Newsletter
International Input-Output Association (IIOA)
Number 33, August 2017

# Welcome from the Editor

Dear IIOA member,

As the new Editor, I am happy to bring you my first and yet the latest issue of the *International Input-Output Newsletter*. It is my pleasure to be part of this endeavor, and I hope to achieve all expectations.

I thank Antonio Amores and Pedro Ferreira for provided me the templates, files, information, and tips. Further, I thank all the piece writers and anyone else who has sent us contributions.

This issue provides a great overview of the Last IIOA Conference in Atlantic City by Michael Lahr and Cuihong Yang. It also presents information of the 7th International School of Input-Output Analysis by Rosa Duarte and the Young Researcher`s night by Ye Yao.

You can also meet the Flash Session Winners of the 2017 IIOA Conference, meet the New IIOA Fellow and check the best article in Economic Systems Research in 2013 and 2014 (Richard Stone Prize).

There are also the Latest ESR articles, Highlights in Journals and Books, Tables from the I-O World, Teaching Materials, Next Courses and Events, and other Prizes (2016 Graedel Prizes and GTAP Team Award).

Any feedback, comments or suggestions are greatly appreciated.

I hope you enjoy it!

***Vinicius de Almeida Vale***
*IIOA Newsletter* Editor
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**26th International Input-Output Conference. June 25-29, 2018**
**Juiz de Fora (Brazil)**
**More information coming soon!**

Would you like to contribute to the IIOA newsletter?
Contact us newsletter@iioa.org

## In this issue

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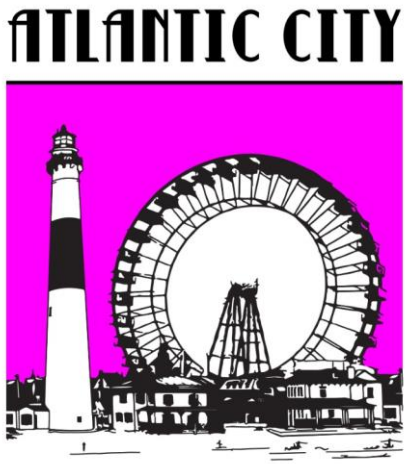
# Recent IIOA Conference




A conference at a beach during summer?!? When no European host stepped forward and we were tapped as organizers by our honored President, it sounded good to us, and seemed particularly fitting venue for the 25th International Input-Output Conference—a silver anniversary! That along with its decline of as a casino destination proved Atlantic City a reasonable, if not ideal, choice as relatively low room costs compensated for a higher-than-normal conference fee.

For fear of sounding as if we are patting each other on our backs, let us simply say that the hotel staff was both gracious and helpful and that most everything worked like a charm. The food was great, the supply and demand for drinks were in equilibrium, and the hotel's location on Atlantic City's famous Boardwalk gave participants ready access to both the beach and casino amenities alike. To top things off, the three plenary talks could not have been better centered on a theme if we had planned it. And, of course, the break-out sessions, as well as flash sessions, were well attended with insightful presentations and wide-ranging, penetrating discussion from the floor.

As usual, the conference week lead off with a convening of the International School of Input-Output Analysis. As the School let out, a roundtable of once and future journal editors was convened to which many questions were posed and answered. This new event was surprisingly well-attended. The School, the Editors' Roundtable, a set of three flash sessions, and a specially focused social evening were all designed to engage younger professionals in the field of input-output analysis.

We added another new feature this year as well. This is one is will surely be a habit of our conferences for years to come—that is, we kicked off use of a smartphone app, named "Whova" that facilitated conference communications. This included enabling participants to organize their own specialized session-by-session conference schedules as well as the ability to transportation-pool to and from the conference venue. IIOA Treasurer Christof Paparella reported that the conference program received nearly 4,500 views, that participants' profiles were viewed nearly 7,000 times, and that 3,154 messages were exchanged, and more than 135 pictures were shared via the app during the week of the conference. We also used it (not exclusive of paper and pen, of course) to vote for top flash-session presenters.

About 223 people from 40 countries participated in the conference: Another 30 or so joined us for meals and the excursion. These numbers include five registration desk staff as well as the staff of two vendors who displayed their wares: U.S. Bureau of Economic Analysis and IMPLAN. Perhaps most pleasing from the perspective of the future of our organization was that students comprised a third of all participants. In total 93 (or 42%) of all participants became IIOA members for the first time. Representation from low-income nations was also stronger than expected, led by the China (31) and Mexico (12). In fact, participation from China was second only to that of the host country (U.S.A.), which served up 34 participants (see figure).

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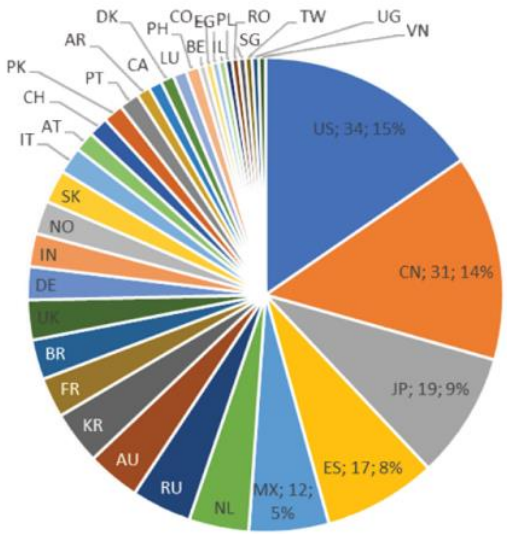


Finally 221 presentations (fully 199 papers plus confirmed attendance without full papers) of the 354 originally proposed by the end of March 2017 made it into the final program. This count suggested 10 periods to host 7 different break-out sessions, although some minor variation on this was required. (There were 17 pre-organized and 52 open break-out sessions.) Each break-out session contained 3-4 presentations, with the count depending upon the session duration (30 minutes for the presentation and discussion of each paper), which differed between morning and afternoon sessions. Session attendance, as reported by session chairs, was, in some cases, as high as 45 strong—standing room only—while very few sessions suffered attendance as low as 6. The program did suffer from a disappointing number (12) of presentation no-shows, but only after several rounds of confirmation. Still, the plenary sessions and the General Assembly of the IIOA were all well-attended. The gala dinner on Thursday plus lunches on both Wednesday and Thursday fed a full contingent!

Of course, it helped Friday's luncheon's attendance that Ivo Havinga, Assistant Director of Economic Statistics at the United Nations Statistical Division (UNSD/DESA), gave a plenary talk just prior. Indeed, people opted to stand or sit on the floor instead of sitting with their backs while he gave his keynote address entitled *Accounting for Global Value Chains: Extended System of National Accounts and Integrated Business Statistics*. This talk was a perfect follow up on the two prior. The first by Andy Wyckoff, the Director for Science, Technology and Innovation at the OECD, followed the conference's


opening ceremony and was entitled *25 Years of Input-Output Analysis at the OECD: From Technology Spillovers to TiVA and Beyond*. The other offered by Tommy Wiedmann was *Environmental and Social Footprints of International Trade* and kicked off Tuesday's sessions.

From the plenary talks, we started out learning how world I-O tables facilitated studies by the OECD ran the gamut from the first multi-national tables, to carbon accounting, and then on to global value chains, which includes trade in value added (TiVA). Andy Wyckoff underlined how such work enabled the enactment of a sequence of new, critical international policies and that being able to communicate that work in a simple way was the key to its recognition by policy makers. Tommy Wiedmann subsequently treated us to an in-depth analysis of how various set of world MRIO tables, which are now available, are being used internationally to investigate our ever-changing world.

He underlined how moves from national self-dependence to trade-dependence have shifted social and environmental burdens associated with certain kinds of production. Tommy noted that a surprising number of water-poor nations export water-rich goods (fruits, nuts, and other agricultural goods). A central issue remains—responsibility for climate change. Ivo Havinga started off by touching briefly upon fragmentation and vertical specialization—essentially where the others left off—and identified how nations and their statistical offices are reacting, especially with respect to transboundary (international) transactions. In part at least, the changing focus seems to be toward better measurement and governance of global value chains for the purposes of national taxation. He wound up his discussion pointing out how countries are likely to pursue even more-detailed accounting techniques, including some aspects of establishment heterogeneity within industries (for example, the actual manufacture of a product versus its simple assembly as already underway in China and Mexico), that may well change the way we view trade.


In addition to an opening reception, we had a 1.5 hour cruise out of Gardener's Basin. Jitneys took us from the hotel to the Basin and back, although at least a few of us meandered there by foot. A picture of a boat on this page captures the first of two rides that conference goers could take. By the time it docked and our first set of folks disembarked, the sky had ominously darkened. Facing the gloomy sky, our second crew enjoyed a somewhat different ride starting at the turnaround point when we all ran to one side of the boat for protection from pelting rain, and the boat began to list, heeling to one side. In any case, despite a lack

of exquisite scenery, the cruise was a nice break and a chance to meet colleagues in the fresh air of the Absecon Inlet.

