



Bent Thage, Klaus Hubacek, Thijs ten Raai, Jan Oosterhaven, José M. Rueda-Cantucho

Dear IIOA member,

So, what did we learn from our recent International Input-Output Conference on Managing the Environment? Well, one could say that presently the I-O community is:

(a) healthy and active with more than two hundred participants at this "modest" intermediate conference, making a strong argument for regular annual meetings; (b) very much concerned about the global environment; and (c) increasingly dealing with issues at the forefront of worldwide policy concern.

Particularly, presented at the conference were the results (some preliminary) of several international projects (and methods related to them) financed by public national and international institutions.. For instance, two full sessions (1e & 2e) were devoted to the presentation of material about the EU FP6-funded integrated project EXIOPOL. This project envisages setting up a worldwide environmentally extended supply-use and input-output framework with environmental extensions that enable the estimation of environmental impacts and external costs of more than a hundred different economic activities, several final consumption categories and a large variety of different types of resources consumed. Also the GINFORS model was introduced in session 2d. It is designed to evaluate the effects of various post-Kyoto regimes for several major economies through 2020. The THERESIA model (session 3d) is a multi-region, multi-sectors dynamic optimization model used to study global-warming mitigation measures. The GRAM model

Editorial Learnings from the last IIOMME Conference

(session 5d) is being designed to examine Europe's international economic interrelations especially with regard to natural resources consumption and trade. And the ENVIMAT model (session 6c) evaluates the environmental impacts of material flows caused by the Finnish economy. Many of Seville's sessions offered similar content.

The key theme of the conference was Environmentally Extended Input-output Tables (EEIOT). Thus most of the empirical work reasonably fell under the rubric of environmental accounting using either environmental satellite accounts or full material flow tables. These accounts can be relevant for nations, regions, and even to levels as small as villages. In another dimension these accounts can be expressed in either monetary or physical terms, or some mixture of these (hybrid tables). Of course, in some cases they are made compatible for use with official I-O tables.

Many of the presentations, however, highlighted an increasing need to have the largely un-coordinated data compilation process firmly integrated into the work programmes of national statistical offices or other official data producers (to the extent that it is not yet the case) since individual research projects typically have a limited life-time, and, hence, typically lack the resources needed to achieve ultimate global needs. Instead many of us find we must resign ourselves to using environmental data that result from these short-term projects, some of which are undoubtedly compiled in what might be called a quick and dirty way.

Seville presentations clearly demonstrated that I-O has a very strong standing in the development of environmental-economic accounting. This is consistent with the efforts (by the UNSD and the Expert Committee on Environmental-Economic Accounting) now being undertaken to transform the existing 2003 SEEA as a world-wide standard for environmental accounting (same status as the SNA). The SEEA is pending approval by the Statistical Commission in 2011. For the purpose of soliciting comments, the UNSD has promised to post draft chapters of the SEEA manual and some supplements (such as one on energy) on its web site sometime in the near future. Only national statistical offices will officially be consulted. So that other interested parties are able to participate in the process, albeit indirectly, we will make a section of the IIOA Message Board available as an SEEA forum as the UNSD posts the chapters. Therefore if you are interested, it is important that you register for the management board so that you will be automatically alerted by e-mail.

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There was a large variety of paper topics in Seville. In addition to large-scale environmental models, some sessions focused on sustainable consumption and production, air emissions, energy use, water use, and so on. Some special sessions had a geographical focus (China, Brazil and Spanish regions). Others presented challenging methodological content on network theory, multiplier analysis, econometric I-O modelling, issues with the supply-use framework, and spatial I-O modelling. Completing the programme, some sessions focused on hybrid models built with both monetary and physical flows; I-O analyses of disasters; international trade; and productivity and efficiency studies.

We thank all participants for their contributions and attendance at the Seville's I-O conference and encourage them to join us in São Paolo next year. And last but not least, we acknowledge the magnificent works of both Chris DeBresson and Emilio Fontela (initially chairman of the Scientific Committee) and especially their contributions to I-O economics.



The Nature's Economic and Financial System

This text is extracted from the book: Maier, H. (2007) *Introduction to Nature's Economic and Financial System Features, Impact on Human Society and Politics*, 2nd edition, Berlin. ISSN: 1439-3956. The Berlin School of Economics offers a teaching module on the subject beginning October, 10 2008. Further information: oeconom@fhw-berlin.de

After explaining subject, aims, and approach, this introduction to nature's economic and financial system substantiates in a first part, *Features of nature's economic and financial system*, the hypothesis of a well functioning economic and financial system within the nature which is not only based on a mere exchange of goods and services but also on a non-visible but measurable equivalent of money which is energy. This natural system works with uncompleted information of participants, and any good and service has its price. Using observations, neoclassical theory, and an extension of hedonic methods, the analysis identifies certain natural phenomena as economic markets with supply and demand for goods and services, and the price specification energy. It explains characteristics of this system: the dual structure of its markets, the transfer of payments, banks and the central bank, state, laws, taxes, subsidies. According to Leontief's theory, it creates and explains an input-output table of nature's economic system, it substantiates why and how a creature can finance its life and hence can exist at all, and it describes the driving forces of this system. Conclusion: Human populations are subject to nature's economic and financial system as well as to the economic and financial system of the state in which they live, both systems interact.

