Newsletter
Number 45, August 2020

INTERNATIONAL INPUT-OUTPUT ASSOCIATION

Welcome from the Editor

Dear IIOA member,

I am pleased to release the latest issue of the *International Input-Output Newsletter*. I thank all contributors.

This is my last issue as IIOA Newsletter Editor. We are pleased to present the new Editor.

This issue contains information about the Online sessions for young researchers, Sir Richard Stone Prize for the ESR publications in 2017 and 2018, Latest ESR articles, Highlights in Journals, chapter books, and databases.

You can also find Call for Web Conferences and Workshop.

I hope you enjoy it! Any feedback, comments or suggestions are greatly appreciated. I also welcome contributions to future issues.

Vinicius de Almeida Vale
IIOA Newsletter Editor
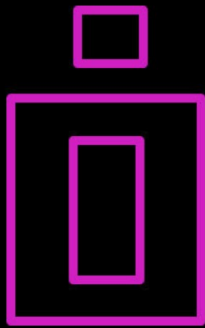Federal University of Parana, Brazil
Newsletter E-mail: newsletter@iioa.org
Personal E-mail: vinicius.a.vale@gmail.com

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

In this issue

INTERNATIONAL INPUT-OUTPUT ASSOCIATION

New IIOA Newsletter Editor

Three years ago, I took over as Editor of the Newsletter with the mission to publish the issues regularly. Mission accomplished! This is my 13th published issue.

During this period, I have had the help of several colleagues. So many, I simply thank all of them as a group. I learned a lot.

I hope you have enjoyed the issues. I also hope the Newsletter has brought you all IIOA members together, in some way.

Starting the next issue, a great personal friend of mine during my time at from REAL at UIUC will take over as Editor. The IIOA Newsletter will continue to be in good hands.

Keep contributing!

I hope to be actively involved in the IIOA!

Hugs!

Vinicius de Almeida Vale
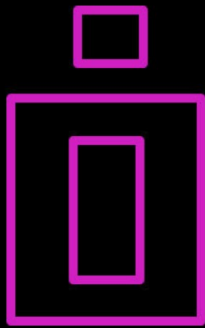Federal University of Parana, Brazil

I am delighted to take the baton from Vinicius and to be the next IIOA Newsletter Editor. In these times when we are all distant from one another and sadly can't celebrate our annual meeting, the Newsletter becomes an even more useful linkage between us members and the Association. I will try to continue the excellent work of my predecessor over recent years. Nonetheless, I intend to introduce some new ideas that I hope you will enjoy.

Warm hugs and keep sending your news to the IIOA newsletter!

André Carrascal Incera
City-REDI/WM-REDI, Birmingham Business School
University of Birmingham, U.K.

Online sessions for young researchers

Unfortunately, the International Input-Output Conference in Kuala Lumpur had to be postponed due to the Covid-19 pandemic. To give young researchers an opportunity to present their work and to get some feedback on their current work, the IIOA Council decided to organize a small-scale online initiative during the first week of July (the week in which the conference would have taken place). It contained five organized sessions. The speakers and titles of their presentations are identified below.

The organizers (Satoshi Inomata, Shigemi Kagawa and Bart Los) invited all researchers who had (i) submitted a paper to the Leontief Prize competition, (ii) wanted to be included in the Development Programme or (iii) had applied for IIOA travel grants. Of the 48 invited researchers, 18 accepted the invitation. To be sure that all presenters could attend without being deprived from sleep, the speakers were assigned to Oceania/Asia/Europe and Europe/Americas sessions (unfortunately, we had no African speakers). So-called 'caretakers' played a pivotal role in the organization: one spea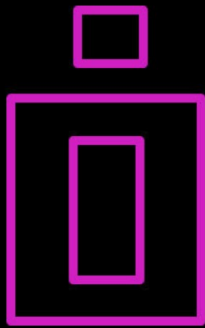ker coordinated the date and the time of the session with the other speakers and made sure that an online video-calling platform would be used that would suit all speakers. The organizers then mass-mailed the IIOA-members to attend the sessions as members of the audience. In order to avoid unnecessary internet connection disruptions, the total number of participants per session was capped at eight. This created a cordial atmosphere, to the extent possible in an online setting. All sessions were full, although misinterpretations with respect to time zones caused a small number of latecomers (but this happens at physical conferences as well…). The caretakers had also ensured that all participants had been sent the slides and papers beforehand, to minimize the 'damage' in case of disruptions.

The sessions went well. Internet-related problems were very minor, and session caretakers all reported substantial interaction between presenters and members of their audiences. As organizers we also learned a lot along the way. We received a number of useful suggestions for improvement. Nobody knows how we will gather in the future. We can only hope, it will be possible to organize physical meetings again. Still, it is likely that online events will remain an important element of our activities, so learning about ways to make these happen was helpful. The prime objective, however, was to support young researchers. This worked out well, to a large extent due to the activities of the session caretakers: Oliya Maxudova (Ritsumeikan Asia Pacific University), Carolina Silva Ribeiro (Federal University of Bahia), Eduardo Sanguinet (Pontifical Catholic University of Rio Grande do Sul/Catholic University of the North), Maksud Bechkanov (Bonn University) and Wannaphong Durongkaveroj (Australian National University).

