Newsletter
International Input-Output Association (IIOA)
Number 32, November 2015

Tales from the I-O world

ACCOUNTING FOR CARBON RESPONSIBILITY: THE CONSUMER AND INCOME PERSPECTIVES AND THEIR RECONCILIATION

Climate change is a prominent societal concern of our times. The main direct anthropogenic source of global climate change is the emissions of greenhouse gases, namely carbon dioxide, but also methane, nitrous oxide and others. These gases have a sufficiently long residence time in the atmosphere such that they are well mixed, and so, the effect of an emission in a certain place will be felt uniformly around the world.

Current international policy on the emissions of greenhouse gases is established under the United Nations Framework Convention on Climate Change. Within this convention, the emissions of each country are accounted using the so-called territorial principle – each country is allocated the emissions occurring within its borders. For some time, this accounting principle has been criticized, since, on the one hand, the emissions associated with a country's imports are not accounted for and, on the other hand, a fraction of the emissions in a country are due to satisfying foreign demand.

These concerns led to the introduction of the concept of consumer responsibility. Basically, consumer responsibility starts from direct emissions and then adds the emissions associated to imports and subtracts the emissions associated to exports, i.e., it adds a carbon trade balance, according to what we may call an upstream perspective.

Among other advantages, consumer responsibility avoids carbon leakage as a solution for mitigation commitments – when offshoring dirty industries, producer responsibility decreases but consumer responsibility stays constant. However, consumer responsibility itself has limitations: (1) unlike territorial responsibility, it is not responsive to changes in the carbon efficiency of export sectors, because all their emissions are passed on to final consumers; (2) like territorial responsibility, it is not responsive to emissions that occur downstream, in countries to which a country exports (e.g., when a country is earning income by exporting fossil fuels, the carbon emissions associated to burning these fossil fuels are going to be attributed to countries downstream in the value chain).

To address the second limitation, Rodrigues et al. (2006) introduced the concept of income responsibility (the current name itself having been introduced by Marques et al. 2012). Conceptually, income responsibility starts from direct emissions and then adds the emissions associated to payments for exports and subtracts the emissions associated to payments for imports. So, it is the natural symmetric concept to consumption responsibility.

In addition, income responsibility addresses the first limitation: a fraction of the carbon emissions of export sectors is attributed to the country (proportionally to the fraction of value added that the country contributes).

However, income responsibility itself has a limitation (a reflex of its symmetry to consumption responsibility): like territorial responsibility, it is not responsive to emissions that occur upstream, in countries from which a country imports.

These limitations lead to the idea that the best would be to reconcile consumer and income responsibility in a single indicator. This was the main challenge addressed by Rodrigues et al. (2006), considering three carbon responsibility indicators: consumer responsibility; income responsibility; total responsibility. No a priori functional form is established for them, it

In this issue

emerges in a mathematically rigorous way as a result of the constraints placed on the indicators.
Conceptually, consumer responsibility corresponds to the usual indicator considered in the literature, which we can think of as being associated with following the flows of goods and services (embodied emissions). Income responsibility looks at the flow in the opposite direction of payments for goods and services (enabled emissions, sensu Marques et al., 2012). Total responsibility reconciles the two.
A standard environmentally extended input-output model is assumed. Between any pair of sectors of any country, there is an economic flow of goods and services with an associated, and an, equal in value, counter-flow of payments for goods and services. We assume that all these flows are known, or are estimated, i.e., that we have an MRIO – Multi-Regional Input Output model. For each sector of each country, we assume that we know the direct carbon emissions.
All three indicators obey the following properties:

1. Scale invariance: the consumption, income and total responsibility of two countries considered together should be equal to the sum of the responsibilities of the two countries considered separately.
2. Normalisation: the sum of consumption, income and total responsibility of all countries in the world must each equal total direct world carbon emissions.

Normalisation states that we are dealing with a "cake sharing" problem: all emissions will be allocated to some country. It also states that the three perspectives (consumption, income and total) are complementary, in the sense that each is associated to a complete allocation of world emissions. Scale invariance implies that international trade flows have a symmetric effect: the responsibility they increase in one trade partner must be equal to the responsibility they decrease in the other trade partner.
Consumer and income responsibility obey:

3. Monotonicity: the consumer and income responsibility of a country cannot go down if the direct emissions of any given sector in any country go up, while the direct emissions of all the other sectors and the economic structure (i.e., all the economic flows) remain the same.
4. Total Indirect Effects: the consumer (resp. income) responsibility of a country can only be a function of incoming and outgoing flows of embodied (resp. enabled) emissions.
5. Economic Causality: all flows of goods and services leaving a sector have the same intensity (consumer responsibility); all payments leaving a sector have the same intensity (income responsibility).