Pictures on Whova suggest that in addition to presenting papers, attentive listening, and counterpointing, conference attendees enjoyed some hardcore networking and plain, old fun. We now have time to contemplate and reminisce until next year in Juiz de Fora, Brazil.

***Michael L. LAHR & Cuihong YANG***
Chairs of the Organizing Committees
*25th International Input-Output Conference*
***Atlantic City***

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# International School of Input-Output Analysis

The 7th edition of the International School of Input-Output Analysis (ISIOA) was held in Atlantic City, on June 19th, before the start of the International IO Conference. This year the School consisted of four modules: ***Computable General Equilibrium Models: an introduction*** by Alejandro Cardenete; ***Analysing Trade in Value Added through Global Value Chains: Sectoral and macro indicators, methodologies and diagnostics*** by Hubert Escaith. ***Entropy econometrics applied to input-output***, Esteban Fernandez and ***Working with OECD's ICIO and Indicators: A Hands-On Approach Using "R"***, by Joaquim Guilhoto and Norihiko Yamano. Overall, more than 70 students participated in the modules. We have since received very positive feedback on them, both on overall satisfaction with the modules and on the performance of the lecturers. We extremely grateful for the voluntary commitment and hard work of the lecturers, as well as the enthusiastic and stimulating participation of the students.

Thank you very much! We hope to see you all in Juiz de Fora. Until then, the ISIOA Directorate be working on a new, attractive proposal for next year!.

***Rosa Duarte***
***The ISIOA Directorate***

# Young Researcher's Night

## International IO Conference, Good for Young Researchers

The Young Researcher's night is becoming a tradition at the annual conference. It provides an opportunity for young researchers to meet in a relaxed setting. Just as last year some of the current and former board members joined the evening giving younger members a unique networking opportunity. But this night is not only about fun and networking. There is always a more serious component, the input-output competition. Last year we had the "input-output graph competition" and this year the first ever "input-output triathlon" .

Eight Teams from all over the world participated in the triathlon on the evening of June 22. The tasks were: 1) Inverting a matrix (the nerdy part), 2) filling up a glass of water with sea water (the sporty part – but due to rain, this task was altered a bit), and 3) choosing a final demand vector and a lucky number to determine the final output (the gambling part –we were in Atlantic City, after all!). The winners were NJBJ (New Jersey Beijing): Siru Ren, Yishu Kong, Chen Pan, Xiang Gao and Kailan Tian. Whether you participated or not, everyone enjoyed the Young Researchers' Night, rocking the Landshark beach bar at Resorts Casino.

While billed as "only for the young", everyone is permitted to join Young Researchers' Night (as Geoff Hewings put it: "Everyone under 70 is young, and everyone else is welcome as honorary guests."). It dedicated to help people get to know one another and to have fun learning. Of course, it is also a unique opportunity to meet other young researchers, talk to them, and find out what they really do with input-output data, to help us all become more creative and engaging. Part of this can be achieved through brainstorming, science quizzes, games, competitions with fellow researchers. It is definitely, the most fantastic part of IO conferences that I have experienced.

You may think, for a conference to be successful, it must have other events oriented toward young researchers. As you wish! The buddy program, which aims at giving the first participant an easy start, helps young researchers by connecting with more experienced conference participants. This year, we had 21 newbies and 9 oldies signed up for the buddy program. Honestly, as a newbie in this conference, I felt so honored to be part of this program. Being at a conference for the first time can be overwhelming, but I got a warm welcome feeling—kind of like "we are family". I give my thanks to my responsible oldies, who showed me around and introduced me to the IIOA crowd. With their help I learned to connect

names to the faces of people and quickly found sessions relevant to me. In addition, the flash sessions were also good for young researchers. It helped us advertise our longer presentations by getting lots of attention for four minutes.

As a young researcher, I know you do not want to attend to a boring conference; they can be like a sleepy philosophy class. Would you like to explore science, meet someone and have fun? If your answer to that is "yes", then young researchers' events are for you. So, at the next IIOA conference, come and enjoy them. They should not be missed. If you cannot make the next conference, then come the one after.

In the end, please allow me to thank all conference staff for their efforts and dedication in helping us make this International IO Conference a wonderful experience, one especially good for young researchers.

***Ye YAO***
Master Student
Institute of Science and Development
Chinese Academy of Sciences

**Train your matrix inversion skills with the matrix used in the "input-output triathlon" (Young Researcher's night)!**

$$\begin{pmatrix} 3 & 0 & 2 \\ 2 & 0 & -2 \\ 0 & 1 & 1 \end{pmatrix}^{-1} = ?$$

# IIOA 2017 Wall of Fame

## Flash Session Award

### Andre Fernandes Tomon Avelino

PhD Student
Department of Agricultural and Consumer Economics
University of Illinois at Urbana-Champaign
Regional Economics Applications Laboratory

**Revisiting the Temporal Leontief Inverse: new insights on regional structural change**

### Moana Simas

PhD Candidate
Industrial Ecology Programme
Norwegian University of Science and Technology

**Is outsourcing decreasing gains in greenhouse gas efficiency in developed nations?**

### Oleg Lugovoy

Sr. Economist,
Environmental Defense Fund, USA
Visiting Research Advisor,
The Russian Presidential Academy of National Economy and Public Administration, Russia

**Bayesian estimation of IO tables**

### Ye Yao

Master Student
Institute of Science and Development
Chinese Academy of Sciences

**Modeling carbon emission pathways in China's regional level –Based on ZSG-DEA and input-output technique**

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# Richard Stone Prize

25th International IO Conference, Atlantic City-NJ, best article in ESR in 2013 and 2014:


**ESTIMATING THE ECONOMIC CONSEQUENCES OF A PORT SHUTDOWN: THE SPECIAL ROLE OF RESILIENCE**

**Adam Rose & Dan Wei**
Economic Systems Research
25(2): 212-232, 2013.

This paper develops a methodology for the estimation of the total economic consequences of a seaport disruption, factoring in the major types of resilience. The foundation of the methodology is a combination of demand-driven and supply-driven input–output analyses. Resilience is included through a series of *ad hoc* adjustments based on various formal models and expert judgment. Moreover, we have designed the methodology in a manner that overcomes the major shortcomings of the supply-driven approach. We apply the methodology to a 90-day disruption at the twin seaports of Beaumont and Port Arthur, Texas, which is a major port area that includes a petrochemical manufacturing complex. We find that regional gross output could decline by as much as $13 billion at the port region level, but that resilience can reduce these impacts by nearly 70%.

President: M. Alejandro Cardenete. Jury: Fernando Perobelli, Kirsten Svenja Wiebe, Manfred Lenzen and Thomas Wiedmann.

# Call for Nominations for IIOA Fellows

Nomination of IIOA Fellows is open for new Fellows to be announced at the 26th IIOA conference scheduled to take place June 24-29, 2018 in Juiz de Fora, Minas Gerais, Brazil. IIOA members may nominate any members of the association according to the guidelines described below. For consideration during this year's nomination process, the current Secretary of the Fellows, Geoffrey Hewings, must receive all nomination materials (at hewings@illinois.edu) no later than **January 31, 2018**. Selection of up to two additional Fellows will be made by vote of the current Fellows.

Fellows of the IIOA are elected to honor them for their scientific contributions to the field of input-output analysis broadly defined. Members of the IIOA, not themselves Fellows, are invited to nominate other members. A nominee must have been a member of the IIOA for at least six years. Each nomination should include: name, current address, current email, current institution, brief curriculum vitae, list of up to ten key publications, and a description of the candidate's contribution to input-output analysis of no more than 100-200 words. Two additional IIOA members, excluding the nominee and the Fellows, must provide letters of support for each nomination. Nominations from previous years are not carried over; in this case re-nominations will be required.

All Fellows are eligible to vote on the nominees. Up to two new Fellows of the IIOA may be elected, and any newly elected Fellows will be installed as such during a plenary event at the conference. Fellows may call themselves Fellows of the IIOA and have the right to free membership in the IIOA. Fellows have the obligation to further promote the development and to advocate suitable application of input-output analysis, broadly defined.

Thank you for your active participation.

Geoffrey Hewings (hewings@illinois.edu)

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# Fellows corner

## Meet the new Fellow

### Manfred Lenzen

Manfred Lenzen is Professor of Sustainability Research at Integrated Sustainability Analysis (ISA) in the School of Physics at the University of Sydney. Manfred has a PhD in Nuclear Physics and 15 years of experience in renewable energy technologies. He has undertaken extensive experimental research on passive solar architecture. He is an international leader in economic Input-Output Analysis and Life-Cycle Assessment, is Associate Editor for the Journal of Industrial Ecology, and is the Editor-in-Chief of the journal Economic Systems Research. He has contributed major methodological advances as well as numerous applications, in particular on embodied energy and greenhouse gas emissions.