A second part, *Disparities and interactions between nature's and human systems*, refers to the leading aims and indicators of the System of National Account (SNA) of the United Nations and of



Vision of a bridge to the economic system of the nature. Is this a market?

an equivalent System of Population's Account (not to confuse with the so-called Green Gross Domestic Product) for nature, this introduction explains some disparities between nature and human economic and financial systems.

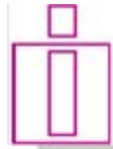
It substantiates the predominance of the natural system: its top aim (conservation of life) is superior, its equivalent of money (energy) is universally usable, its leading indicators (socio-biometric indicators) are more appropriate to measure societal and individual features than pecuniary figures, and it does not acknowledge waste. Because of the unsolvable linkage between nature's and human systems both systems act and react, respectively, on actions and reactions in the different system, and hence leave tracks that can be identified as until now unknown (and unintended) social and natural phenomena. It is substantiated that and why the social and natural phenomena: crowding of world population, demographic ageing, migrations, poverty, unemployment, and distinction of species, devastation of regions, change of climate (mainly) are reactions of the superior natural system on economic actions of the predominant man's species. The result is a different understanding of present social and environmental problems as well as the conclusion and hypothesis, respectively, that the social constitutional state - erroneously

claiming freedoms - unilaterally defined and implemented human rights and laws which challenge sustainable reactions of the superior natural system in the long run on all populations and species, respectively.

These sustainable reactions of the natural system include big challenges to human society to be answered by politics in present and future, and the positive insight that in present human species' flexibility is superior to the flexibility of different species; hence these challenges don't look inescapable for human society.

The third part, *Political approaches to meet disparities and social challenges*, starts by discussing political and constitutional reasons for the disclosed disparities between nature's and human economic and financial systems. Referring to the Convention of Human Rights of the United Nations and the Constitutional Law of the Federal Republic of Germany, it identifies exemplarily conflicting points caused by leading aims, social transfers, and the value of money. As for the future behaviour of human society how to answer to these disparities and challenges, too; this part presents two scenarios: *Adapting to superior natural system*, and *Trusting on superior human flexibility*, for reflection and discussion. Both scenarios refer to Stackelberg's duopoly theory, and they exclude juristic aspects as well as questions of political feasibility. The first scenario includes considerable incisions into basic laws and freedoms in order to reduce obvious disparities between nature's and human systems. In the second scenario human species uses its superior flexibility to balance reactions of the natural system on its economic activities, as long as possible. Present efforts of governments and states to meet environmental and social problems can be identified as actions within this second scenario.

The final part, Closing remarks, summarizes and evaluates the findings. It also considers interfaces to and



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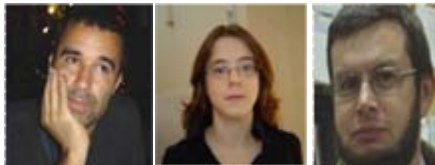
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impact on various disciplines: economic theory, political science, and the natural sciences, especially biology, physics, and chemistry.

A clear formulation of these interfaces is made to encourage scientists of related disciplines, especially young scientists, to control those results and hypotheses of this investigation which are (by translation from economics) part of their own discipline. This control is necessary, and it can't be done by the economist himself. In case of verification there is a wide field for further research, and there are a lot of impulses, too. In case of falsification there is a need for revision, any substantial hint is useful. This part ends with answers to questions and comments up to now.

Helmut Maier
Professor of Economics
Berlin School of Economics
Berlin, Germany

Best Poster Awards



Socio-economic impact assessment of CO2 emissions reduction policies applying a rectangular input-output model of the portuguese economy.- J. MARQUES, M. MARQUES AND J.M. MARTINS

During the nineties, Portugal has recorded remarkable growth of economic activity reflected in an increasing use of resources, namely fossil fuels, with direct consequences on greenhouse gases emissions. The trend slowed down but continued during this decade. Under the Kyoto Protocol, Portugal could rise up to 27% and till 2010 its 1990 baseline CO₂ greenhouse gases equivalent emissions (GHG). This target was reached by the year 2000 and surpassed. In an emission trade system, Portugal should acquire emission rights with estimated costs over 1 GEuro per year.

The control of the generation of carbon dioxide from non-renewable sources, through legal measures, imply socio-economic consequences to be minimised, based on the estimation of impacts and the regular monitoring of emissions trends.

This study performs an evaluation of the economic impacts of policies to reduce CO₂ emissions from non-renewable energy sources, based on Rectangular Input-Output analysis applied to the national accounting matrices. One of the fundamental bases to build the model is a correct estimate of CO₂ generation by each sector of activity. A new emission inventory was developed considering the fuels transactions included in I-O tables and covering 59 activities.