Property 3 is equivalent to stating that countries should not be able to reduce their carbon responsibilities in ways that contribute to increased global carbon emissions.
The combination of properties 1, 2 and 4 can be seen as stating that responsibility is "injected" in the system every time carbon emissions occur, and this responsibility then flows between countries, with goods and services (consumer responsibility), or with the payments thereof (income responsibility). In the consumer perspective, this responsibility ends up being delivered to final demand; in the income perspective, this responsibility ends up being delivered to the primary factors of production (mostly capital and labour).
Properties 1-5 imply that consumer responsibility is the usual indicator calculated with a Leontief matrix in consumption based accounting, and that income responsibility can be calculated in an analogous way, but with a Ghosh matrix (Rodrigues et al., 2010).
Total responsibility is a function of consumer and income responsibility and obeys:

6. Symmetry: if the consumption and income responsibilities of a country are exchanged, total responsibility stays the same.

Scale Invariance, Normalisation and Symmetry imply that total responsibility is the arithmetic average of consumer and income responsibility.
Marques et al. (2012) calculated consumption and income responsibilities for 112 world regions, using an MRIO based on the GTAP database. A striking example can be found by comparing Norway and USA. Norway has per capita producer responsibility equal to 11.4 ton CO2 while the USA has 16.5 ton CO2. The comparative picture does not change significantly when considering per capita consumption responsibility, with 10.1 ton CO2 for Norway 18.7 ton CO2 for the USA. However, it changes drastically when considering per capita income responsibility, with 31.1 ton CO2 for Norway and 15.7 ton CO2 for the USA. Finally, per capita total responsibility is 20.6 ton CO2 for Norway and 17.2 ton CO2 for the USA. The interpretation of these results is straightforward: Norway has a clean energy system, strongly based on hydroelectricity. However, it earns very high revenues from exporting oil and natural gas. The corresponding CO2 will only be emitted in the importing countries (i.e., enabled emissions), and so only shows up in income responsibility, where emissions "followed"

the payments for goods and services.
Income responsibility also allows us to calculate the carbon responsibility of primary factors of production. Marques (2013) showed that, in 2004, 47% of carbon emissions were enabled by capital, while capital only provided 35% of world GDP; in contrast, unskilled labour enabled 23% of global emissions, while providing 38% of world GDP. Again, the interpretation of these results is straightforward: energy intensive and hence carbon emitting sectors are comparatively capital intensive.
The formal approach developed Rodrigues et al. (2006, 2010) has established a systematic setting for discussing the multitude of carbon responsibility indicators that have been arising in the literature. It also generated the concept of income responsibility, a necessary complementary view to that of consumption responsibility, but also, through the symmetry principle, introduced a clear criterion to combine the two.

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Published papers and books in IOA and related methods

Last ESR articles

Economic Systems Research

Journal of the IIOA

Latest articles (up to 31th October 2015)

ON THE ACCURACY OF CGE FORECASTS IN EXPANSION AND RECESSION: SPAIN 1990-1997. POLO C. and VIEJO R.

A recursive dynamic disaggregated CGE model of the Spanish economy is used to compare the model predictions of endogenous variables with their observed values over the period 1991-1997. It includes 12 producers, 12 households, government and 2 external sectors. There are four types of labour and real wages that depend on unemployment rates. Private investment is determined by private savings and public and external surpluses. Domestic products and imports are imperfect substitutes. All exogenous variables and tax parameters are updated every year with the best available information. The model provides rather accurate predictions in 1991, a normal year, but it underestimates the intensity of the 1992-1993 recession. It also predicts dramatic reversals of trade balances in response to devaluations. These results suggest both that investment savings driven models provide useful insights in the medium term but underestimate the consequences of downturns, and that Armington's elascitities typically assumed may be too large.