Thanks a lot!

Bart Los

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Session 1

Kehan HE (University College London), "Improving Input-Output Model for Time Lagged Analysis – a Big Data Approach"

Wannaphong DURONGKAVEROJ (Australian National University), "Developmental Gains from Joining Global Production Networks: Does Domestic Value Added Matter?"

Yu ZHANG (Chinese Academy of Sciences), "Impact of Non-Tariff Barriers: Evidence from China"

Session 2

Maksud BECHKANOV (Bonn University), "An Economy-wide Assessment of Agricultural Productivity Change Effects on Virtual Water Trade Flows"

Peilin CHEN (Renmin University of China), "World Embodied Energy Accounting with Capital Stock Change"

Yixin HU (Southern University of Science and Technology), "Fluvial Flood Footprint Assessment under Climate Change: An Application to Ghana"

Session 3

Guilherme CARDOSO (Federal University of Minais Gerais), "Fiscal Austerity in Brazil: Impacts on Household Income and Economic Activity"

Patiene PASSONI (Federal University of Rio de Janeiro), "Input-Output Model in the Context of Relative Prices: the Implication of Deflation Methods for Technical Coefficients"

Simone GRABNER (Gran Sasso Science Institute), "Interregional Input-Output Linkages and Relatedness as Drivers of Regional Diversification: Evidence from United States Counties"

Eduardo SANGUINET (Pontifical Catholic University of Rio Grande do Sul/ Catholic University of the North), "Uneven Integration in Domestic and Global Value Chains: the Role of Functions in Value Added Trade in Brazilian Regions"

Session 4

Keitaro MAENO (Kyushu University), "The Role of Market Shares of Commodities and Carbon Footprint of Nation"

Koshiro MATSUI (Kyushu University), "Global Warming and Lifecycle CO_2 Emissions from Electricity Consumptions at Prefecture Level"

Man LI (Shandong University), "The Role of China's Main Blue Economy in Tackling Climate Change: An Input-Output Analysis"

Oliya MAXUDOVA (Ritsumeikan Asia Pacific University), "The Impact of the Mining Industries Sector of Tajikistan on Economic, Environmental and Social Development"
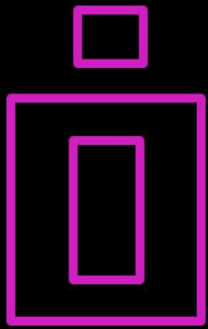
Session 5

Andressa PROQUE (Federal University of Juiz de Fora), "Fuel tax, Cross Subsidy and Transport: Assessing the Effects on Income and Consumption Distribution in Brazil"

Anjali SHARMA (University of Maryland), "An Input-Output based Analysis of the Labor Impacts of Clean Energy Transitions in India"

