students will give talks on their dissertation. They can present dissertation projects, first draft of dissertation chapters on newly completed papers. Private consultations with lecturers are also scheduled.

LECTURERS

- PROF. BENGT KRISTROM - *School Coordinator*
Swedish University of Agricultural Sciences, Department of Economics - Sweden
- PROF. OLVAR BERGLAND
Agricultural University of Norway, Department of Economics & Social Sciences - Norway
- PROF. MICHAEL HANEMANN
University of California, Department of Agricultural & Resource Economics and Goldman School of Public Policy - UK
- PROF. NICK HANLEY
University of Glasgow, Department of Economics - UK
- PROF. ALAN RANDALL
The Ohio State University - Department of Agricultural, Environmental and Development Economics, USA

The deadline for applications is **March 30th**. Please visit our web-site (<http://www.feem.it/ess/>) to have further detailed information on the School.

The Summer School Secretariat
Monica Eberle



The @feem.it project

Eva Sportoletti Baduel

Fondazione Eni Enrico Mattei, Multimedia Libraries

Three years ago Feem inaugurated its first multimedia library in Turin. New multimedia libraries have since been opened in Genoa, Novi Urengo (Siberia), Milan, Venice and Rome. Multimedia libraries are addressed to university students in particular, and are part of the @feem.it project, which is aimed at providing young people with free-of-charge technological support. Multimedia libraries offer students the possibility to use personal computers, shared printers, CD-ROMs, video cameras and to receive the assistance of tutors. The single libraries are independent, but a homogenous network is guaranteed by continuous contacts among local library managers.

Multimedia libraries have study rooms and organise courses on the main application systems, seminars and films in English. Evening opening hours in most of the libraries have extended the access to many students and some data can further clarify the present situation: overall 23,074 subscribers; in March students have been offered 13,799 pc hours, 33 courses and 8 films in English with DVD technology.

As previously mentioned, multimedia libraries periodically organise seminars in the different locations. Different topics are discussed, but the subjects chosen are always concerned with the future of young people. An example is the seminar on the Internet that will be held at Milan's multimedia library on May 30th. The seminar will be held by a communications expert and it will deal with planning and organising a web site, its contents and style, providing useful hints on optimal graphic and information presentation.

The multimedia library in Genoa focused on young people by organising a seminar on new job opportunities last April. Venice has favoured young people by extending its library opening hours to Sunday afternoons from 3-7 p.m.

Multimedia libraries are generally located in central or easily accessible areas. An online pc booking system has been established to avoid long waits.

These results show that our aim at disseminating knowledge on information technology and progress has been achieved and we hope that the success of our multimedia project will continue in future years.

FEEM announcements



FEEM JOINS SSRN

We take pleasure in announcing that Fondazione Eni Enrico Mattei has recently joined CEPR, CESifo, the Center for Economic Studies of the University of Munich and the Ifo Institute for Economic Research and the NBER in making full text copies of their papers available through the Economics Research Institutes Paper Series on ERN.

Feem friends and the institutions that are already included in the mailing list of our "Note di Lavoro Bulletin" will soon be receiving news on Feem's latest papers also through ERN's electronic journal.

FEEM announcements



CONFERENCE ANNOUNCEMENT AND CALL FOR PAPERS

ENVIRONMENTAL MANAGEMENT ACCOUNTING NETWORK – EUROPE EMAN – EU

FEEM, as part of the EMAN Steering Committee, announces that the Environmental Management Accounting Network (EMAN) will hold its fifth annual conference on Monday 11 and Tuesday 12 February 2002 at Gloucestershire Business School, Cheltenham, UK.

The main theme of the conference will be *environmental management accounting and government policy*. This theme will include topics such as the scope for governments to implement environmental policy through economic instruments, the implications for public policy setting at local, national and international levels, and the appropriate degree of intervention by government in order to influence the internal management of companies.

The conference will have a special focus on the environmental accounting at company level.

For details or information:

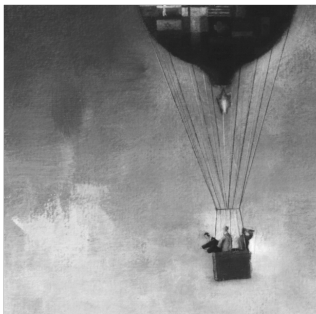
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CALL FOR PAPERS FIRST ANNOUNCEMENT

CATEP (CONCERTED ACTION ON EMISSION TRADING) WORKSHOP ON

TRADING SCALES: LINKING INDUSTRY, LOCAL/REGIONAL, NATIONAL AND INTERNATIONAL EMISSIONS TRADING SCHEMES

Fondazione Eni Enrico Mattei, Venice, Italy
December 3-4, 2001

BACKGROUND OF THE WORKSHOP

The Kyoto Protocol to the Framework Convention on Climate Change was agreed upon in Kyoto, Japan, in December, 1997, and established binding emissions reduction targets for industrialised countries. As one means of complying with these limits the Kyoto Protocol allows the trading of greenhouse gas emissions across national borders. This development gave rise both to a lot of research regarding emissions trading and its effects as well as to the emergence of various emission trading schemes implemented at different economic and geographic levels. As a consequence, the question whether and under which conditions differing trading systems harmonise and could be linked arises. This question holds even independently of the ratification prospects of the Kyoto protocol because trading schemes have already been implemented at the company, industry and domestic level in different regions of the world in order to achieve cost-effective emission abatements.