## Interview

**How was that you started working on IOA? Are there people or events that have been influential in your career?**

**Manfred Lenzen (M.L.):** When I studied Physics at the University of Bonn, Prof Klaus Heinloth had a major influence on me, and essentially made me environmentally aware, concerned and literate. Later I was working in the Department of Applied Physics at the University of Sydney under Prof Richard Collins, on renewable energy and energy conservation technologies, with whom I had many good debates. The question struck me, whether the technologies we were developing would generate or conserve more energy over their lifetime than they would require when being manufactured. When reading up on the literature, I came across input-output analysis.

**You have impeccable credentials (degrees, professorships, fellowships, etc.), but having degrees doesn't automatically prepare one to do great research work like you have done. How did you pick up your impressive reasoning skills? What sets you apart from other researchers?**

**M.L.:** Thank you for the kind words. I am not sure about being "impeccable" and "impressive", or being set apart from other researchers. When I look back and re-read some of the papers I've written I'm not that impressed myself with them. When I think of other researchers I think of what I owe them rather what sets me apart from them. I owe a lot to the support, friendship, advice and inspiration of a handful of people, amongst them Klaus Heinloth and Richard Collins, my professors at the Universities of Bonn and Sydney, as well as my colleagues Marcela Bilek, Ted Trainer, Tommy Wiedmann and Barney Foran. Then I think there are a few people, amongst them George Monbiot, Bill McKibben or Jim Hansen, who we owe for getting science-based messages out into the real world.

Having fun whilst working has been very important. I've had the best time whenever I was working with colleagues who have a good sense of humour, or in stimulating environments. I will never forget working in Brazil with Roberto Schaeffer, and in Japan with Ryuji Matsuhashi, and their teams. I also have fond memories of working with my colleagues in the Pacific. Despite of, or maybe because of being on "island time", we produced good work (Lenzen, M., M. Krishnapillai, D. Talagi, J. Quintal, D. Quintal, R. Grant, S. Abraham, C. Ehmes and J. Murray (2014) Cultural and socio-economic determinants of energy consumption on small remote islands. Natural Resources Forum 38, 27-46; http://www.isa.org.usyd.edu.au/research/islands.shtml).

**What place would Input-Output analysis occupy in the History of Economic Thought? How would you relate Input-Output to different (and sometimes competing) schools of thought (Classical-Keynesian/Neoclassical)?**

**M.L.:** I can't answer this question confidently because I am not an economist (the same holds for the other questions have omitted answering; so much for "impeccable…")

**What are from your point of view the hot topics that IOA could address and has not done yet (or too slightly)? What other disciplines could enhance IOA the most?**

**M.L.:** I can't answer this question in all its generality for our field, but I have published a few ideas in the paper Lenzen, M. (2014) An outlook into a possible future of footprint research. *Journal of Industrial Ecology* 18, 4-6. I wish we could integrate Bob Costanza's social traps (Costanza, R., P.W.B. Atkins, M. Bolton, S. Cork, N.J. Grigg, T. Kasser and I. Kubiszewski (2017) Overcoming societal addictions. *Ecological Economics* 131, 543-550) into input-output analysis, but so far I don't know how.

**What do you think the most important recent developments in the field have been? What do you think will be the most exciting and productive areas of research in IOA during the next few years?**

**M.L.:** I think the best answer to this question can be provided by the paper Dietzenbacher, E., M. Lenzen, B. Los, D. Guan, M.L. Lahr, F. Sancho, S. Suh and C. Yang (2013) Input–output analysis: The next 25 years. *Economic Systems Research* 25, 369-389.

**What is your pet peeve with IOA-related published papers?**

**M.L.:** That we seem to be unable to make a tangible difference in the world. Sometimes I ask myself: What do we do after we've extolled the environmental virtues of our research work at some conference or workshop? We go home and carry on as if there were no climate change. Sometimes, it seems to me as if there we are in complete collective denial of what's in store for our children.

**Do you have other tips for doing great applied research work?**

**M.L.:** Always ask yourself the question: "So what?" Can the results I have obtained be obtained by a simpler or standard method? Who needs to know what I have found out? What real-world problem cannot be solved without knowing my results? Be very concrete in your answers to yourself, avoid answers such as "might be useful for…" or "could assist…", instead try to come up with names of people of institutions.

**Your best work is…?**

**M.L.:** Lenzen, M. and C. Dey (1996) Do we really care about climate change? *Search* 27(9), 277-280. I think this is what my mentor Klaus Heinloth would have wanted me to do most of all. As for more recent work, I feel Lenzen, M., A. Malik and B. Foran (2016) How challenging is decoupling for Australia? *Journal of Cleaner Production* 139, 796-798 is useful, because it challenges the efficacy of decoupling.

**The work that took you longest is…?**

**M.L.:** Lenzen, M. (2004) The genealogy of the family Capitaine of Pier, Germany. *Dürener Geschichtsblätter* 86, 215-230. I started researching my family tree as a boy, in 1976. At some stage I was researching Prof von Capitaine, a well-known Baron from the region where I grew up. This man was born a commoner, but assumed his title after claiming descent from a Luxembourg noble family. After some lengthy investigations involving archives in communist East Germany, I was able to show that he tried unsuccessfully to prove his noble descent to the authorities, and that he probably unlawfully assumed his title. This took 28 years, a bit longer than Project Réunion… (http://www.isa.org.usyd.edu.au/mrio/mrio.shtml)

**You obviously have a very successful research career. How do you feel now about the pressure to publish? Has your view changed over the years?**

**M.L.:** I feel that publishing something for the sake of it, that is, without solving a substantial underlying problem, can be a waste of time and resources. Recent years have seem a profusion of scientific publications, but have they brought us much closer to addressing the big issues of our time? On the other hand, I understand the situation of researchers faced with their institutions' insistence on performance indicators, often leaving them without choice.

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# Prizes

## 2016 Graedel Prizes


The Journal of Industrial Ecology (JIE) Best Paper Prizes:

Combining Multiregional Input-Output Analysis with a World Trade Model for Evaluating Scenarios for Sustainable Use of Global Resources, Part I: Concepts

**F. Duchin, S.H. Levine, and A. Stromman**
*Journal of Industrial Ecology,*
20(4): 775-782, 2016

Consumption in a particular country often entails resource extraction, production, and environmental degradation in remote locations. This fact has stimulated a growing body of empirical analysis using input-output (I-O) databases and techniques to reveal and quantify the underlying linkages. Two lines of research rooted in I-O economics, multiregional input-output (MRIO) analysis and I-O modeling of the world economy, describe and analyze these relationships, the first for the past, increasingly in the form of footprints and the underlying pathways, and the latter under alternative scenarios about possible courses of action in the future. The article shows how organizing such scenario outcomes into an MRIO database can extend the reach of MRIO analysis to the future while simultaneously supplementing the capabilities of the world trade modeling framework. We describe the compilation of an MRIO database from the results of scenario analysis using the world trade model (WTM) in a companion article (Part II, Implementation); the subsequent application of MRIO techniques to this database permits the evaluation of prospects for the future. We also address several overlooked challenges, namely, the need to include factor endowments and distances between potential trade partners in an MRIO database, the representation of sectors providing transport of internationally traded goods, and the manipulation of mixed physical and money units when both quantities and prices are endogenous.

Combining Multiregional Input-Output Analysis with a World Trade Model for Evaluating Scenarios for Sustainable Use of Global Resources, Part II: Implementation

**F. Duchin and S.H. Levine**
*Journal of Industrial Ecology*
20(4): 783–791, 2016

The standard multiregional input-output (MRIO) framework can be combined with the outcomes of analysis using a model of the world economy to calculate footprints and other path-based results for scenarios about the future. A companion article, entitled "Combining multiregional input-output analysis with a world trade model for evaluating scenarios for sustainable use of global resources, part I: Conceptual framework," describes our approach for extending the reach of MRIO techniques from descriptions of the past to prospects for the future. Here, we demonstrate the mathematics for converting scenario outcomes obtained using an input-output (I-O) model of the world economy to MRIO flow tables and then applying MRIO footprinting techniques to the resulting MRIO database. A numerical example comparing water footprints under alternative scenarios demonstrates that the world model outcomes are a sounder basis for the analysis of scenarios than the standard MRIO approach and identifies the reason why this is so. The approach described in this article integrates two previously distinct lines of research in I-O analysis, enlarging opportunities for collaboration on both the formulation and analysis of scenarios that can provide concrete guidance for longer-term strategies.