Carolina SILVA RIBEIRO (Federal University of Bahia), "Effects of Wind Energy Input on the Sectors of Economic Activity in the Semiarid Region of Bahia"
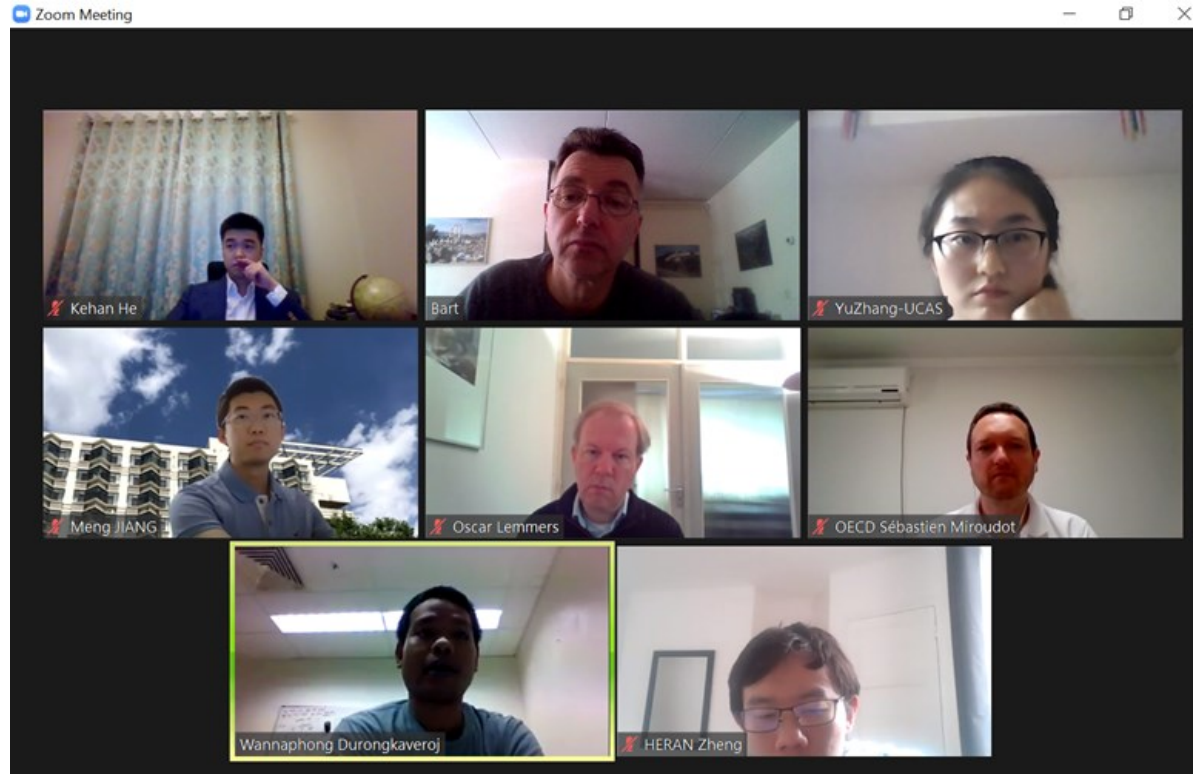
Heran ZHENG (Norwegian University of Science and Technology NTNU), "Targeted City Network to Reduce Carbon Footprint for 309 Chinese Cities"
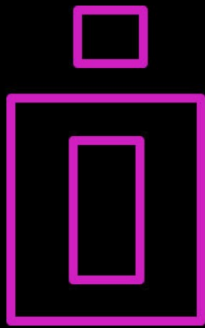
INTERNATIONAL
INPUT-OUTPUT ASSOCIATION

Online sessions for young researchers

INTERNATIONAL INPUT-OUTPUT ASSOCIATION

Sir Richard Stone Prize for the ESR publications in 2017 and 2018

Sir Richard Stone Prize is awarded every other year for the best paper(s) that was submitted and accepted for publication in IIOA's journal *Economic Systems Research* in the two consecutive volumes. The prize is donated by Francis & Taylor, the Publisher of the journal. (See the list of past awardees here)

This year, the jury has decided to award the prize to the following two papers of exceptional qualities. Congratulations!!

Jury member of Sir Richard Stone Prize, 2020

Randall Jackson (Chair)

Clopper Almon

Francesca Severini

Kirsten Svenja Wiebe

Haiyong Zhang

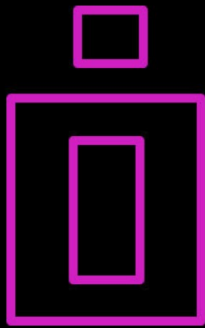### Selection procedure:

The first round short-listing to four papers:

Out of all papers published in ESR in 2017 and 2018, the pool of papers was shortlisted to four finalists, which

- had at least one vote from all jury members;

- was selected #1 by one of jury members

The final decision

The four papers were given rankings, from which the top two papers were selected as winners.

Why has China's vertical specialization declined?

Yuwan Duan, Erik Dietzenbacher, Xuemei Jiang, Xikang Chen & Cuihong Yang

Economic Systems Research, 30:2, 178-200, 2018

Review summary:

This paper analyzes China's changing role in Global Value Chains by estimating its annual vertical specialization shares from 2000 to 2012. The authors provide an excellent example of the versatility and utility of structural decomposition analysis in an adaptation of the method to an assessment of the relative importance of alternative factors that have led to the decline of vertical specialization in China. Their analysis decomposes the changes in China's vertical specialization share into the effects of 14 components, identifying the substitution of imported intermediates with domestically produced intermediates" as "the main driver for China's declining vertical specialization share." Starting from the idea driving the research to the comments of its results, the all content is very clear and of a high level, especially regarding the description of the dataset and the structural decomposition approach. Their "results imply that improving the quality and competitiveness of domestic intermediates may be an efficient way to upgrade a country's role in" global value chains. It also provides important implications for other development countries to actively move up the GVCs. In selecting this paper for the award, the jury emphasized the value of a demonstration of the flexibility of spatial decomposition analysis in application to new problem domains.
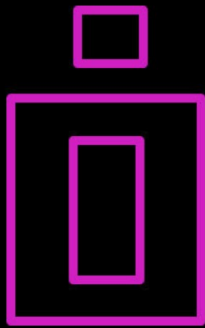
Applicability of a spatial computable general equilibrium model to assess the short-term economic impact of natural disasters

Yoshio Kajitani & Hirokazu Tatano, *Economic Systems Research, 30:3, 289-312, 2018*

Review summary:

In this paper, the authors provide an important contribution to the literature on the choice of and effectiveness of disaster impacts assessments approaches, with a specific focus on the role of estimated elasticities of substitution relative to the analytical timeframe. They quite effectively situate their research within the context of the relevant literature, and provided an exceedingly clear and concise description of the salient aspects of their model. their work supports the conclusion "that plausible settings can make CGE models suitable for disaster impact analysis, at least for short-run cases." The jury deemed this paper to be a significant contribution to the model validation literature.