The impact of different scenarios of GHG emissions and mitigation measures has been assessed at national level and by economic activities, applying the I-O model. The scenarios were built from the Portuguese National Plan for Climate Change, which considers measures such as fuel taxation, changes on production/consumption patterns or changes on fuel consumption patterns.

The results reinforce the potential of Portugal to reduce GHG emissions through the implementation of economic instruments, particularly green taxes and fuel switch. Nevertheless, even considering this potential, the results point to the non-accomplishment of Kyoto targets. News policies and commitments may be considered in further developments of this model.



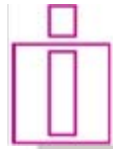
A Framework for Assessing the Biocomplexity of Material Use.- J. K. CHOI, B. R. BAKSHI AND T. HAAB

With the rapidly growing level of the degradation of our natural capitals, there are strong needs for analyzing the bio-complexity of our current systems in economic, social, and environmental aspects.

Bio-complexity is the dynamic web of often surprising interrelationship that arises when components of various disciplines interact in multiple temporal and spatial scales. There are various modelling techniques available for the analysis of engineering, environmental, and economic systems respectively. However most of the methodologies usually ignore the multi-scale aspect of different disciplines and the importance of the synthesis of each methodology.

The ultimate goal of this research is to develop a systematic framework for assessing the bio-complexity of material use and modelling the lifecycle of industrial material in multiple aspects in order to utilize the framework for improving decision making in various disciplines. Special emphasis will be placed on the importance of the multi-scale modelling of the complex systems by comparing the result of single scale modelling. And the broader implication of the expanding the system boundary of the study to the ecosystem goods and services will be discussed.

A framework is developed for the integration of the different scales of modelling scheme in the context of economic input-output (I-O) modelling and engineering optimization problem in order to provide a broader implication of the life cycle aspect of our current industrial system. The major benefit of input-output analysis is that it provides a snap-shot of an economy at specific period with readily available empirical data and many researchers still rely on the monetary transaction. However, such a procedure may introduce inconsistencies in the resultant accounting of physical consumption of commodities, necessitating adjustments in the procedure to insure reasonable results. Physical accounts become more important in the study of the bio-complexity of material use and there are strong needs for enhancing the current states of the physical accounting in the IO context.



In addition, fuller incorporation of the demand side is vital for analyzing alternative scenarios such as the interaction of consumer behaviour, commodity price, and technology alternatives.

The proposed framework use both physical and monetary input output tables in every step of modelling process to provide the insight of the significant difference of using both accountings. Leontief price model and cost-push system are used to capture the change of the price caused by the certain shock (such as carbon tax) in the economy (coarser scale). Ghosh model has been used to balance out the monetary and physical change at the short period time after the disturbance to the system. And then engineering (finer scale) optimization problem should be solved to cope with the price change of resource inputs to the industry production process. In the little longer period time, change of price of industry production (outputs) will affect the consumer behaviour in purchasing the necessary goods and services. Therefore, the concept of the price elasticity of demand is integrated in the input-output framework to capture the amount of the physical demand change accrued by the commodity price change.

Finally, Leontief physical model and demand-pull system is used to capture the total amount of change in production (outputs) of each sector after consumer demand change. For example, when certain amount of carbon tax is levied through whole economy level, it increases the price of commodities in short-run, then industries should adjust the production level and the increase of price may shifts the demand of consumer for certain commodities which decrease the price of the commodity back to certain degree. Therefore, there is a complex feedback loop between economy and the industrial process. As a case study, the effect of carbon tax will be illustrated in the economic, environmental, and social aspect of the use of material in the electricity generation process. Different level of disaggregated level electricity generation sectors are embedded to the readily available detailed level of economic transaction data from the U.S. Bureau of Economic Analysis.

University Of Pune



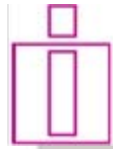
All India Input-Output Research Association (IORA)

The All India Input-Output Research Association (IORA) was registered at Pune in 1965. The IORA has been well recognized since 1965 by international and national academic/professional institutions and sponsoring organizations like the Planning Commission (PC), the Indian Council of Social Science Research (ICSSR), the University Grants Commission (UGC), the Reserve Bank of India (RBI), the National Bank for Agriculture and Rural Development (NABARD), the Industrial Development Bank of India (IDBI), the Industrial Credit and Investment Corporation of India (ICICI), the Unit Trust of India (UTI), the Industrial Finance Corporation of Indian (IFCI) and all national and private banks and corporations.

The First IORA Conference was conducted at the Gokhale Institute of Politics and Economics in Pune (1965) with the leadership of Professor W.W. Leontief, Nobel Laureate in Economics and pioneer of Input-Output (I-O) analysis and I-O developments in dynamic and interregional models. The conference thus encompassed economic theory, tools and techniques and applied economics. The second IORA Conference was led by Professor Walter Isard (University of Pennsylvania) in 1967. Many foreign and Indian economists contributed to the proceedings. More recently, the 1995 IORA Conference was organized in collaboration with several foreign delegates in New Delhi. So far, there have been 14 different IORA Conferences (one every two to three years) in Pune, Bombay, Ahmedabad, Shillong, Delhi, Hyderabad and at BITS Pilani. Edited volumes of all 14 conferences proceedings have been published by reputable publishing companies like Allied Publishers (Academic Foundation, New Delhi).