## GTAP Team Award

2017 Recipients: European Commission - Joint Research Centre and DG Trade - For collaborating on the incorporation of the 28 EU I-O tables for the GTAP Data Base.

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# Published papers and books in IOA and related methods

## Latest ESR articles


**Economic Systems Research**
**Journal of the IIOA**
**Volume 29, Issue 3, 2017**

**Avelino, A. F. T.** (2017) Disaggregating input–output tables in time: the temporal input–output framework. *Economic Systems Research*, 29(3): 313-334.

The input–output framework has evolved dramatically since its initial formulation. New analytical techniques and extensions have allowed a more comprehensive assessment of the economy and expanded its applicability. Nonetheless, the core of the framework has remained unchanged: an annually compiled input–output table, which conveys monetary flows between sectors in a region in a particular year. Hence, the technical coefficients derived from it are 'average' input compositions, neglecting fluctuations in production capacity, seasonality and temporal shocks within that period. This paper develops a consistent methodology to disaggregate the annual input–output table in its time dimension in order to estimate intra-year input–output matrices with distinct technical structures for a particular year. The main advantages in relation to the annual model are to allow seasonal effects to be studied within the input–output framework, to better understand the process of coefficient change and to offer a more comprehensive dynamic view of production.

**Nansai, K., K. Nakajima, S. Suh, S. Kagawa, Y. Kondo, W. Takayanagi, and Y. Shigetomi** (2017) The role of primary processing in the supply risks of critical metals. *Economic Systems Research*, 29(3): 335-356.

This study seeks to understand the role of primary processing, i.e. the first post-mining stage, in supply risk, by means of a case study on three critical metals (neodymium, cobalt, and platinum) in the context of Japan. Applying the 'footprint' concept with a multiregional input–output model, we have quantified the direct and indirect vulnerability of the Japanese economy to such risks. Considering the supply risks associated with primary processors, we find that Japanese final consumers are exposed to relatively higher supply risks for neodymium as compared with cobalt and platinum. Our study shows that the primary processing stage of a metal's supply chain may contribute significantly to the overall supply risks, suggesting that this stage should be taken into due account in understanding and mitigating supply-chain vulnerability through, e.g. supplier diversification and alternative material development.

**Schütz, M. H.** (2017) Australia's regional innovation systems: inter-industry interaction in innovative activities in three Australian territories. *Economic Systems Research*, 29(3): 357-384.

Regional specifics reveal in differences in economic activity and structure, the institutional, socio-economic and cultural environment and not least in the capability of regions to create new knowledge and to generate innovations. Focusing on the regional level, this paper for three Australian territories (New South Wales, Victoria and Queensland) explores patterns of innovative activities in their private business sectors. Furthermore, these patterns are compared to specifics of each region's economic structure. We make use of input–output-based innovation flow networks, which are directed and weighted instead of binary. The value added of the proposed analysis is that we are able to trace a variety of different aspects related to the structure of innovative activities for each territory. It gets evident that mostly innovative activities in each territory are not strong in 'niche' branches but in fields of intense economic activity, signalising the high path-dependency of innovative activities in a specific geographical environment.

**Kristkova, Z. S., C. Gardebroek, M. van Dijk, and H. van Meijl** (2017) The impact of R&D on factor-augmenting technical change – an empirical assessment at the sector level. *Economic Systems Research*, 29(3): 385-417.

The aim of the paper is to quantify endogenous factor-augmenting technical change driven by R&D investments in a panel of 11 OECD countries over 1987–2007. This paper contributes to the scant empirical evidence on the speed, sources and direction of technical change for various sectors and production factors. Assuming cost-minimization behavior, a CES framework is used to derive a system of equations that is estimated by a GMM system estimator. The estimated factor-augmenting technology parameters show that in most sectors, technical change was labor-augmenting and labor-saving. Statistically significant effects of manufacturing and services R&D were found on factor-augmenting technical change (with the highest R&D elasticities found in the high-tech manufacturing and transport, storage and communication sectors). Whereas 'in-house' R&D stimulates total factor productivity, R&D spilled over to other sectors has a capital-augmenting effect accompanied by a higher use of labor. The results of this study provide a starting point for incorporating endogenous factor-augmenting technical change in impact assessment models aimed at broad policy analysis including economic growth, food security or climate change.

**Cho, C.** (2017) A note on distortions from estimating the regional impacts of exogenous changes in output. *Economic Systems Research*, 29(3): 418-429.

This paper demonstrates both theoretically and empirically that when outputs instead of final demands are exogenously predetermined, the traditional Leontief final demand model overestimates economic impact, and even more so in a multiregional context. We assess this premise vis-à-vis the Leontief output model using the 2013 interregional input–output table of the Republic of Korea. We find that from a multiregional perspective the standard Leontief final demand model yields substantially biased output multipliers for Chungbuk Province.

**Su, Y., H. Yang, and C. Lin** (2017) Increase of electricity price and energy efficiency: analysis using the macroeconomic interindustry model of Taiwan. *Economic Systems Research*, 29(3): 430-451.

From 2012 to 2013, the price of electricity in Taiwan increased by 19.78%. This large increase forced producers to invest in improving electricity efficiency. In this paper, the macroeconomic interindustry model of Taiwan (MEIT) is developed to study the economic effects of high electricity prices and consequential improvement in energy efficiency. MEIT describes the structure of 47 industries, from both real and price-income approaches. To resolve inconsistent data, RAS is employed. A technical model is also integrated to consider technical feasibility, which offsets the usual shortcomings of technological analysis in an economic model. The iron and steel industry is taken as a case study. Estimated results indicate that higher electricity prices negatively affect Taiwan's economy. However, improving energy efficiency can reduce some of this effect.

**Oosterhaven, J.** (2017) On the limited usability of the inoperability IO model. *Economic Systems Research*, 29(3): 452-461.

This note shows that the inoperability input–output model (IIM) estimates only a part of mainly the negative indirect economic impacts of disasters, whereas it neglects most of the positive indirect impacts. This means that the IIM is not suited to prioritize industries for policy interventions that aim at reducing the negative impacts of such disasters. Besides, this note shows that the application of the IIM is problematic and tends to overestimate the subset of impacts that the model is able to quantify. Finally, we identify two approaches that much better capture the variety of different disaster impacts.


**Economic Systems Research**

**Journal of the IIOA**

**Latest articles** (up to 31th July)

**Fujii-Gambero, G., and R. Cervantes-Martínez**. The weak linkages between processing exports and the internal economy. The Mexican case. *Economic Systems Research.*

The aim of this paper is to show the internal linkages of manufacturing exports and the rest of the economy. We take the Mexican economy as the case of study. Manufacturing exports constitute the most of exports and processing

exports (maquiladora) represent an important part of them. We consider the indirect domestic value added contained in Mexican manufacturing exports, dividing them into exports from the internal economy and the maquiladora industry. We show that the internal backward linkages of exports are weak, that only a few sectors produce inputs for exports, and that the forward linkages are weak too because the Mexican maquiladora industry assembles imported parts and components into final goods for export. The actual picture is quite different from that presented by Hirschman [(1958) The Strategy of Economic Development. New Haven, Yale University Press], who argued that the manufacturing sector plays a key role to promote economic growth because of its dense forward and backward internal linkages.

**Román, M. V., I. Arto, and A. Ansuategi.** Why do some economies benefit more from climate finance than others? A case study on North-to-South financial flows. *Economic Systems Research.*

The Copenhagen and Paris Agreements, in which developed countries committed to mobilise USD 100 billion a year by 2020, indicate that climate finance will continue to grow. Even though economic development is not the aim of climate finance, climate-related disbursements will generate an economic impact on recipient countries' economies. This impact will also reach other countries (including climate finance donors) through induced international trade. In this paper, we apply a structural decomposition analysis to study why the economic impact of climate finance varies between countries. We focus on specific climate actions and quantify the contribution of four drivers: value-added intensity, domestic multiplier, foreign multiplier and trade structure. The paper helps identifying the factors with the greatest potential to enhance the economic gains of climate finance in each country. This information can be useful for policy-makers trying to design national strategies that exploit the synergies between climate action and economic development.

**Peneder, M., and G. Streicher.** De-industrialization and comparative advantage in the global value chain. *Economic Systems Research.*

We investigate the causes of de-industrialization and potential for re-industrialization using trade-linked input–output data from WIOD. By introducing a new global value chain measure of comparative advantage, we relate a sector's share in domestic final demand to that in production and separate the direct effect of trade on its income share. This method identifies the declining share of manufacturing value added in domestic final expenditures to be the main cause of de-industrialization. Differences in comparative advantage between countries do matter, especially in the case of employment shares, but have a limited impact via the direct trade effect on value added. The findings point to a peculiar paradox of industrial policy: precisely when it is successful in raising competitiveness and hence productivity growth of manufacturing, it also furthers the global decline of relative prices in manufacturing. In contrast to the national objectives of re-industrialization, effective industrial policies accelerate de-industrialization in the global economy.