Messages from awardees

Yuwan Duan
Associate Professor
School of International Trade and Economics, Central University of Finance and Economics
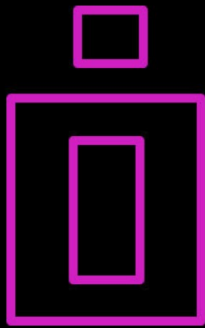
"We are overwhelmed with gratitude to have been selected to receive the Sir Richard Stone Prize. We are deeply honored. This award is a high degree of recognition of our paper, and also strengthens my confidence in devoting my rest of life to scientific research. I would like to express my sincere gratitude to those who helped us in this paper and my research career. I also hope that this recognition of our work can serve as an inspiration to others in the field. This paper examined the causes and implications of the decline in Chinese vertical specialization in recent years. We find that the substitution of imported intermediates with domestically produced intermediates was the main driver, which suggests an upgrade of China's role in the Goble Value Chain. However, if the study was for this year, then COVID-19 should be the main culprit for the decline in global vertical production. I hope that we humans can eliminate the virus as soon as possible and wish that everyone will be able to ride out this epidemic safely and healthily."

Yoshio Kajitani
Professor,
Faculty of Engineering and Design, Kagawa University

"We are very honored to receive the Sir Richard Stone Prize. The awarded paper is an outcome of long-term discussions not only between the authors but also with many experts of I-O and CGE modelling. Especially, a series of sessions on disaster impact analysis in the IIOA annual meetings gave us precious occasions to meet with the specialists in this field. We hope the paper replies to many of practical questions raised in the sessions, in applying interindustry types of modeling to natural disasters. Our special thanks are due to Profs/Drs. Stephanie Chang, Yasuhide Okuyama, Jan Oosterhaven, Adam Rose, Albert Steenge and many others for the discussions to our presentations and Prof. Michael Lahr and anonymous reviewers for constructive feedbacks and supports at the review process. We also greatly appreciate the encouragements and insightful comments from Prof. Geoffrey Hewings and Dr. Nori Yamano, and Prof. Norio Okada, who also gave us the chance to step in this research field (engineering-economics modeling) almost 20 years ago.

While appreciating many good lucks, we cannot help thinking that the Covid-19 is challenging us and changing economic systems. We strongly hope the evidence-based approach and economic impact modeling contribute to better policy making."

Published papers and books in IOA and related methods

Latest ESR articles

Economic Systems Research

Journal of the IIOA

Volume 32, Issue 3, 2020

Ferreira, J. P., Lahr, M., Ramos, P. and Castro, E. Accounting for global migrant remittances flows. *Economic Systems Research, 32(3): 301-317.*

Migrant remittances are important to some countries. According to the World Bank, they comprise more than 30% of the GDP of Kyrgyzstan, Tonga, Tajikistan, Haiti and Nepal. Compared to official development aid or foreign direct investment, remittances have lately become a prime income stream for less-developed nations. In this paper, we analyze the net spillover and feedback effects from the consumer demand generated in migrants' home countries. We use World Bank estimates of remittances and the World Input-Output Database (WIOD) for the investigation with so-called 'hypothetical insertion' as the tool of choice. We find that even some developed nations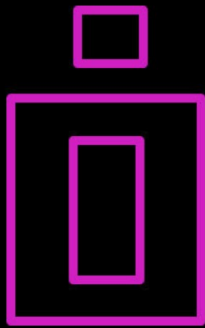, like the US, likely benefit from remittances (the largest global path for remittances is that from the US to Mexico), but that not all do (e.g. Canada does not). We stop short of making strong policy recommendations. Instead, we suggest that more attention be paid to the veracity of remittance estimates.

Giammetti, R. Tariffs, domestic import substitution and trade diversion in input-output production networks: an exercise on Brexit. *Economic Systems Research, 32(3): 318-350.*

In this paper we employ the World Input–Output Database to develop a multi-sector inter-country model that allows us to identify the channels through which the trade effects of Brexit would propagate. The inclusion of global value chains and indirect Brexit effects in the model leads to estimates that diverge with the results of the main literature. Indeed, we found that Brexit could be risky and costly not only for the UK but also for many EU countries. Furthermore, we develop a second model and present the first empirical analysis on the consequences of domestic import substitution and trade diversion policies in Input–Output schemes. We found that allowing sectors and countries to partly substitute foreign products, leads to significantly lower losses for both macro-regions: the UK and EU27 would lose, at worst, the 0.28 and 0.5 percent of value-added, respectively.