These publications have been cited in the Planning Commission Technical Notes and Detailed reports of Five Year Plans; The Central Statistical Organization (CSO), on a continuing basis, in preparation and revision of updated I-O tables, in State Plans and implementing I-O and programming-related techniques and in the advancement of economic theories, techniques and applications of such techniques in interindustry and interregional frameworks. Typically such work is carried out in economic departments in universities and research institutions. A prime example of the latter is the Indian Statistical Institute (ISI) in Delhi, which has performed such work on a continuing basis since 1950 under the leadership of P.C. Mahalanobis, D.R. Gadgil, P.N. Mathur, R. Bhargadwaj, P. Venkataramaya, Y.K. Alagh, Ambika Bhosh, Pitamber Pant, many of their students, as well as other followers and contributors to I-O economics.

I-O models are unique analytical tools that force one to think about the direct and indirect effects of policy changes resulting various types of economic activities. They assure inter-sectoral and inter-regional consistency and/or optimal decision making in the dynamic developed and developing economics at national, regional and gross-root level in the villages and in backward regions of developing economies (India) and in developed economics particularly in the context of current two decades of globalization, privatization and liberalization. I-O models have been indispensable tools for preparing India's Five Year Plans from the Third through to the latest Tenth and Eleventh Plan Models developed by top economists from abroad an India (Prof. Ranger Frisch, J. Sandee, Bethlehem, Oscar Lange, W.W. Leontief, A. Carter, J. Tinbergen, H.B. Chemery, Manne and Markowitz, Richard Stone, S. Charaborty, M.S. Ahulwalia, Reddaway, P.N. Mathur, R. Baradwaj, P. Venkataramaya, R.K. Koti, Y.K. Alagh, A. Rudra, Ambika Ghosh, Eckaus, Lefebber, K. Perikh, S.P. Gupta, S.R. Hashim, M.A. Delvi, R. Radhakrishna, N.S. Iyenger, Raj Krishna, Timbergin, Pitambar Pant, V.R. Panchamukhi, C. Rangarajan,



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K.N.Prasad, K.K.Sexena, D.Chakroborty, A.Kundu, P.Basu, R.K.Parachura, Pranab Sen, S. Tendulkar, L.Argade, H.Sarkar, S.B.Dhahia, J.V.M.Sarma, S.Madduri, Sri Prakash, V.V.N.Somayajulu, K.L.Krishna, K.Krishana Murthy, D.V.Sastry, Uma Datta Roy Chowdary, Atul Sharma, D.M.Nachane, Moni Mukharjee, P.R.Brahmananda and many experts).

I-O is applied in the fields of structural change, monetary and fiscal policy analysis, international and interregional trade; transport; technological change; energy and environment; computer, software and information technology, project appraisal, prices; industrial productivity, rural development etc. All of these fields are related to problems in states and regions of India. They are covered in IORA publications and other volumes. Accordingly IORA conferences benefit faculty, research scholars, students, economics, planners, policy makers and development executives across the country and abroad.

XIV All India Input-Output Research Association (IORA) Conference

XIV All India Input Output conference of Input-Output Research Association (IORA), India (Registration No. Mah/570/Poona, 1965) is one of the biggest academic conferences in India for economic academics, development executives, planners and policy makers. It is held to enrich the fields of economic theories, techniques and applied economics through the framework input-output analysis and related mathematical economics. The conference highlights economic issues of national, regions, sectors and sections of the population and institutional role (of banks) in India, particularly those related to Tenth and Eleventh Plan periods and recent decades.

The XIV IORA conference continues its mission to encourage a rapid pace of economic development in India while assuring grass roots fulfilment of all social goals. A focus of the conference will be increasing national self-reliance in the face of international competition in terms of technological development, foreign exchange earnings, balance of trade and payments and minimum fiscal deficits as needed in the current decades of globalization, liberalization, privatization, New Economic Reforms and policies, structural adjustment and stabilization policies. The conference will include discussions regarding the emergence of new innovative stock markets, sectors, and services, information technology, renewable energy, environment influences and social and financial services.

Conference content covers not merely the development of all production sectors but also provides a forum for academics to interact with industrialists, bankers, development executives, planners and policy makers to ensure university-industry linkages. A major focus of these interactions will be issues of 11th Five Year Plan and Union/State Budgets.

In Memory of W.W. Leontief and P.N. Mathur (Indian Leontief) and S. Chakarborty, Top Academic Economists will be invited to address Indian policy making, planning etc and also to deliver lectures on current economic policy and planning models of the intra and inter-regional balanced development environment and specialized themes of the conference. The conference aims to bring out new theories, new techniques and new applications of input-output and programming techniques for economic practice and policy guidelines.