CONSTRUCTION OF MULTI REGIONAL INPUT-OUTPUT TABLES USING THE CHARM METHOD TÖBBEN J. and KRONENBERG T.H.

Subnational multi-regional input–output tables (IOT) are important tools for studying interregional socio-economic and/or environmental interrelations that help to address a wide range of current societal, ecological and economic challenges. However, the lack of subnational input–output data is a major obstacle which leads to a wide use of non-survey methods. Like other non-survey methods, the cross-hauling adjusted regionalization method (CHARM) was originally developed for the construction of single-regional IOT. In this paper, we extend CHARM to the case of bi- and multi-regional IOT. We find that the original CHARM formula has two limitations that are also of great importance for the single-regional case: First, cross-hauling in interregional trade is implicitly set to zero and, second, accounting balances may be violated owing to structural differences between the regional and national economies. We present a modified formula addressing these issues and examine its performance in terms of a case study.

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THE LABOUR FOOTPRINT: A FRAMEWORK TO ASSESS LABOUR IN A COMPLEX ECONOMY GÓMEZ PAREDES J., YAMASUE E., OKUMURA H. and ISHIHARA K.N.

As addressing labour becomes crucial in the move towards sustainability, there is the need for assessment tools suitable for current complex economic systems. This article presents an input-output based framework (?labour footprint?) for evaluating labour issues behind the production of different economic commodities, including entire supply chains. In line with the guidelines of the International Labour Organization, six labour issues are considered: collective bargaining, forced labour, child labour, gender inequality, hazardous work, and social security. This conceptual article sets to (a) define this footprint's labour dimensions, (b) cite relevant data sources, (c) describe its calculation, (d) illustrate its application through a case study, and (e) discuss this framework's relevance from ?conscious consumption?, ?supply chain responsibility?, and regulators' standpoints. Since it advances the evaluation of fundamental labour issues and the scope of multi-criteria analyses, this footprint may be a valuable tool for sustainability assessments.

Highlights in journals

MAIR S., DRUCKMAN A and JACKSON T. (2015) GLOBAL INEQUITIES AND EMISSIONS IN WESTERN EUROPEAN TEXTILES AND CLOTHING CONSUMPTION, *JOURNAL OF CLEANER PRODUCTION*

Rising demand for cheaper textiles and clothing in Western Europe is well documented, as are changes in the Textiles and Clothing industry's globalised production structure. We apply a sub-systems global MRIO accounting framework to examine the sustainability implications of meeting Western European demand for textiles and clothing goods between 1995 and 2009. Our framework estimates environmental and socio-economic impacts of consumption in a consistent manner and shows where these occur both geographically and in the value chain. The results demonstrate that Western European textiles and clothing consumption remains dependent on low-cost labour from BRICs, principally in the Textiles and Clothing and Agricultural sectors. Conversely, we show that the wage rate for BRIC workers in the global value chains serving Western European textiles and clothing consumption has risen over time but remains low relative to the wage rate paid to Western European workers. Likewise, we find that profits are increasingly generated within BRIC and that they are now at comparable levels to those generated in Western Europe. We find a slight overall decrease in the amount of carbon emitted in the production of textiles and clothing goods for Western Europe between 1995 and 2009. However, the trend is not linear and the importance of different underlying drivers varies over the time series. We conclude by discussing the implications of these results for a more sustainable future for Western European textiles and clothing consumption.

CADARSO M.Á., GÓMEZ N., LÓPEZ L.A., TOBARRA M.A. and ZAFRILLA J.E. (2015) QUANTIFYING SPANISH TOURISM'S CARBON FOOTPRINT: THE CONTRIBUTIONS OF RESIDENTS AND VISITORS. A LONGITUDINAL STUDY, *JOURNAL OF SUSTAINABLE TOURISM* 23(6)

This paper develops and explains an input-output model to quantify the carbon footprint linked to residents' and visitors' tourist consumption in the Spanish economy between 1995 and 2007, thus offering a rare longitudinal review of a national carbon footprint. Two measures are calculated: a domestic one similar to the producer responsibility criterion and a total measure that includes imported intermediate and final goods, similar to the consumer responsibility measure. The important role of tourism in Spain explains why its domestic carbon footprint represented 10.6% of total CO2 emissions in 2007. Visiting tourists represented 47% of this figure, households 36%, business tourism represented 14% and public administration expenditures 3%. By industry, transport (26%) was positioned as the highest emitter in 2007, with hotels and restaurants the second (21%) (benefitting indirectly from energy and environmental efficiency improvements over the period). The Spanish reliance on imported oil products and the growing importance of foreign-based air services has caused the total carbon footprint of tourism to increase by more than 100%. Therefore, climate change mitigation plans must include imports, and action must take

place through the whole global production chain and in the transport sector, particularly air transport. Future mitigation policies are discussed.