Attary, N., Cutler, H., Shields, M. and van de Lindt, J. W. The economic effects of financial relief delays following a natural disaster. *Economic Systems Research, 32(3): 351-377.*

In the U.S. the economic damages of natural disasters have increased substantially over time. While private insurance payouts tend to arrive relatively quickly, federal recovery monies are often allocated unevenly, with some communities waiting years to receive previously designated funds. We examine the costliness of delay by linking an economic model of the Joplin, Missouri economy to a civil engineering model that replicates the damage from a tornado that devastated the community in 2011. Building damage estimates from the natural hazard and engineering models are translated into capital stock losses, which subsequently impact the local economy through lost output. We examine several different recovery paths, with a focus on differences in the timing of recovery assistance. Our results show that delaying financial assistance can have important, irretrievable adverse outcomes in the short run.

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Tiziano, D., Tuninetti, T., Laio, F. and Ridolfi, L. Tools for reconstructing the bilateral trade network: a critical assessment. *Economic Systems Research, 32(3): 378-394.*
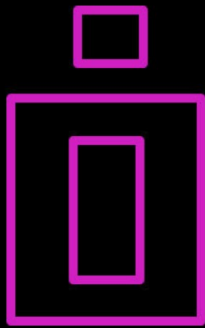
This study critically assesses the performances of the Gravity Model (GM) and of the RAS algorithm for the bilateral flow intensity estimations and link prediction. The main novelty is the application of these methodologies to reconstruct the network topology with a minimum amount of information. Moreover, we implement a multi-layer analysis to provide a comprehensive and robust framework, by testing several food commodities, over the period 1986–2013. The main outcomes suggest that the RAS algorithm outperforms the Gravity Model in the estimations of the bilateral trade flows, importantly guaranteeing the balance constraints (i.e. global import equals global export), while GM generates lower relative errors, but it underestimates total global flows. Both RAS and GM can be applied to accurately recover the network architecture. The implications of our study encompass a wide range of applications: systemic-risk assessment, creation of new databases, and scenario analyses to support policy decisions.

Miroudot, S. and Ye, M. Multinational production in value-added terms. *Economic Systems Research, 32(3): 395-412.*

Micro-level evidence has emphasised that firms that produce across countries are responsible for a large share of international exchanges of goods, services, capital and knowledge. At the aggregate level, quantitative studies that look at multinational production generally rely on the concept of sales of foreign affiliates, which is a gross concept that includes the value of intermediate inputs. In the case of trade, the literature has recently shifted to a value-added approach that can distinguish in exports the contribution of the different economies supplying inputs. In this paper, we propose a framework that decomposes value-added in domestic sales in order to trace its origin and remove any double-counting. We find that an intercountry input–output table split on ownership can yield an analysis of activities of foreign affiliates of multinational firms in value-added terms.

Tsionas, M. G. Bayesian input–output table update using a benchmark LASSO prior. *Economic Systems Research, 32(3): 412-427.*

We propose updating a multiplier matrix subject to final demand and total output constraints, where the prior multiplier matrix is weighted against a LASSO prior. We update elements of the Leontief inverse, from which we can derive posterior densities of the entries in input–output tables. As the parameter estimates required by far exceed the available observations, many zero entries deliver a sparse tabulation. We address that problem with a new statistical model wherein we adopt a LASSO prior. We develop novel numerical techniques and perform a detailed Monte Carlo study to examine the performance of the new approach under different configurations of the input–output table. The new techniques are applied to a 196 × 196 U.S. input–output table for 2012.

Cai, J. and Leung, P. A note on linkage between gross value added and final use at the industry level. *Economic Systems Research, 32(3): 428-437.*

Gross value added (GVA) is a common indicator of an industry/sector's economic performance. While an economy's total GVA is always equal to its total final use, an individual industry/sector's GVA is usually not equal to its final use. Yet an accounting identity between an industry/sector's GVA and the final use of multiple industries/sectors can be established by a gross value added-final use (GVA-FU) matrix. This paper derives the GVA-FU matrix in the Leontief demand-driven model and its equivalence in the Ghosh supply-driven model and interprets the matrix from different perspectives. The GVA-FU matrix can help policymakers and practitioners better understand an industry/sector's percentage of gross domestic product (GDP) – the underlying measure behind the United Nations Sustainable Development Goals (SDGs) Indicator 14.7.1 – from the demand-side perspective and facilitate its proper use for policy and planning. The GVA-FU matrix can become a standard component of the input–output apparatus for multiple applications.

Economic Systems Research

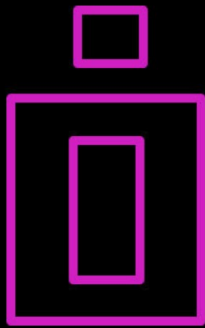**Journal of the IIOA**

Latest articles (up to 27-Jul.)