Dr.Boppana Nagarjuna
Coordinator
14th IORA-India Conference

Prof.J.V.M.Sarma
Local Organising Secretary
14th IORA-India Conference

Prof.V.V.N.SOMAYAJULU
Gen.Secretary-IORA India

Conferences



XXXIII SYMPOSIUM OF ECONOMIC ANALYSIS - ZARAGOZA (SPAIN) 2008

The Spanish Economic Association organizes the Simposio de Análisis Económico. Authors are invited to submit theoretical and applied papers in all areas of economics for presentation at the XXXIII Simposio de Análisis Económico in Zaragoza, Spain from the 11th to 13th of December 2008. Submissions should be for contributed sessions or job market sessions. Authors will be asked to indicate the intended session type during the online submission process. Submissions must consist of a single PDF file with a maximum size of 3MB to the following address:

<http://editorialexpress.com/conference/simposio2008>

Submission deadline:

· For Candidates for job market: September 14, 2008.

The authors who have sent papers will receive answer before:

· For contributed sessions: July 31, 2008.

· For Candidates for job market: October 19, 2008.

President of the Spanish Economic Association: Xavier Vives

Chair of Scientific Committee: Javier Gardeazabal

Chair of Local Committee: Antonio Montañes



In the next ESR issue

Economic Systems Research

Journal of the International Input-Output Association

Volume 20

Number 3

June 2008

Erik Dietzenbacher. Editor

Andrea Bonfiglio & Francesco Chelli. *Assessing the Behaviour of Non-Survey Methods for Constructing Regional Input-Output Tables through a Monte Carlo Simulation*

The paper aims to analyse the behaviour of a battery of non-survey techniques of constructing regional I-O tables in estimating impact. For this aim, a Monte Carlo simulation, based on the generation of “true” multiregional I-O tables, was carried out. By aggregating multi-regional I-O tables, national I-O tables were obtained. From the latter, indirect regional tables were derived through the application of various regionalisation methods and the relevant multipliers were compared to the “true” multipliers using a set of statistics. Three aspects of the behaviour of the methods have been analysed: performances to reproduce “true” multipliers, variability of simulation error and direction of bias. The results have demonstrated that the Flegg et al. Location Quotient (FLQ) and its augmented version (AFLQ) represent an effective improvement of conventional techniques based on the use of location quotients in both reproducing “true” multipliers and generating more stable simulation errors. In addition, the results have confirmed the existence of a tendency of the methods to over/underestimate impact. In the cases of the FLQ and the AFLQ, this tendency depends on the value of the parameter δ .

Giorgio Rampa. *Using Weighted Least Squares to Deflate Input-Output Tables*

This article proposes a balancing procedure for the deflation of input-output (I-O) tables from the viewpoint of users. This is a “subjective” variant of Weighted Least Squares (WLS) method, already known in the literature.

It is argued that it is more flexible than other methods, and it is shown that SWLS subsumes the first-order approximation of RAS as a special case. Flexibility is due to the facts that (a) users can attach differential “reliability” weights to first (unbalanced) estimates, depending on the confidence they have in the different parts of their pre-balancing work, (b) differently from RAS, one is not bound to take any row or column total as exogenously given, and (c) additional constraints can be added to it. The article describes also how SWLS was utilised to estimate a yearly (1959-2000) series of constant-price I-O tables for the Italian economy.

Massimiliano Mazzanti, Anna Montini & Roberto Zoboli. *Environmental Kuznets Curves for Air Pollutant Emissions in Italy: Evidence from Environmental Accounts (NAMEA) Panel Data*

This paper provides new empirical evidence on delinking and Environmental Kuznets Curves (EKC) for greenhouse gases and other air pollutant emissions in Italy. A panel dataset based on the Italian NAMEA (National Accounts Matrix including Environmental Accounts) for 1990-2001 is analyzed. The highly disaggregated dataset (29 production branches, 12 years and 9 air emissions) provides a large heterogeneity and can help to overcome the shortcomings of the usual approach to EKC based on cross-country data. Both value added and capital stock per employee are used as alternative drivers for analysing sectoral NAMEA emissions. Trade openness at the same sectoral level is also introduced among the covariates. We find mixed evidence supporting the EKC hypothesis. The analysis of NAMEA-based data shows that some of the pollutants such as two greenhouse gases (CO₂ and CH₄) and CO, produce inverted U-shaped curves with coherent within range turning points. Other pollutants (SO_x, NO_x, PM₁₀) show monotonic or even N-shaped relationship. Macro sectoral disaggregated analysis highlights that the aggregated outcome should hide some heterogeneity across different groups of production branches (industry, manufacturing only and services). Services tend to present an inverted N-shape in most cases. Manufacturing industry shows a mix of inverted U and N-shapes, depending on the emission considered. The same is true for industry (all industries, not only manufacturing): though a turning point has been experienced, N-shapes may lead to increased emissions with respect to very high levels of the economic driver. In general, EKC evidence is more pronounced for greenhouse gases. The results suggest that analysis at macro sector (whole industry, manufacturing only and services) can be the most promising approach to future research on EKC.