LÓPEZ L.A., CADARSO M.A., GÓMEZ, N. and TOBARRA M.A. (2015) FOOD MILES, CARBON FOOTPRINT AND GLOBAL VALUE CHAINS FOR SPANISH AGRICULTURE: ASSESSING THE IMPACT OF A CARBON BORDER TAX, *JOURNAL OF CLEANER PRODUCTION* 103:423-436

We develop a MRIO model to evaluate the importance of international trade of agricultural products as well as their food-miles emissions on the proposed extended carbon footprint (ECF) measure of Spanish agriculture in 2000-2008. This measure of ECF incorporates the virtual carbon embodied (domestic, imported and international transport) in the consumption of Spanish products of agriculture plus the direct emissions or producer responsibility of the Spanish agriculture sector. Our results show that Spanish agriculture ECF in 2008 is 18.5 Mt CO2, more than doubles the usual measure of carbon footprint. The importance of these emissions leads us to calculate the effect of levying a carbon border tax, on both embodied emissions and international freight transport in agriculture products, on the price of agriculture products consumed by Spanish households and bought by different Spanish industries. Our results do not appear to impose too great a burden on the economy as a whole (3.7% over the value of imported agriculture products and 0.02% over total Spanish domestic final demand). However, there might be a significant impact from taxing embodied carbon and transport emissions on some sectors and in terms of a potential change in the origin of imports, with Chinese and East-Asian exports into Spain being the most affected.

VOROPANOV S.A. (2015) APPLICATION OF METHOD OF BILATERAL ESTIMATION OF THE OUTPUT MULTIPLIER IN THE ABSENCE OF A COMPLETE INPUT–OUTPUT TABLE: EXAMPLE OF GERMANY AND FRANCE, *STUDIES ON RUSSIAN ECONOMIC DEVELOPMENT* 26(4):413–421

This paper proposes a method that allows for individual indicators of technological matrix to receive bilateral and point estimates of output multipliers. The proposed approach not only confirms previous results obtained by other authors, but also improves them. The ex post forecast for the 1995–2009 produced for 34 sectors of German and French industry proves the sufficient accuracy of the proposed estimators.

WIEDMANN T.O., CHEN G. and BARRETT J. (2015) THE CONCEPT OF CITY CARBON MAPS: A CASE STUDY OF MELBOURNE, AUSTRALIA. *JOURNAL OF INDUSTRIAL ECOLOGY*

This paper introduces a new conceptual framework based on environmental input-output analysis that allows for a consistent and complete reconciliation of direct and indirect GHG emissions from a city. The city carbon map shows local, regional, national, and global origins and destinations of flows of embodied emissions. The carbon map concept has been applied to the greater metropolitan area of Melbourne, Australia.

WANG Y., GESCHKE A. AND LENZEN M. (2015), Constructing a time series of nested multi-region input-output tables, *International Regional Science Review*

We develop a large-scale high-resolution time series of nested multiregion input–output (MRIO) tables, encompassing a range of technical advances that are relevant for MRIO applications worldwide. First, our database is the first ever hierarchically nested system of subnational and international MRIO tables on three independent counts: (a) it features global country-level coverage, (b) it is available as a long annual time series, and (c) it is complemented with matching information on element uncertainty. Second, it is at the time of writing the largest existing MRIO system in the world, and in its creation a number of challenges related to computer storage and run time had to be overcome. The MRIO tables feature complete interregional trade at this level of detail, in combination with detailed regional–international trade with 185 countries. Our experiences with constructing such a large and detailed framework contribute knowledge needed by practitioners wishing to assemble similar databases for other countries, in that our build pipeline can readily be adopted for the integration of subnational MRIO databases, for example, for the United States, China, Australia, Spain, and Germany. We demonstrate our approach by constructing a time series of MRIO tables for the example of the Chinese economy between 1997 and 2011, distinguishing each of the 30 provinces and 135 industry sectors for each province, and linking each province with 185 world countries.