In addition to its use as a potential economic instrument addressed to global warming, emissions trading has a variety of other existing and potential uses, including abatement of SO₂ NO_x

and particulates, allocation of water, and the management of fisheries. In all such cases, the challenge of widening (or narrowing) both the geographic scope and the activities to which the ET scheme applies must be addressed. The fundamental objective of the EC funded Concerted Action on Emissions Trading (CATEP) is to provide a link between the work of the research community on the one hand, and the needs of the practitioners on the other. In particular, CATEP aims at mobilising existing and on-going research on tradable emission permits and other related flexible mechanisms in order to provide the policy process at European level with the latest insights and findings. Furthermore, it should help animate relevant new research by keeping researchers informed through the policy process on emerging needs and issues. The aim is to deepen the dialogue between researchers, key sectoral interest groups and the social partners.

The CATEP workshops are designed to encourage and facilitate shared learning. The specific objectives are to provide a forum for: state of the art research; linkage of research to the policy process, including presentation of emerging practise; networking of researchers and the development of

new research ideas in the field of emissions trading.

OBJECTIVES OF THE WORKSHOP

The overall aim of this inaugural workshop is to provide an overview of the key issues in theory and practise pertaining to emissions trading. The core objective regards the question whether differing trading schemes could be linked and possibly harmonised. Therefore, different trading schemes at national, regional, international as well as industry level are going to be presented with an emphasis on how these programs could be harmonised or linked. Issues arising from the linking of these schemes are going to be discussed, whereby we aim at determining the difficulties that have to be overcome when systems are linked. We want to highlight the elements that have to be made compatible in order to enable the linking of national schemes and of national schemes with regional schemes.

Since an important aim is to enhance the dialogue between research and policy in order to clarify on what issues and themes research should concentrate, the workshop is intended to gather together academics, researchers, practitioners and policy makers. Insights should be provided as to the likely economic and environmental effectiveness of various emission trading schemes.

THEMES OF THE WORKSHOP

The workshop is aimed at stimulating the debate on issues connected to different emissions trading systems and questions arising from their possible linkage, with a particular focus on the elements that have to be made compatible in order to enable a linking. Within this context, special attention will be given to the following themes:

- a An overview on emissions trading, analysing theoretical issues relating to static and dynamic efficiency, equity, uncertainty while referring also to empirical findings;

- b Issues related to domestic and regional trading, including emission trading at national and at regional level, discussing how the national programs could be harmonised or linked, particularly within the EU;

- c Issues related to international trading, emphasising empirical validation or otherwise the issues arising from the theoretical framework, with a particular focus on differential marginal costs between the various countries and the consequent potential for trade and transfers;

- d Issues related to company trading, focussing on corporate initiatives, and examining the corporate view as regards competitiveness effects of differing systems.

STRUCTURE OF THE WORKSHOP

The structure of the workshop is as follows: four sessions are allocated to two days, two sessions a day, whereby each session lasts 3.5 hours. Each session starts with the presentation and discussion of two invited lectures, each lasting one hour. Following the outcome of this call for papers and based on a peer review, a number of papers will be selected for the second part of each session. A synthesis of the most interesting and innovative short papers will also be presented and discussed in the last hour of each session.

HOW TO APPLY

Those who wish to contribute on the topics related to the themes identified as themes of the workshop should send their paper or note to the address below. Participation of researchers from New Accession Countries to the EU is strongly encouraged.

DEADLINES:

- **All papers must be received by September 1st, 2001.** The Organising Committee will review all applications.
- Notification of acceptance and second announcement will be sent

by E-mail to the presenter by October 1st, 2001.

- The final version of the paper to be circulated at the workshop should be submitted by November 10th, 2001.
- All papers must be accompanied by an abstract written according to the following rules:
 1. One-page, single-spaced abstract (in English);
 2. Name(s) of author(s), with the surname of the paper presenter in CAPITALS;
 3. Institution affiliation, e-mail and address of authors;

Send paper and abstract either by e-mail (pdf or word file) or by post to:
Barbara Buchner
Fondazione Eni Enrico Mattei
Campo S.M. Formosa, Castello 5252
30122 Venezia (Italy)
Tel. +39-041-2711 458
Fax +39-041-2711 461
E-mail: eberle@feem.it

LANGUAGE

The working language of the workshop will be English.

ACCOMMODATION AND TRAVEL EXPENSES

Accommodation will be organised by Fondazione Eni Enrico Mattei. Accommodation and travel expenses (train tickets, APEX flight tickets) of speakers will be reimbursed.

ORGANISING COMMITTEE

Barbara Buchner, *Fondazione Eni Enrico Mattei*
Carlo Carraro, *Fondazione Eni Enrico Mattei and University of Venice*
Monica Eberle, *Fondazione Eni Enrico Mattei*
Marzio Galeotti, *Fondazione Eni Enrico Mattei and University of Bergamo*
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