**Incera, A. C.** Drivers of change in the European youth employment: a comparative structural decomposition analysis. *Economic Systems Research.*

This paper uses a structural decomposition approach to examine the proximate causes of change in the EU15 youth workforce from 1995 to 2011. Besides the traditional sources considered by the literature, I include age-specific factors: a labor utilization index that accounts for the hours that employed youth work by showing the extent of part-time contracts; an age mix factor that indicates the share that youth comprise of total employment and, finally, changes in the inverse of the overall sectoral labor productivity, which describes variations in total labor demand. By applying this approach, I identify the core drivers behind the recent changes in the evolution of youth employment in each of the 15 countries; this is crucial for tailoring policy strategies. Results suggest that to foster youth employment, most Mediterranean countries should implement youth-specific measures while other EU15 countries could do so by enhancing overall employment.

**Liang, S., Y. Wang, C. Zhang, M. Xu, Z. Yang, W. Liu, H. Liu, and A.S.F. Chiu.** Final production-based emissions of regions in China. *Economic Systems Research.*

Existing studies focus on either direct emissions of each province in China using production-based accounting (i.e. direct emitters) or emissions caused by the final consumption of each province using consumption-based accounting (i.e. final consumers), but overlook provinces whose final sales drive large amounts of upstream emissions (i.e. final producers). Improving the production efficiency of the latter can help to reduce national emissions. Here we use a final production-based accounting framework to identify critical final producers. Results show that the major final producers leading to China's emissions are Hebei, Shandong, Jiangsu, Zhejiang, and Guangdong, which are the major manufacturing centers in China. China should encourage the production efficiency improvement of dominant firms in industries of these provinces. The final production-based accounting framework can also help to define and allocate emission responsibilities of Chinese provinces. It can complement production-based and consumption-based accounting frameworks to guide environmental policy-making in China.

**Phimister, E., and D. Roberts.** Allowing for uncertainty in exogenous shocks to CGE models: the case of a new renewable energy sector. *Economic Systems Research.*

The paper explores the importance of allowing for uncertainty in the magnitude of exogenous shocks in Computable General Equilibrium (CGE) models. The shock examined is the introduction of a new onshore wind sector in North East Scotland. A simple analytical model is developed to show how, a priori, the size of the new sector (the model shock) is uncertain and asymmetrically distributed as a result of spatial correlation in costs and returns across potential development locations. The importance of allowing for this uncertainty is tested by comparing the results from a CGE model where the sector size is assumed known with certainty to those from a model where the sector size is a random variable with an asymmetric distribution. The results show the extent to which allowing for uncertainty can influence the magnitude of estimated impacts with some variables more sensitive to the uncertainty than others.

**Duchin, F., and S.H. Levine.** Choosing among alternative technologies: conditions for assuring the feasibility of an input–output database or scenario. *Economic Systems Research.*

The conceptual reach of the basic input–output modeling framework is substantially extended by new models that incorporate the economic logic of comparative advantage as the basis for the endogenous choice among alternative production technologies. This paper establishes procedures that define the conditions under which the database used for scenario analysis in this extended framework assures the existence of an economically feasible solution. We provide a criterion for structural feasibility, the property established by the Hawkins–Simon condition for the basic input–output model, and introduce a criterion for scale feasibility. The logic underlying the tests is illustrated by numerical examples based on the Rectangular Choice-of-Technology model and database. These procedures can be particularly useful for incorporating engineering and other technical sources of information into multi-regional input–output databases; they can also provide substantial underlying detail about individual technologies, sectors, and factors of production for both feasible and infeasible scenarios.

**Poissonnier, A.** A general weighted least squares approach for the projection of input–output tables. *Economic Systems Research.*

In the context of input–output analysis, it is often necessary to update a matrix for a date when only the sum of its columns and rows are known. This projection problem is quite similar to temporal disaggregation. I borrow from this literature a class of solutions for which the exact result can be implemented without iteration. These solutions minimize the adjustment made to the out-of-date matrix and as such can be said optimal according to a chosen criteria. The framework I expose is flexible enough to encompass many of the existing methods and develop new ones. I propose one of such methods to project a matrix between two given benchmarks. I exemplify the technique on 35 years of input–output tables for France and show in particular that the issue of negative cells can be avoided.

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# Highlights in journals

**Amaral, J. F. do, and J. C. Lopes** (2017) Forecasting errors by the Troika in the economic adjustment programme for Portugal. *Cambridge Journal of Economics*, 41(4):1021-1041.

This article presents an evaluation of the economic adjustment programme negotiated between the Portuguese government and the Troika (European Commission, ECB and IMF) in May 2011, using an assessment that is different from the usual studies. Instead of a comparison between the actual results and the proposed targets, an evaluation of the quality of the programme forecast is made, showing that errors could have been avoided if the productive (input–output) structure of the economy and also the unemployment rate/external deficit trade-off had been taken into account. The main conclusion of this assessment is that a large underestimation of the unemployment rate was made, amounting to about four percentage points, which illustrates the technical flaw of this adjustment programme and the huge economic and social costs it unnecessarily caused. The methodology used can easily be replicated for assessing other similar programmes, such those applied in Greece, Ireland and Cyprus.

**Guevara, Z., T. Domingos** (2017) The multi-factor energy input-output model. *Energy Economics*, 61:261-269.

Energy input–output analysis (EIO analysis) is a noteworthy tool for the analysis of the role of energy in the economy. However, it has relied on models that provide a limited description of energy flows in the economic system and do not allow an adequate analysis of energy efficiency. This paper introduces a novel energy input–output model, the multi-factor energy input–output model (MF-EIO model), which is obtained from a partitioning of a hybrid-unit input–output system of the economy. This model improves on current models by describing the energy flows according to the processes of energy conversion and the levels of energy use in the economy. It characterizes the vector of total energy output as a function of seven factors: two energy efficiency indicators; two characteristics of end-use energy consumption; and three economic features of the rest of the economy. Moreover, it is consistent with the standard model for EIO analysis, i.e., the hybrid-unit model. This paper also introduces an approximate version of the MF-EIO model, which is equivalent to the former under equal energy prices for industries and final consumers, but requires less data processing. The latter is composed by two linked models: a model of the energy sector in physical units, and a model of the rest of the economy in monetary units. In conclusion, the proposed modelling framework improves EIO analysis and extends EIO applications to the accounting for energy efficiency of the economy.

**Acemoglu, D., A. Ozdaglar, and A. Tahbaz-Salehi**. Microeconomic origins of macroeconomic tail risks. *American Economic Review*, 107(1):54-108.

Using a multisector general equilibrium model, we show that the interplay of idiosyncratic microeconomic shocks and sectoral heterogeneity results in systematic departures in the likelihood of large economic downturns relative to what is implied by the normal distribution. Such departures can emerge even though GDP fluctuations are approximately normally distributed away from the tails, highlighting the different nature of large economic downturns from regular business-cycle fluctuations. We further demonstrate the special role of input-output linkages in generating tail comovements, whereby large recessions involve not only significant GDP contractions, but also large simultaneous declines across a wide range of industries.

**Lopes, J. C., and J. F. do Amaral** (2017) Self-defeating austerity? Assessing the impact of a fiscal consolidation on unemployment. *The Economic and Labour Relations Review*, 28(1): 77-90.

The great recession of 2008/2009 had a huge impact on unemployment and public finances in most advanced countries, and these impacts were magnified in the southern Euro area by the sovereign debt crisis of 2010/2011. The fiscal consolidation imposed by the European Union on highly indebted countries was based on the assumptions of so-called expansionary austerity. However, the reality so far provides proof to the contrary, and the results outlined in this article support the opposing view of a self-defeating austerity. Based on a model of the input–output relations of the productive system, an unemployment rate/budget balance trade-off equation is derived, as well as the impact of a strong fiscal consolidation based on social transfers and the notion of a neutral budget balance. An application to the Portuguese case confirms the huge costs of a strong fiscal consolidation, both in terms of unemployment and social policy regress. The conclusion is that too much consolidation in anyone year makes consolidation more difficult in the following year.

**Poetzsch, C.** (2017) Technology transfer on a two-way street: R&D spillovers through intermediate input usage and supply. *Review of World Economics*, 28:1-17.

Intermediate input usage is known to channel R&D spillovers across countries and industries. This paper highlights that technology also diffuses across countries and industries through intermediate input supply. Technology transfer to intermediates suppliers ensues from R&D that induces a demand for technologically advanced intermediates. I analyze R&D spillovers through intermediate input usage and supply for 18 manufacturing industries in 20 OECD countries over 1987–2009. Results support both use- and supply-driven R&D spillovers. Comparing their effects reveals interesting variations. Among domestic industries, intermediate input supply is the dominant channel. For international relations, both use- and supply-driven R&D spillovers are found.