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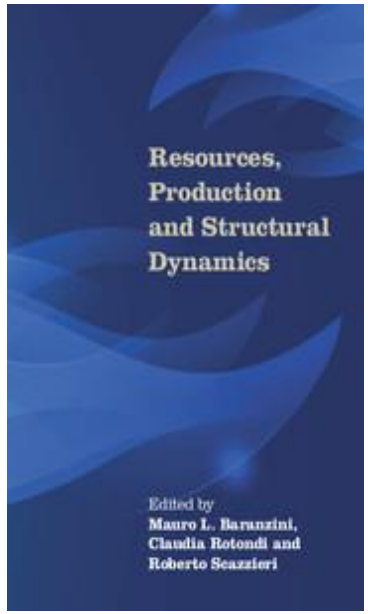
FRY J., LENZEN M., GIURCO D. and PAULIUK S. (2015) AN AUSTRALIAN MULTI-REGIONAL WASTE SUPPLY-USE FRAMEWORK, *JOURNAL OF INDUSTRIAL ECOLOGY*

The production of waste creates both direct and indirect environmental impacts. A range of strategies are available to reduce the generation of waste by industry and households, and to select waste treatment approaches that minimise environmental harm. However, evaluating these strategies requires reliable and detailed data on waste production and treatment. Unfortunately, published Australian waste data are typically highly aggregated, published by a variety of entities in different formats, and do not form a complete time-series. We demonstrate a technique for constructing a multi-regional waste supply-use (MRWSU) framework for Australia using information from numerous waste data sources. This is the first MRWSU framework to be constructed (to the authors' knowledge) and the first sub-national waste input-output framework to be constructed for Australia. We construct the framework using the Industrial Ecology Virtual Laboratory (IELab), a cloud-hosted computational platform for building Australian multi-regional input-output tables. The structure of the framework complies with the System of Environmental-Economic Accounting (SEEA). We demonstrate the use of the MRWSU framework by calculating waste footprints that enumerate the full supply chain waste production for Australian consumers.

Highlights in Books

RESOURCES, PRODUCTION AND STRUCTURAL DYNAMICS. Baranzini M.L., Rotondi C. and Scazzieri R. Cambridge University Press, 2015

Economists since the First Industrial Revolution have been interested in the links between economic growth and resources, often pointing to resource scarcities as a hindrance to growth. Offering a counter perspective, this volume highlights the positive role that scarcities can play in inducing technical progress and economic growth. It outlines a structural framework for the political economy of scarcity and rents, and offers a novel way of organizing the evidence concerning the role of resources in industrial growth. This book proposes a major shift in the treatment of scarcity issues by focusing on bottlenecks and opportunities arising within the production system, and will appeal to economists and policy makers interested in the role of resources as triggers of structural change.



Review

This book is very timely in that it discusses, in a broad perspective, the changing role of "non-produced" or "primary" commodities in modern societies. At the moment more than ever, there appears to be a growing awareness that many of these resources are fundamentally scarce, and that this must be borne in mind when analysing present-day economic systems.
The book is dedicated to Alberto Quadrio Curzio in recognition of his lifelong contribution to the study of land, mines, agricultural products, minerals and energy sources, all in their various qualities.
There are 23 chapters which have been contributed by 27 authors. The first chapter is a general introduction to the overall theme of the volume by the three editors, while in the final chapter the editors conclude with an outlook towards a political economy of economic resources. The chapters are grouped into five parts, i.e.,

1. Resources and distribution in a structural perspective;
2. Structural dynamics: resources and multi-sectoral linkages;
3. Resources, institutions and social structures;
4. Resources, industrial change and the structure of the world economy;
5. Towards a political economy of resources and structural change.

The organisation of each part is explained in the first chapter, and placed in its own -often long- intellectual history. After this introduction, the book opens with a contribution by Luigi Pasinetti on the origin of the theory of rent.

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At this place it is not possible to discuss each part in specific detail. Therefore, instead of making a selection (which will always be a somewhat arbitrary one), I shall devote a few words to Part 2, which focuses on input-output (IO) modeling themes, thereby leaving the other parts to the reader and the relevant sites of CUP. There are seven chapters, contributed by Carlo D'Adda, Faye Duchin, Heinrich Bortis, Kumaraswamy Velupillai, Michael Landesmann, Ivano Cardinale, and the undersigned.