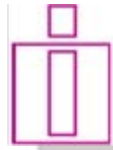
Simona Cantono, Reinout Heijungs & René Kleijn. *Environmental Accounting of Eco-innovations through Environmental Input-Output Analysis: the Case of Hydrogen and Fuel Cells Buses*

The introduction of environmentally friendly innovations in both transport and energy sectors are included in the list of priorities of the European Union political agenda. This paper investigates the environmental consequences of the introduction of hydrogen and fuel cells technology in the European economic system by applying environmental input-output analysis and life cycle assessment tools. Hydrogen is produced through the reforming of natural gas and it is employed in fuel cells buses that offer transport services to final consumers. We have built three scenarios based on different assumptions on the final demand. We have shown the results for three impact categories: global warming, photochemical oxidation and acidification. The results suggest that the use of hydrogen in fuel cells buses is only environmentally desirable if accompanied either by the employment of renewable sources or by carbon dioxide capture, or both.

Akiko Nakajima. *Total Labour Requirements and Value Added Productivity of Labour in the Process of Economic Development*

When the inverse of the value added productivity of labour is regressed on total labour requirements (which is equivalent to labour values), a significant relationship is obtained. This indicates that the value added productivity of labour can be explained by total labour requirements (labour values). The mean value of the regression coefficients is about 1.7. The regression coefficients have a tendency to increase during the process of rapid economic development and to decrease afterwards. This study is based on input-output analysis, where total labour requirements per monetary unit of output and the value added productivity of labour are calculated for each of 24 industries in Japan, Korea and USA, every 5 years between 1960 and 1985.

Annual Report, IIOA 2007



Highlights in journals

B. Meyer, M. Distelkamp & M. I. Wolter, Material Efficiency and Economic-Environmental Sustainability. Results of Simulations for Germany with the Model PANTA RHEI. *Ecological Economics*, 63(1) 2007, pp. 192-200.

Based on empirical evidence, the paper discusses the impact of a consulting and information program for the improvement of material productivity with regard to economic and environmental targets for Germany. The instrument used in the analysis is the integrated economic-environmental model PANTA RHEI, which is parameterized econometrically. The paper presents the model and shows in a baseline forecast that without policy changes, sustainability will be violated in both the economic and the environmental dimensions. This applies to the latter particularly with regard to land use and material consumption. The alternative simulation that introduces a consulting and information program for the improvement of material productivity yields a win-win result: growth rates of GDP and employment are rising, the public debt is reduced, and material consumption is much lower than in the baseline and remains at the actual level, which means that a decoupling of growth and material consumption is possible.

G. Peters & E. G. Hertwich, "CO₂ Embodied in International Trade with Implications for Global Climate Policy", *Environmental Science and Technology*, 42, 2008, pp. 1401-1407.

The flow of pollution through international trade flows has the ability to undermine environmental policies, particularly for global pollutants. In this article we determine the CO₂ emissions embodied in international trade among 87 countries for the year 2001. We find that globally there are over 5.3 Gt of CO₂ embodied in trade and that Annex B countries are net importers of CO₂ emissions. Depending on country characteristics – such as size variables and geographic location – there are considerable variations in the embodied emissions. We argue that emissions embodied in trade may have a significant impact on participation in and effectiveness of global climate policies such as the Kyoto Protocol. We discuss several policy options to reduce the impact of trade in global climate policy. If countries take binding commitments as a part of a coalition, instead of as individual countries, then the impacts of trade can be substantially reduced.

Adjusting emission inventories for trade gives a more consistent description of a country's environmental pressures and circumvents many trade related issues. It also gives opportunities to exploit trade as a means of mitigating emissions. Not least, a better understanding of the role that trade plays in a country's economic and environmental development will help design more effective and participatory climate policy post-Kyoto.

M. Ciaschini & C. Socci, Bi-regional SAM linkages: a modified backward and forward dispersion approach. *Reviews of Urban and Regional Development Studies*, vol. 19 issue 3, 2008, pp.233-254.

The aim of the paper is to apply a new backward and forward dispersion approach, starting from the original Rasmussen definition, which can give further insight into the interactions between industries and institutional sectors in a multiregional framework. The method is based on identification of the Macro Multipliers and the related impact components of a model based on a bi-regional SAM, which allows for the representation of the bi-regional multisectoral and multi-industry model in a two-dimensional space defined by the two dominating impact components. From such representation, we derive a set of indices of intraregional and interregional backward and forward dispersion that identifies key groups of industries and institutional sectors. The strength of these groups is further evaluated in terms of correlation of the impact components within the groups and cross-correlation between industry and institutional sectors groups. Comparative analysis among regional results gives a full picture of regional income policies.

J. Bournay, On the treatment of taxes and government in National Accounts. *Review of Income and Wealth*, 53(4), 2007, pp. 735-746.