Tsujimura, M. and Tsujimura, K. Flow-of-funds structure of the U.S. economy 2001–2018. *Economic Systems Research.*

Great inventions and substantial productivity growth of the Roaring Twenties brought unprecedented prosperity to the United States. After Black Thursday in the fall of 1929 however, the U.S. economic landscape changed dramatically. To ensure that the bitter experience of the Great Depression does not recur, Wesley Mitchell and Morris Copeland, the architects of flow-of-funds analysis, urged a better understanding of the circulation of funds, the means of payment. The new century has so far brought us many technological innovations and new ways of doing business. The objective of the paper is to find out if and how well the funds have been flowing in the U.S. economy over the past two decades, using the flow-of-funds matrix (payer-payee matrix) proposed by Tsujimura and Tsujimura (2018). A flow of funds analysis of the U.S. quantitative easing. The industrial revolution of the new century does not seem to have enough momentum circulating funds, the lifeblood of the economy.

Mainar-Causapé, A. J., Philippidis, G. and Sanjuán-López, A. I. Constructing an open access economy-wide database for bioeconomy impact assessment in the European Union member states. *Economic Systems Research.*

The bioeconomy encompasses the extraction, processing and transformation of renewable biological resources and waste streams, connected to activities as diverse as food, feed, energy and manufacturing. Under the auspices of the European Union's 'Green Deal' strategy, this broad collective of sectors is promoted as a cornerstone for achieving sustainable growth. Progress in developing ex-ante tools of economy-wide modelling analysis to assess its performance is, however, hindered by a paucity of consistent and comprehensive data. To overcome this shortcoming, the construction steps for a new set of open access social accounting matrices (dubbed 'BioSAMs') is described for a detailed and comprehensive selection of traditional and contemporary bio-based accounts for each of the EU member states. To illustrate its potential, a structural analysis based on three different and complementary methods (Rasmussen-Jones, hypothetical extraction method and eigenvector) is performed to classify bio-based sector wealth generating properties and to identify high performance ('key') sectors.

**Parys, W.** David Hawkins and the making of the Hawkins-Simon conditions. *Economic Systems Research.*

The Hawkins-Simon conditions, which are necessary and sufficient for the viability of input–output systems, are described in many encyclopedias, textbooks and papers, but always without historical details about the philosopher David Hawkins. The rich literature on the history of input–output economics has neglected Hawkins, probably because he spent only a few years among the economists. My paper fills this gap. By using the relevant archival material on Hawkins, Simon, and Leontief, I correct and expand some scarce remarks on Hawkins by Simon and Samuelson. I discuss Hawkins's three remarkable contributions to economics. First, Hawkins's dynamic input–output model in *Econometrica* in 1948 scooped Leontief. Second, I show how the correspondence between Hawkins and Simon created their famous joint note in *Econometrica* in 1949. Third, an overlooked chapter in Hawkins's 1964 book *The Language of Nature* discussed the commodity values of commodities, generalizing Marx's labour values and the Technocrats's energy values.

Mushkudiani, N., Pannekoek, J. and Zhang, L. Uncertainty measures for economic accounts. *Economic Systems Research.*

The problem of adjusting large systems of estimated economic or social accounts such that they fulfill known functional relationships can be quite complex. For such complex systems, evaluating the accuracy of the estimates after the adjustment is difficult since these estimates are defined by unadjusted initial estimates, the accounting equations and the adjustment method. In this paper, we consider such accounting systems as a single entity and develop scalar uncertainty measures that are based on the first two moments of the joint distribution of final adjusted estimates. Scalar measures can help to effectively communicate to the users the relevant uncertainty of disseminated macro-economic accounts and can assist the producer in choosing and improving adjustment method and input estimators. The proposed approach is illustrated both analytically and by simulation. Applications to supply and use tables and to time series data are presented.

Ciaschini, C. and Chelli, F. M. Evaluating the impact of Violence Against Women in the macroeconomic Input–Output framework. *Economic Systems Research.*

Violence against women and girls (VAW&G) has progressively become an emergency issue in many European countries and a relevant topic of public discussion. In this paper, we attempt to insert this theme within a model for macroeconomic policy design and evaluation. Special attention is devoted to the assessment of distortions in the allocation of public expenditure generated by VAW&G, in terms of gains and losses in aggregate total output. We adopt a macroeconomic input–output approach by adding to the framework an industry that produces care services to victims of VAW&G. The resulting model is integrated with the public expenditure reallocations that emerge as a result of the progressive elimination of violence. It is, thus, a simulation tool for determining total output gains or losses that emerge from the reallocation of public expenditures as VAW&G fades.
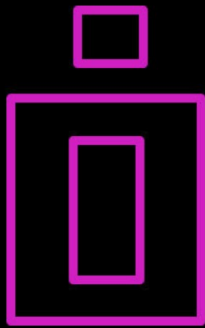
Wang, Z., Zhang, Y., Niu, M. and Fan, Z. How important is domestic and foreign demand for China's income growth by business function?. *Economic Systems Research.*