**Wilting, H.C., A.M. Schipper, M. Bakkenes, J.R. Meijer, and M.A.J. Huijbregts** (2017) Quantifying biodiversity losses due to human consumption: a global-scale footprint analysis. *Environmental Science & Technology*, 51(6):3298–3306.

It is increasingly recognized that human consumption leads to considerable losses of biodiversity. This study is the first to systematically quantify these losses in relation to land use and greenhouse gas (GHG) emissions associated with the production and consumption of (inter)nationally traded goods and services by presenting consumption-based biodiversity losses, in short biodiversity footprint, for 45 countries and world regions globally. Our results showed that (i) the biodiversity loss per citizen shows large variations among countries, with higher values when per-capita income increases; (ii) the share of biodiversity losses due to GHG emissions in the biodiversity footprint increases with income; (iii) food consumption is the most important driver of biodiversity loss in most of the countries and regions, with a global average of 40%; (iv) more than 50% of the biodiversity loss associated with consumption in developed economies occurs outside their territorial boundaries; and (v) the biodiversity footprint per dollar consumed is lower for wealthier countries. The insights provided by our analysis might support policymakers in developing adequate responses to avert further losses of biodiversity when population and incomes increase. Both the mitigation of GHG emissions and land use related reduction options in production and consumption should be considered in strategies to protect global biodiversity.

**Oosterhaven, J. and J. Többen** (2017) Wider economic impacts of heavy flooding in Germany: a non-linear programming approach. *Spatial Economic Analysis*, 1-25.

Wider economic impacts of heavy flooding in Germany: a non-linear programming approach. Spatial Economic Analysis. This paper further develops a new methodology to estimate the wider, indirect impacts of major disasters, and applies it to the 2013 heavy flooding of southern and eastern Germany. We model the attempts of economic actors to continue their usual activities, as closely as possible, by minimizing the information gain between the pre- and post-disaster pattern of economic transactions of the economy at hand. Findings show that government support of local final demand substantially reduces the indirect losses of the floods, while having a disaster at the top of the business cycle increases them. Moreover, we find that assuming fixed trade origin shares and fixed industry market shares, as in all multiregional input– output models, leads to implausibly large estimates of the indirect losses.

**Los, B., P. McCann, J. Springford, and M. Thissen** (2017) The mismatch between local voting and the local economic consequences of Brexit. *Regional Studies,* 51(5):786-799.

The mismatch between local voting and the local economic consequences of Brexit. Regional Studies. This paper reveals that in the 2016 UK referendum regarding whether to remain in or leave the European Union, the regions that voted strongly for leave tended also to be those same regions with greatest levels of dependency on European Union markets for their local economic development. This observation flies in the face of pro-leave narratives that posited that the major beneficiaries of European Union membership were the 'metropolitan elites' of London. Economic geography dominated the observed voting patterns, and geography will also certainly dominate the post-Brexit economic impacts, but not necessarily in a way that voters anticipated or wished for.

**Guevara, Z., O. Córdoba, E. X. M. Garcia, and R. Bouchain** (2017) The status and evolution of energy supply and use in Mexico prior to the 2014 energy reform: An input-output approach. *Economies*, 5(1):1-17.

In 2014, the Mexican government approved a bold energy reform that allows private energy companies to freely participate in the energy market (something prohibited during the previous eight decades). This reform is expected to significantly restructure the energy sector and boost and diversify the energy production. Moreover, changes in the energy sector and production might lead to structural changes in the rest of the economy and ultimately generate significant economic benefits for the country. Nevertheless, the fundamental role of the energy sector in this oil producing country makes the potential impacts of the reform complex to forecast. The objective of the study is to analyze the current state, evolution, and driving factors of the total primary energy use in Mexico in 2003–2012 (prior to the implementation of the reform) as a precedent for future analyses of impacts of the energy reform. The results show three driving factors of the evolution of primary energy use: final non-energy demand, direct energy intensity, and economic structure. Also, it was found that the energy sector has been in a precarious situation regarding its structure and efficiency. However, this situation had a small effect on the evolution of primary energy use.

**Sharify, N., V.T. Omran, and T.V. Ahangaree** (2017) The Impact of Exchange Rate Devaluation on Price Indices of Exported Goods in Iran. *Iranian Economic Review*, 21(1):85-99.

Exchange rate is an important factor influencing price indices of exported goods of a country in different ways. Imported intermediate commodity is one of the important ways by which the change in exchange rate affects price indices of the exported goods. Using the input-output table of Iran for the year 2001, this paper investigates the impact of exchange rate devaluation on price indices of exported goods in Iran. The results of the research indicate that, when all agents do not adjust their earnings exactly with respect to price indices of products, the exchange rate pass-through is partial; therefore the increment in the level of exported prices is less than that of exchange rate variation. In contrast, when all agents adjust their earnings with respect to price indices, the price indices of all products will increase as much as exchange rate variation, hence, the pass-through is complete, and as a result, the current devaluation policy is neutral.

**Wilting, H.C., and M.M.P. van Oorschot** (2017) Quantifying Biodiversity Footprints of Dutch Economic Sectors: A Global Supply-Chain Analysis. *Journal of Cleaner Production*, 156:194-202.

Economic sectors contribute to biodiversity loss via environmental pressures, such as land use and greenhouse gas (GHG) emissions, directly and via their supply chains. This study is the first that systematically quantifies supply-chain-related environmental pressures and terrestrial biodiversity losses in relation to sectoral production by presenting so-called biodiversity footprints for 47 sectors in the Dutch economy. The supply chains of the food and chemical sectors were investigated in more detail, by applying a structural path analysis. Mean Species Abundance (MSA) was used as a biodiversity indicator, representing the degree of ecosystem naturalness. Our results revealed that (i) the largest supply-chain-related biodiversity losses occur in land-intensive and energy-intensive sectors; (ii) sectors that produce primary resources, such as crops and livestock, showed the largest biodiversity footprint per EUR of output; (iii) for most sectors in the Dutch economy, more than 50% of the biodiversity losses related to their supply chains were being caused abroad; and (iv) more than 45% of the supply-chain-related losses caused by the food and chemical sectors occurred upstream of the direct suppliers. Our results imply that mitigation of GHG emissions as well as land-use-related options should be considered in sectoral strategies to protect global biodiversity. The results create a clear rational for not only improving sectoral production efficiency, but also for taking supply-chain responsibility. Supply-chain-related biodiversity losses often cannot be directly influenced by the sector, or occur in other countries. Additional strategies may be needed then to reduce global biodiversity losses.

**Allan, G.J., P. Lecca, and K. Swales** (2017) The impacts of temporary but anticipated tourism spending: An application to the Glasgow 2014 Commonwealth Games. *Tourism Management*, 59(1):325-337.

An extensive literature attempts to identify the economic impact of tourism expenditure. While Input-Output methods have been widely applied these may not always be appropriate for such applications and there is a growing use of more flexible Computable General Equilibrium (CGE) approaches. This paper uses a multi-period Scottish CGE model to estimate the system-wide effects of the temporary tourism expenditure related to the Glasgow 2014 Commonwealth Games. We quantify the sensitivity of our results to model specification, focusing in particular on how investment and consumption decisions are made and shifted over time to accommodate the temporary tourism shock. As part of this analysis we identify the pre-announcement period that optimises the present value of the economic impact. Whilst the empirical results apply to a specific event, our results have implications for similar analyses applied to mega events and other temporary phenomena affecting tourism expenditure, such as terrorism attacks or epidemics.

**Guevara, Z., and T. Domingos** (2017) Three-level decoupling of energy use in Portugal 1995-2010. *Energy Policy*, 108:134-142.

Primary energy intensity in Portugal declined by 20% in the two decades to 2010, a significant achievement in energy decoupling. However, more progress is needed to comply with current EU climate directives. The objective of this work is to analyze the main determining factors of primary energy use that drove energy decoupling in Portugal in 1995–2010 with a focus on understanding the contribution of the three levels of energy consumption, and on identifying opportunities for policy intervention. To do so, we perform a structural decomposition analysis on a novel energy input-output model that includes the primary, secondary and useful levels of energy consumption and the conversion processes between them. The results show that Portugal experienced relative energy decoupling. While final energy and non-energy demands contributed to energy coupling, sectoral useful energy intensity, the structure and efficiency of the energy sector, end-use energy conversion efficiency and structural changes in the rest of the economy were the main decoupling forces. Moreover, the advantages of the proposed three-level decoupling analysis for energy policy are shown. In addition, to the best of our knowledge, the present paper constitutes the first energy input-output study to include useful energy flows (measured as exergy).