Framed in the context of the ongoing revision of the 1993 System of National Accounts (SNA), this note proposes a new presentation of the National Accounts. While it does not require new information, nor difficult calculations, it is suggested to be conceptually clearer and practically simpler. The changes concern the treatment of taxes and government in the national accounts which imply that: (i) GDP, measured at basic price, is now exactly the sum of all value added, which is split in the compensation of employees and an enlarged operating surplus;

(ii) the two functions of government are clearly distinguished in a modified sequence of accounts, that is, as producing non-market services up to the allocation of primary income account, and then as redistributing the national income; and (iii) with a conventional allocation of government services and GDP broken down between market GDP and non-market GDP, households remain the only final consumer and the so called question of consumption subsidies is resolved.

C. Morilla, M. A. Cardenete & G. J. Llanes, "Economic and Environmental Efficiency using a Social Accounting Matrix". *Ecological Economics*, 60/4, 2007, pp. 774-786.

This paper aims to show the utility of the so-called Social Accounting Matrix and Environmental Accounts (SAMEA) for economic and environmental efficiency analysis. The article uses the SAMEA for Spain in 2000, applied to water resources and greenhouse gas emissions. This matrix is used as a central core of a multisectoral model of economic and environmental performance, and it calculates the denominated "domestic SAMEA multipliers" and their decomposition into characteristic, direct, indirect and induced effects. These multipliers show some evaluation of economic and environmental efficiency. Also, we present an application of these multipliers that demonstrates that there is no causal interrelation between those sectors with higher economic backward linkages and those with higher environmental deterioration backward linkages.

Zhang Yaxiong & Zhao Kun, Impact of Beijing Olympic-related Investments on Regional Economic Growth of China: Interregional Input-Output Approach, *Asian Economic Journal*, 2007, Vol. 21 No. 3, pp. 261-282

Using the interregional input-output model, the present paper analyzes the impact of Olympic-related investments on the economic development of Beijing and its surrounding areas, as well as the rest of China. The interregional input-output model provides a satisfactory simulation and analysis of Olympic-related investments that are implemented in Beijing and other areas and their spillover effects on other regions. We estimate that from 2002 to 2007, Olympic-related investments will add 2.02, 0.23 and 0.09 percent annually to gross regional products of Beijing, its surrounding areas and the rest of China, respectively.



Highlights in books

TRADE AND ENVIRONMENT IN THAILAND An emerging economy, Kakali Mukhopadhyay, New Delhi Serials Publ. 2007, 231 pages. ISBN: 81-8387090-2.

The complex interrelationship between trade and environment has become a focal point for international as well as national policy makers. Standard economic theory assumes that free trade leads to a win-win situation of all players participating in international trade. However, free trade has an overall positive or negative impact on the environment. It offers both benefits and costs to environmental quality depending on a number of factors including, -the existence of optimal environmental protection measures, the level of economic and technological development, and the level of environmental awareness. Environmentalists argue that free trade is responsible for environmental problems because free trade is likely to increase production and consumption of environmentally unfriendly goods and services leading to high pollution and environmental degradation. So trade can be in conflict with environmental protection.

The past 15 years have seen an increasing debate over the linkages between trade and environmental regulations. From these debate two conflicting hypotheses----pollution haven and factor endowment have emerged. First, the pollution haven hypothesis (PHH) suggests that the developed countries impose tougher environmental policies than the developing countries, resulting in distortion of existing patterns of comparative advantage. So the polluting industries shift operations from the developed to the developing countries; developing countries thus become "pollution havens." The second hypothesis, the factor endowment hypothesis (FEH) predicts, trade liberalisation will result in trade patterns consistent with the Heckscher-Ohlin-Vanek (HOV) theory of comparative advantage based on factor endowment differentials. Rich countries are well endowed with capital. Since capital-intensive goods are often also pollution-intensive, factor-endowment theories of international trade assume that rich countries specialize in polluting goods. Thus the manifestation of the PHH is in direct conflict with the FEH.

This issue is of great concern among economists, environmentalists and world bodies like WTO, but there is no consensus. The review of the literature also suggests that the empirical evidence is still far from clear (Copeland and Taylor, 2004). The methodologies employed to test the hypothesis are widely varied so are the results. Hence, the biggest challenge in front of us is to promote liberal trade while maintaining and strengthening protection of the environment. Towards this end, the current volume has made a modest effort to address the current debate. It attempts to assess the magnitude of the effects of trade liberalization on the environment in context of Thailand, a newly industrializing economy.

The Thai economy has evidenced rapid growth in recent years, and is viewed as an example of economic success in the region. This growth has largely been led by increased participation in international trade, especially a marked increase in exports. The intense economic and largely industrial development, significant changes in trade pattern and the production technology have important implications for the environment and also serious consequences for the future of the Thai economy. Thus Thailand is a good laboratory for assessing the impact of trade on the environment by testing the above mentioned two hypotheses.

The objective of the present study is to estimate the impact of Thailand's trade with rest of the world and exclusively OECD on CO₂, SO₂ and NO_x emissions from fossil fuel combustion during 1980 to 2000. Firstly, the study measures the pollution terms of trade reflecting Thailand's environmental gains or losses from trade. Secondly, it finds out the relevance of the factor endowment hypothesis. Finally, it examines the implications of foreign direct investment on the environment. To identify the trade impact on environment the study has calibrated models based on Input-Output framework.