This paper explores the contribution of domestic and foreign demand to China's income growth by business function. To this end, we extend a single country input–output approach to a global multi-country setting, and further redefine the measure via forward linkages. We also propose chaining structural decomposition analysis to identify the role of domestic and foreign demand in functional income changes over 1999–2011. Using the World Input–Output Database combined with Labor Occupations Database, we distinguish functional activities in production, management, marketing and R&D. This enables us to find that domestic and foreign final demands, especially the former, jointly lead to China's income growth by business function. Dynamically, the generally upward trends in China's income hold in the aggregate as well as by industry and business function. We also find that China's income growth is quite heterogeneous across industries and business functions.

Södersten, C. H. and Lenzen, M. A supply-use approach to capital endogenization in input–output analysis. *Economic Systems Research.*

Input–output analysis currently treats capital investment as exogenous to the inter-industry system despite capital goods being used further in production processes. Previous studies have applied the Leontief calculus to include impacts of capital in footprint calculations. Here, we adopt a supply-use approach to incorporating capital into footprint calculations, by constructing capital supply-use tables (KSUTs) that enable differentiating capital goods. As the new KSUT formalism is compliant with the Supply-Use formalism in the UN's System of National Accounts, we can keep full transparency throughout the process of calculating impact multipliers. We demonstrate the usefulness of the KSUT framework in a case study of the Australian economy, with environmental extensions from the EXIOBASE3 database. If consumption-based emissions were considered for the UN's Framework Convention on Climate Change, the KSUT framework would provide a consistent and transparent foundation for working out countries' responsibility for carbon emissions from both current use and capital investment.

Carvalho, T. S., Santiago, F. S. and Perobelli, F. S. Demographic change in Brazil and its impacts on CO2 emissions. *Economic Systems Research.*

In recent years, the debate about demographic changes and its impacts on the economy has increased. The growth in the relative share of elderly people in the age pyramid may occur in the coming decades in many parts of the world, and their effects on the composition of consumption, notably on energy demand and emissions, are not yet known. This article estimates the changes in the pattern of consumption in Brazil due to the changes projected in the age pyramid in 2050 and the consequences of these changes on CO2 emissions. For this, projections will be made using an input–output model for the Brazilian economy for the year 2010 considering 67 productive sectors and six age groups. The results suggest that emissions grow less than proportionally to population growth and that the participation of sectors such as fuels and transport shows a small decrease in the consumption vector for 2050.
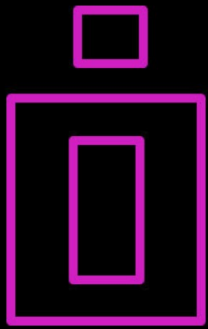
Xiao, H., Meng, B., Ye, J. and Li, S. Are global value chains truly global?. *Economic Systems Research.*
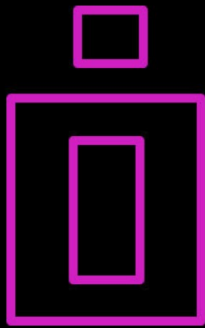
Are global value chains (GVCs) truly global or are they more of a regional phenomenon? We provide a new perspective on this issue using network analysis based on the measure of trade in value added. We first show that GVC activities can be consistently identified and grouped into three types of networks, i.e. traditional, simple, and complex trade networks, according to the number of times that factor contents cross national borders in global production sharing. Further investigation on the changes in topology and structure of various networks reveals that, GVCs are more likely organized regionally and dominated by large countries, like the US, China, and Germany. However, at the sector level, what GVCs look like largely depends on the perspective (supply or demand) and the type of networks adopted. This can help better understand the possible structural change of GVCs brought by the US–China trade war and the COVID-19 pandemic.

Hong, W., Chai, H., Chen, Y. H. H., Reilly, J. M., and Paltsev, S. Will using newer input–output data for general equilibrium modeling provide a better estimate for the CO2 mitigation cost?. *Economic Systems Research.*

We provide a critical evaluation about how updating the input–output data of a computable generation equilibrium model can affect policy results, an assessment that is rarely done in existing literature. Specifically, we explore how datasets with different fossil energy cost shares alter results of policy simulations that aim at reducing CO_2 emissions. We prove analytically that a sudden fossil fuel price surge, which provides little time for adjustment through input substitution, can lead to a higher CO_2 mitigation cost. The finding is demonstrated empirically in a full-scale economy-wide model for a base year with lower fossil fuel prices, contrasted with results from a base year when fossil fuel prices spiked. We then propose an adjustment to resolve the issues of using input–output data that embed abrupt fossil-fuel price hikes.