**Ribeiro, L.C. de S., E.P. Domingues, F.S. Perobelli, and G.J.D. Hewings** (2017) Structuring investment and regional inequalities in the Brazilian Northeast. *Regional Studies.*

Structuring investment and regional inequalities in the Brazilian Northeast. *Regional Studies*. This paper evaluates the long-run regional impacts of the construction of three oil refineries proposed for Brazil's Northeast (NE) region. A dynamic, interregional computable general equilibrium (CGE) model was developed, with 28 regions in the NE and the rest of Brazil and 30 sectors. The database construction methodology could be applied to any other country. The main results of the refinery investment simulations in the NE indicate positive impacts in all regions. However, the construction and operation of these three refineries would generate an increase in intraregional inequalities. On the other hand, in the long run, these investments could contribute to the NE gaining an increased relative share of Brazilian gross domestic product (GDP).

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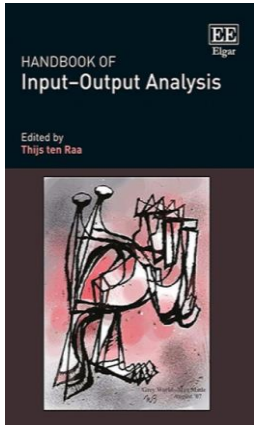
# Highlights in Books

## Handbook of Input–Output Analysis

Edited by Thijs ten Raa, Associate Professor of Economics, Edward Elgar Publishing, 2017




In this authoritative Handbook, leading experts from international statistical offices and universities explain in detail the treatment and role of input-output statistics in the System of National Accounts. Furthermore, they address the derivation of input-output coefficients for the purpose of economic and environmental modeling, the building of applied general equilibrium models, the use of these models for efficiency analysis, and the extensions to stochastic and dynamic input-output analysis. As well as revealing and exploring the theoretical foundations, the Handbook also acts as a useful guide for practitioners.

### Critical Acclaim

'Covering a wide range of topics, this practical handbook provides not only a useful compilation of fundamental knowledge but also of the history of input-output analysis, reminding us of the inspiring efforts of its pioneers. The book is a welcome and much-needed reference for novices as well as for established researchers in IOA who want to expand their analytical portfolio. Many facets of IOA are explained and referenced in detail, ranging from underlying basics and concepts to state-of-the-art developments.'

**Thomas Wiedmann**, UNSW Australia.

'This is a wonderful book covering the key topics of input–output analysis, from the basics to its link with national accounting, along with new approaches to the construction of input-output tables. The coverage roams from conventional applications to the frontiers of theory and practice, including the turn to international trade. It is not only an excellent guide for beginners, but also a good "appetizer" for input–output academics and professionals to explore their favorite or hot topic further. You will benefit from reading this book.'

**Cuihong Yang**, Chinese Academy of Sciences, China.

'This edited volume represents an excellent selection of chapters compiled by the pre-eminent economist in the field of input-output economics, Thijs ten Raa. The topics covered include a methodological chapter on the supply and use framework of national accounts; environmental accounting in an input-output framework; the measurement of productivity growth, factor content, and mutlipliers; the treatment of the service sector in input-output economics; the treatment of international trade in this framework; and general equilibrium analysis in the CGE model.'

**Edward Wolff**, New York University, US.

'The dramatic development of global production networks in the last few decades has inspired new analytical insights in the field of international trade and environmental economics. The input–output analysis, once considered "old-fashioned," was brought back to the stage as a key analytical tool, and this Handbook's impeccable timing captures these emerging academic interests and refreshes the image of traditional input–output users. This unique publication features multi-dimensional coverage of relevant topics rallying the expertise of statisticians, theorists, and practitioners, and hence is expected to serve a wide range of today's scientific needs. A highly informative read for students, scholars, business persons, and policy-makers alike.'

**Satoshi Inomata**, IDE-JETRO, Japan.

## Environmental and Economic Impacts of Decarbonisation: Input-Output Studies on Consequences of the 2015 Paris Agreements

Edited by Óscar Dejuán, Manfred Lenzen and Maria Ángeles Cadarso,
Routledge, 2017


On December 12th, 2015, at the United Nations Conference on Climate Change held in Paris, 195 countries adopted the first-ever universal and legally binding climate deal. They agreed to decarbonize the economy in order to hold the increase in the global average temperature to well below 2ºC relative to the preindustrial levels.

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Although each country is free to design its own strategy on mitigation and adaptation, it will be bound to such strategy and is supposed to implement the bulk of the adjustments by 2050.

Many questions arise from the Paris Agreement that points to a second Industrial Revolution. What are the required changes in the structure of production and in the patterns of consumption? What will be their impacts on emissions, employment and international trade? This book answers these questions from a variety of input-output models able to compute the impacts on specific sectors and regions. This volume has 17 chapters written by 52 co-authors who are specialists in input-output analysis and environmental sustainability. They come from 24 universities, research centers and international agencies all over the world, sharing their commitments to explain important and complex ideas in a way that is understandable to the non-experts and experts alike.

*Environmental and Economic Impacts of Decarbonization* is a very important read for those who study environmental economics, climate change and ecological economics.

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## Regional Research Frontiers - Vol. 2 Methodological Advances, Regional Systems Modeling and Open Sciences

Editors: Jackson, Randall, Schaeffer, Peter (Eds.)
Springer International Publishing, 2017


This is the second volume in a two-part series on frontiers in regional research. It identifies methodological advances as well as trends and future developments in regional systems modelling and open science. Building on recent methodological and modelling advances, as well as on extensive policy-analysis experience, top international regional scientists identify and evaluate emerging new conceptual and methodological trends and directions in regional research. Topics such as dynamic interindustry modelling, computable general equilibrium models, exploratory spatial data analysis, geographic information science, spatial econometrics and other advanced methods are the central focus of this book. The volume provides insights into the latest developments in object orientation, open source, and workflow systems, all in support of open science. It will appeal to a wide readership, from regional scientists and economists to geographers, quantitatively oriented regional planners and other related disciplines. It offers a source of relevant information for academic researchers and policy analysts in government, and is also suitable for advanced teaching courses on regional and spatial science, economics and political science.

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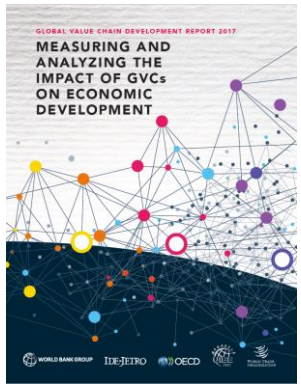
## Global Value Chain Development Report 2017 Measuring and Analyzing the Impact of GVCs on Economic Development

Edited by David Dollar, Jose Guilherme Reis, and Zhi Wang




The importance of the global value chain (GVC) phenomenon has stimulated researchers to develop statistics and analysis based on the value added in trade. The GVC phenomenon also demands that researchers analyze the discrete tasks or phases in the production process. Data are now available on the value added traded among major economies during 1995–2014. This first Global Value Chain Development Report draws on the expanding research that uses data on the value added in trade. Its main objective is to reveal the changing nature of international trade that can be seen only by analyzing it in terms of value added and value chains.

Global Value Chain Development Report 2017 is a joint product of the World Bank Group, the Institute of Developing Economies JETRO, the Organisation for Economic Co-operation and Development, the Research Center of Global Value Chains headquartered at the University of International Business and Economics, and the World Trade Organization.

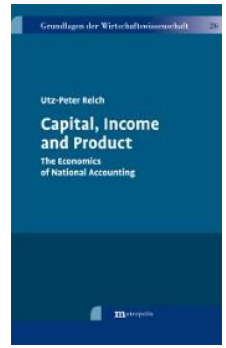
The work is based on extensive research collaboration to better understand the evolution of global value chains and its implications for economic development.

**Contents**



## Capital, Income and Product: The Economics of National Accounting

Utz-Peter Reich
Metropolis-Verlag




This book is about national accounts. To most economists that is unknown territory. In spite of having been discovered and developed by fathers of economics science from Adam Smith to Richard Stone, the activity was outsourced, and the territory sold to departments of statistics, by the vanity of later generations. Bachelors and masters turned out by the economics departments of today do not master national accounts, as a result.

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# Call for articles


EURONA is an open access, peer reviewed, scholarly journal dedicated to National Accounts and Macroeconomic Indicators. EURONA aims at providing a platform for researchers, scholars, producers and users of macroeconomic statistics to exchange their research findings, thereby facilitating and promoting the advancement of National Accounts and Macroeconomic Indicators.

EURONA publishes empirical and theoretical articles within the scope of National Accounts and Macroeconomic Indicators, as well as articles on important policy uses of these statistics. They may relate to both users' and producers' interests, present subjects of general relevance or investigate specific topics.

EURONA is non-partisan and applies the highest standards to its content, by emphasizing research integrity, high ethical standards, validity of the findings and cutting edge results. EURONA gives room to all viewpoints.