Probably the most ambitious contribution in this part is by Faye Duchin, who discusses the potential of IO economics for addressing the critical resource challenges of the twenty-first century. She strongly advocates an IO theory of resources and resource rents, organized around a selected set of empirically relevant problems (such as the economics of the recycling of materials). The author observes that the development of (IO) theory is currently lagging behind data compilation and empirical analysis.

Duchin's plea for empirical relevance is in line with Velupillai's contribution. Velupillai warns of the "chimera" of a complete analysis of economic dynamics; or in a wider context, of an over-ambitious pursuit of "general theories". Here he goes back to the lessons learned at earlier efforts at integration of equilibrium theory and dynamics.

Carlo D'Adda discusses a problem in the price determination in dynamic Leontief models. We have the elegant duality between the physical and the price system in the static case. However, as pointed out by the author, this simplicity disappears when a growth trajectory is entered. The reason is the appearance of a capital matrix which is more complex than the input coefficients matrix in the static case.

Landesmann writes on Ricardian and Schumpeterian rents, hereby connecting to themes of Part 1. He asks attention for types of scarcities resulting not so much from a limited availability of resources, but rather from a limited access to technologies. He points out that rents may easily be transferred through sectoral links and thus influence overall sectoral structure and performance.

Bortis's contribution concerns the relation between financialization and capital mobility in the management of natural resources. Core issues concern income distributions and employment, which means that the entire socio-economic system must be considered. Classical Keynesian political economy is considered under new conditions imposed by new markets.

Cardinale's chapter outlines a political economy of resources. Here he refers to the notion of sectoral interdependencies first outlined in Quesnay's Tableau économique. Cardinale adds here that in order to understand the structure of modern interconnected economies, also socio-political aspects as motivated by the political interests of the various sectors must be taken into account, which can then lead to a new understanding of transitions between resource bases.

The undersigned contributed a chapter on the possibility of trade-offs when one or more primary factors are in limited supply. Cases of such scarcities may lead to the necessity of considering trade-offs between specific commodity allocations. What is proposed is a model for calculating exact functional relations between reductions in selected inputs and/or outputs and increases in other ones.

Finally, I would like to add that for an IO modeller the book is particularly interesting in that it focuses on precisely those commodities – also known under the name of "factors"-, the availability and prices of which are traditionally not discussed as a separate issue. The presence of these factors is often taken "for granted", thereby forming the basis of our notions of quantitative optimality and price formation. The present volume clearly confronts us with the question if we still have the luxury to continue with this, since many essential resources are becoming scarce either right now already, or in the foreseeable future. It therefore seems that the time has come to focus on the availability of and our access to resources, all positioned within a broad socio-political spectrum.

Humbold Foundation Fellowships

Alexander von Humboldt Stiftung/Foundation

The Humbold Foundation runs a number of research fellowship programs for divers target groups (PostDoc, developing countries, young research team leaders, experienced researchers and internationally recognised cutting-edge researchers).

Bert Steenge
University of Groningen

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Appointments

IIOA Appointments for 2016

Rosa Duarte, ISIOA Director

Associate professor at University of Saragossa (Spain). IIOA Council member 2014-2017. Prior ISIOA certificates coordinator

Antonio F. Amores, ISIOA certificates coordinator

Research Fellow at European Commission´s Joint Research Centre. IIOA Newsletter editor 2014-2015

Pedro J. Martíns-Ferreira, Newsletter editor

Statistician of the SUIOT team at Eurostat.

IIOA Council elections

By December 31 of this year, the terms of three of our nine elected council members end; these council members are:

- Albert Steenge
- Jose Rueda-Cantuche
- Satoshi Inomata (who will continue to serve in the council for another year as an appointed member).

For this reason we need to elect three new council members who will start serving the association January 1, 2016. Furthermore, a new president will be elected by the new council early on in 2016.
Out of all nominees who are willing to run for office three new council members will be elected by all members of the IIOA in December 2015 using EVOS, our electronic voting system.
You will receive an email invitation for that. Alternatively, you will be also able to vote by logging into our members area: http://members.iioa.org and clicking on EVOS.