I hope this effort will make a modest contribution to trade and environment debate and provide some direction for trade and environmental policies. Scholars, policy makers of the newly industrialized economies and the countries embarking on major liberalization programme will find the book useful.

INPUT-OUTPUT ANALYSIS FOR THE INDIAN AND THE WORLD ECONOMY. Kazushige Shimpo and Megha Shukla (eds.), Proceedings of the Conference on Input-Output Analysis for Indian and the World Economy, 17 December 2007, New Delhi, 2008.

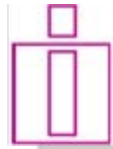


This volume contains the papers of the Conference on Input-Output Analysis for Indian and the World Economy, jointly organized by TERI (The Energy and Resources Institute, New Delhi, India) and G-SEC (Global Security Research Institute, Keio University, Japan). It contains topics such as the compilation of Indian input-output tables and extensions for environmental IO analysis; and input-output applications to environmental analysis, greenhouse gas emissions, water pollution, energy use by households and energy balances in IO accounts.

STRUKTUREN UND INTERDEPENDENZEN DER ÖSTERREICHISCHEN WIRTSCHAFT; INPUT-OUTPUT ANALYSEN FÜR 2003 (Structures and interdependencies of the Austrian economy), Hans Werner Holub, Josef Richter, Nicole Heiling, Leonhard Pertl, Roland Vögel LIT Verlag, Münster, Hamburg, Berlin, Wien, London; ISBN 978-3-8258-1559-2 July 2008.



This book presents the results of all kind of standard analysis on the basis of the static open Leontief model. It aims at providing insight into structural characteristics of the Austrian economy and at serving as background material for courses in IO and empirical economics.



Newsletter

International Input-Output Association (IIOA)

Number 3; August, 2008

International projects



The University of Sydney



Embedded carbon emissions indicators in UK

The aim of the proposed project work is to develop a time series of input-output tables for the UK by using an automated data optimisation procedure that allows the construction of national input-output and environmental databases in greatest possible sector disaggregation that can be used for a multi-region environmental input-output model in the future. Thus the work will set the basis for a UK++ MRIO model, enabling future multi-regional analyses of environmental impacts associated with UK trade flows, including the provision of a robust indicator for embedded emissions.

In order to achieve this aim initial data estimates need to be made, data constraints need to be defined and specific optimisation algorithms need to be developed and implemented.

In order to derive reliable and robust estimates for embedded emissions, it is important to explicitly consider the production efficiency and emissions intensity of a number of trading countries and world regions in an international trade model, which is globally closed and sectorally deeply disaggregated.

The implementation and application of a full multi-regional input-output framework poses three basic challenges: data availability, data reconciliation and computability. These issues and possible practical solutions are discussed in detail in Wiedmann et al. (2006). In the following we focus on the important issue of data handling in a MRIO model.

Compiling the required data, estimating missing data and balancing conflicting data in the right way is the most crucial part of an MRIO framework. Most resources should be devoted to this part of the work as a good handling of data ensures consistency, robustness and repeatability of the whole approach. The data system should allow to

- include data in different classifications,
- aggregate or disaggregate sectors, depending on the research question,
- find a compromise solution for conflicting data,
- cope with suppressed data,
- estimate missing data,
- accommodate different years for the analysis of time series.

References:

Wiedmann, T., Minx, J., Barrett, J., Vanner, R. and Ekins, P. (2006a). Sustainable Consumption and Production - Development of an Evidence Base: Resource Flows. Final Project Report, August 2006. Department for Environment, Food and Rural Affairs, London, UK, London. <http://randd.defra.gov.uk/>

Wiedmann, T., Wood, R., Minx, J., Lenzen, M. and Harris, R. (2008). Emissions Embedded in UK Trade - UK-MRIO Model Results and Error Estimates. International Input-Output Meeting on Managing the Environment, 9-11 July 2008. Seville, Spain.

Obituary: Graham J. Treloar

On Monday 2 June 2008, after a spirited fight with cancer, our dear friend and colleague **Graham J. Treloar** passed away in Melbourne, Australia. He was a leader in the fields of Sustainable Construction and Life-Cycle Assessment, and has left his academic peers with a wealth of insights. Graham was from 2000 until the end of 2006 the Deputy Director of the Built Environment Research Group at Deakin University in Geelong, Australia.

He started at the University of Melbourne in January 2007 as an Associate Professor in Property and Construction. Graham was selected by the Australian Institute of Building as the inaugural Young Achiever of the Year for 2002. His main contribution to the field of Input-Output Analysis Industrial Ecology was his idea to streamline the compilation of Life-Cycle Inventories using Structural Path Analysis (ESR 9(4), 1997) (JIE 6(3-4), 2003). His idea is now widely applied in Building and Construction Research, and is certain to spread beyond this community. His inspiration and untiring support for his colleagues and students, as well as his unique sense of humour will be dearly missed. Graham leaves behind his wife and two daughters and a loving extended family.

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