More information here.

If you wish to submit an article to EURONA, please send it to

ESTAT-EURONA@ec.europa.eu.

# Tables from the I-O world

## OECD's 2016 Edition of ICIO and TiVA Indicators

In the end of 2016 the Directorate for Science, Technology and Innovation (STI) at OECD released the 2016 version of the OECD's ICIO (Inter-Country Input-Output) Tables (http://oe.cd/i-o) and Trade in Value Added (TiVA) indicators (http://oe.cd/tiva).

The 2016 edition of the TiVA database provides indicators for 63 economies covering OECD, EU28, G20, most East and South-east Asian economies and a selection of South American countries. 34 unique industrial sectors are represented, including 16 manufacturing and 14 services sectors, as well as related aggregates (such as total manufactures and total services). This edition is a "light" update of the 2015 version introducing two new countries, Morocco and Peru. Indicators are now provided for all years from 1995 to 2011.The industry list remains unchanged. Depending on the indicator, it can be expressed in USD million (in current prices) or as a percentage.

The OECD's TiVA Indicators, for clarity of presentation can be classified into 4 subgroups according to their need of data and complexity of information, as: a) Structural Indicators - based on the values presented in ICIO; b) Indicators based on Value Added, Gross Exports and Imports; c) Indicators based on Value Added and Final Demand; and d) Complex Indicators which are based on Value Added, Gross Exports and Final Demand.

The TiVA database can provide insights, among others, into:

- Domestic and foreign value added content of gross exports by exporting industry;
- Services content of gross exports by exporting industry, by type of service and value added origin;
- Participation in GVCs via intermediate imports embodied in exports (backward linkages) and domestic value added in partners' exports (forward linkages);
- 'Global orientation' of industrial activity i.e. share of industry valued added that meets foreign final demand;
- Country and industry origins of value added in final demand, including the origin of value added in final consumption (by households and government) and in GFCF (investment by businesses);
- Bilateral trade relationships based on flows of value added embodied in domestic final demand;
- Inter-regional and intra-regional relationships;
- Domestic value added content of imports (NEW).

Also with this new release, the companion document OECD's Guide to the TiVA indicators (http://www.oecd.org/sti/ind/tiva/TIVA_2016_Definitions.pdf) was completely revised from its

previous version, adding the new indicators, including the comments and suggestion received throughout the years, and making it a more intuitive and comprehensive guide, by showing how the indicators are estimated, how they are interconnected and how they can be interpreted. Its intention is to serve as a reference for users about how the indicators are estimated and how they can be interpreted. It also presents the list of countries, regions, industries, and industries aggregates for which the indicators are estimated.

OECD
BETTER POLICIES FOR BETTER LIVES

## New multi-regional supply and use tables for Australia

Within four months of the release of official national statistics, IELab researchers have produced a time-series (2008-2015) of balanced sub-national, multi-regional supply-and-use tables (MR-SUTs), integrated with a set of socio-economic and environmental accounts. In the accompanying publication*), the researchers demonstrate the relevance of such purpose-built information to government and corporate decision-makers by analyzing the indirect economic and employment consequences of a slowdown of the mining boom in Western Australia.

The novel MR-SUTs provide a great deal of new and timely information for decision-makers with an interest in integrated analysis of socio-economic and environmental factors. In particular, the data fill two major gaps – missing years in the time-series of national SUT published by the ABS; and sub-national SUT suitable for regional analysis, accompanied by inter-regional trade matrices. The demonstrated innovations in flexibility and timeliness will help move past some of the limitations that have historically hindered the uptake and utility of applied input-output analysis.

The MR-SUTs are freely available for download at https://ielab.info/resources/91

*) Lenzen, M., Geschke, A., Malik, A., Fry, J., Lane, J., Wiedmann, T., Kenway, S., Hoang, K. and Cadogan-Cowper, A. (2017) New multi-regional input–output databases for Australia – enabling timely and flexible regional analysis. *Economic Systems Research*, 29(2): 275-295.

# Data and programs

## The ImpactECON Global Supply Chain Package

The ImpactECON Global Supply Chain package is a set of data and programs that allow you to convert the GTAP 9.0a-2011 Data Base into a global supply chain database.

The ImpactECON Global Supply Chain Package includes:

- a set of shares and scaling factors, and program that can be used to convert the GTAP 9.0a-2011 Data Base into the ImpactECON Global Supply Chain Database;
- a program to convert a standard RunGTAP application of the GTAP model into an ImpactECON global supply chain application with supply chain database and model; and
- full documentation and operating manuals.

The Global Supply Chain Database includes additional information on:

- Value of imports of commodities (57) purchased by sector (57), households, government and investment, source (140) and destination (140) regions at market, agent and world prices.
- Differential tariffs on imports of commodities (57) purchased by sectors (57), households, government and investment by source (140) and destination (140).

Further information is available at: https://impactecon.com/downloads/the-impactecon-supply-chain-ie-sc2-package/

ImpactECON

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# Teaching materials and related courses

**Input-output analysis and environmental responsibility: measures and applications Global**

Responsibility Week, Notthingham Business School, Nottingham Trent University, Nottingham, UK (March 27-30, 2017)

**Content**

Part 1: Generalized input-output analysis

Part 2: Production-based vs. consumption-based emissions

Part 3: Determinants of pollution growth: A structural decomposition analysis

The course discusses the basics of generalized IO analysis, production- and consumption-based emissions, and structural decomposition analysis. All the material is freely available here.

# Events

## Next courses

**2017-2 GTAP 101 Course: "Introduction to CGE Modeling"**
September 18 - November 5, 2017

The objective of the GTAP 101 course is to engage participants in an active, team-based process of learning about the GTAP computable general equilibrium (CGE) model and its use in applied economic policy analysis. The curriculum emphasizes an intuitive and graphical treatment of economic theory in the CGE model, and provides structured experiences in manipulating and running the standard GTAP Model within the RunGTAP software environment. RunGTAP is an intuitive, menu-driven CGE model that minimizes technological hurdles and allows students to quickly begin to focus on their economic thinking and experimentation. The curriculum is geared to advanced undergraduates, graduates and professionals. At the end of the course, participants will be entry-level modelers and more informed consumers of CGE-based analyses. The course also serves as an entry point for developing the technical skills required for the GTAP Short Course.

**2017 GTAP Preferential Trade Agreements (PTA) Mini-Course: "Applied Policy Analysis: Mini-course on Preferential Trade Agreements"**
October 23 - November 26, 2017

GTAP PTA is a three-week, fully-online mini-course that is designed to provide professionals and students with hands-on, applied training in the analysis of preferential trade agreements (PTAs) using the GTAP computable general equilibrium model. The objectives of the GTAP PTA course are to provide students with an underpinning in the economic theory of tariffs and customs unions and regulatory policy analysis, and to help them develop their applied skills in database development, design of PTA experiments and analysis of model results. The curriculum emphasizes an intuitive and graphical treatment of economic theory, provides structured experiences in manipulating and running the standard GTAP model within the RunGTAP software environment, and culminates in team-based research projects. At the end of the course, participants will have developed skills in the analysis of tariff and non-tariff liberalizations in a PTA. Pre-requisites are completion of GTAP 101 or the GTAP Short Course, or a working competency in the RunGTAP modeling software.

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# Next conferences

## 7th Spanish Conference of Input-Output Analysis

September 18-20, 2017 - Mérida (México)

The Hispanic-American Input–Output Analysis Society (SHAIO) and Autonomous University of Yucatán will organize the 7th Spanish Conference on Input–Output Analysis on September 18-20, 2017, Mérida, México.

## The 13th Biennial International Conference on EcoBalance

October 9-12, 2018 - Tokyo (Japan)

The Institute of Life Cycle Assessment, Japan (ILCAJ) will organize The International Conference on EcoBalance on October 9-12, 2018, Tokyo, Japan.

The 13th Biennial International Conference on EcoBalance
EcoBalance 2018

## 28th Annual Conference of The Pan Pacific Association of Input-Output Studies – PAPAIOS

October 20-22, 2017 - Osaka (Japan)

The Pan Pacific Association of Input-Output Studies invites your participation and contribution to the 28th Annual Conference. The 28th Annual Conference of the Pan Pacific Association of Input-Output Studies (PAPAIOS) will be held by Ritsumeikan University, Osaka (Japan), on October, 20-22, 2017, Osaka, Japan.

## 64th Annual North American Meetings of the Regional Science Association International

November 8-11, 2017 – Vancouver (Canada)

The North American Regional Science Council (NARSC) will organize the 64th Annual North American Meetings of the Regional Science Association International, November 8-11, 2017, Vancouver, Canada.

## 26th International Input-Output Conference

June 25-29, 2018 - Juiz de Fora (Brazil)


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