European Prize in Regional Science 2015

Jan Oosterhaven

The European Prize in Regional Science (EIB) is created to recognize outstanding regional scientists at the European level. The EIB - European Prize in Regional Science can be awarded each year to a distinguished European regional scientist.

Events

Next courses

24th Annual Short Course in Global Trade Analysis "Introduction to Applied General Equilibrium Analysis in a Multi-Region Framework" August 6-12, 2016 West Lafayette, IN (USA)

Leader: Dr. Roman Keeney, Associate Professor of Agricultural Economics.

Background

The objectives of this course are to introduce participants to a standardized framework for conducting global trade analysis in an applied general equilibrium setting, provide hands-on training with software that has been tailored to global trade analysis and give participants the opportunity to interact with economists working on global trade and resource use issues while becoming part of an international network.

Structure

The course will consist of two parts:

1. Online Modules: Microeconomic foundations of AGE analysis.
2. Onsite Intensive Training: Basic features of the model and data base.

Dates/Deadlines (Eastern Standard Time)

Application	Nov 2 - Feb 28
Acceptance Notifications	April
Online Course	May 23 - July 24
Onsite Course	August 6-12

Limited number of fellowships may be available

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Next conferences

19th Annual Conference on Global Economic Analysis "Analytical Foundations for Cooperation in a Multipolar World". June 15-17 2016, Washington DC (USA)

The goal of the annual conference is to promote the exchange of ideas among economists conducting quantitative analysis of global economic issues. Particular emphasis will be placed on applied general equilibrium methods, data, and application. Related theoretical and applied work is also welcome.
The overall theme of the conference is "Analytical Foundations for Cooperation in a Multipolar World" with **sub-themes** on Perspectives and policies for sustainable, inclusive growth; Poverty and inequality in a rapidly changing world; Sustainable development for the 21st Century; Structural transformation in a changing world; Implications of the internet for the world economy with sub-themes of trade in digital goods and NTMs

Dates (US Eastern Standard Time)

Abstracts, Organized Session Proposals and Scholarships applications	Nov 2 - Jan 15
Acceptance Notifications	late Feb
Final Papers	Apr 15
Early Registration	Jan 11 - Apr 15
Late Registration	Apr 16-30
Registration Payment	May 7

GTAP

THE WORLD BANK
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24th International Input-Output Conference, July (4th), 5th-8th, 2016, Seoul (KOREA)

Seoul has long been the capital city of Korea from ancient periods noted by its traditional heritage and numerous tourist attractions. According to the Economist Intelligence Unit survey on Best Cities Ranking and Report, Seoul ranks 20/70 major cities in the world. In terms of safety, Seoul ranks 24/50 major cities according to the Safe Cities Index 2015 of Economist Intelligence Unit. The conference site, Yonsei University is located in Shinchon, flourished by Korean youth, trendy restaurants, shops and cafes. Also, Shinchon is easily accessible from the Inchon international airport.
Average summer temperature is about 20.5-27.5ºC (68.9-81.5ºF) 78% humidity.

Dates

Organized session proposals	December 25, 2015
Abstract	January 31, 2016
Leontief Prize/Travel grants applications	Februar. 29
Notification of acceptance	April 1, 2016
Early registration ends	April 30, 2016
Full papers	May 20, 2016
Online registration ends	May 31, 2016
Internat. School I-O Analysis	July 4, 2016

KESRA The Korean Association of Economic Systems Research
KIET Korea Institute for Industrial Economics & Trade
THE BANK OF KOREA
Yonsei University 1915 2015 100 College of Commerce and Economics

5th Spanish Workshop on Input-Output Analysis, September 29th-30th 2016, Bilbao (SPAIN)

The Hispanic-American Input-Output Society (SHAIO), BC3 and the University of the Basque Country (UPV) are working together to organize this workshop that will take place at the Faculty of Economics and Business (UPV).

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Dates

Abstracts	May 31, 2016
Full Papers	June 30, 2016
Notification acceptance	July 31, 2016

LOW CARBON PROGRAMME
EUSKAMPUS JRP ON ENERGY AND ENVIRONMENT

SHAIO

Universidad del País Vasco
Euskal Herriko Unibertsitatea

bc3 BASQUE CENTRE FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

ECON CONFERENCES

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