Temursho, U. On the Euro method. *Economic Systems Research.*

This paper critically examines the Euro method usage for the purposes of updating supply and use tables (SUTs) and/or input–output tables. Its known restricted applicability to only unnecessarily aggregated and symmetric SUTs (and not their underlying rectangular versions) is already an issue of concern. However, by studying analytically the nature of Euro's adjustments of the SUT elements and empirically assessing some of its underlying assumptions, including newly revealed ones, it is concluded that the Euro method is a largely ad hoc updating procedure. Its recently claimed superiority over the generalized RAS approach (GRAS, or SUT-RAS) in the absence of industry output is challenged. It is shown that applying the standard GRAS with exogenously given estimates of industry outputs under such restricted data-availability environment still outperforms the Euro method.

Zhou, L. and Chen, Z. Are CGE models reliable for disaster impact analyses?. *Economic Systems Research.*

This study investigates a fundamental issue of computable general equilibrium (CGE) modeling: are CGE models reliable for measuring the economic consequence analysis of disasters? We assess the outputs of CGE analyses after controlling for various modeling factors such as data, type of model, and modeling mechanisms via a meta-analysis of 253 CGE simulations in 57 empirical studies. Our study arrives at three major findings. First, we confirm that resilience significantly reduces business disruptions from disasters. Second, results using either real-world or hypothetical data tend to vary substantially by hazard type. Third, results are quite sensitive to model assumptions and modeling structure. Overall, we suggest that future impact assessments of disasters should be conducted more cautiously in terms of adopting appropriate data, models, and shock scenarios, in order to improve the validity of CGE modeling outcomes.

Duan, Y., Ji, T. and Mei, D. Tariff costs embodied in product prices: a dynamic analysis from global value chain perspective. *Economic Systems Research.*

The present study examines a measure, the embodied tariff, which is defined as the sum of all tariffs imposed on intermediate inputs at various stages of productions. It captures the total tariff costs in products in the context of the global value chain. We estimate the embodied tariff for 44 economies and 56 sectors, decompose it by tariff source, and also decompose its temporal changes using structural decomposition analysis. The embodied tariff is more than twice the size of the traditional direct input tariff, indicating a non-negligible value chain effect. This demonstrates an overall declining pattern over time, which reflects a dominating effect of decreasing customs tariffs over increasing international production fragmentation. Since 2011, however, the decline in international production fragmentation has also decreased embodied tariffs. A country's customs tariff is sizably translated into the embodied tariff of its own products, creating a competitive disadvantage for domestic producers.

Gabela, J. G. F. On the accuracy of gravity-RAS approaches used for inter-regional trade estimation: evidence using the 2005 inter-regional input–output table of Japan. *Economic Systems Research.*

In contrast to international trade, it is still difficult to find regional trade statistics within a nation. Given that the gravity model continues to be very popular, we test two gravity-RAS approaches used for interregional trade estimation: a standard one and an extended version, which additionally estimates intra-regional flows. We assess the accuracy with the help of two measures and for different sectoral aggregation levels. For that, we use the survey-based 2005 interregional input–output table of Japan as a benchmark. Results show high overall accuracy levels for the standard approach, better than when using international data, albeit with heterogeneous errors for sectors and regions. We further find that the results of a multiregional input-output model are highly sensitive to the trade estimation approach and that errors slightly increase for increasing sectoral disaggregation levels. Results from an experiment based on a random number generator show how RAS influences results.
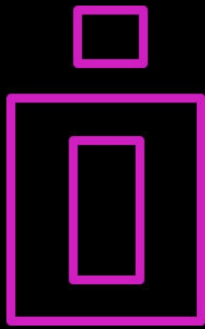
INTERNATIONAL INPUT-OUTPUT ASSOCIATION

Moya-Martínez, P., Bermejo, F. and del Pozo-Rubio, R. Hard times for long-term care systems? Spillover effects on the Spanish economy. *Economic Systems Research.*
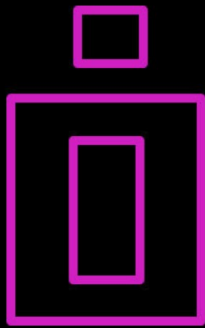
Since the end of the last century, demographic aging has led to an increased demand for new social protection services. Universalizing these to meet the needs of the most vulnerable requires the design of policies that ensure the sustainability of the system. Consequently, the economic structure of a country and its productive fabric are affected. Assessing the impact of this growing demand is not an easy task, although extended input-output models can help. With this aim, we determine the spillover effects of the demand shocks arising from the increase in public spending allocated for the implementation of the Spanish long-term care system. The results reveal that such spending proves efficient in sustaining 116,000 jobs, most of which are in social work activities, entailing a large amount of direct but low-skilled employment. In addition, 5,000 million euros are generated in value added, including a fiscal return of 1,400 million euros.

Haddad, E. A., Mengoub, F. E. and Vale, V. A. Water content in trade: a regional analysis for Morocco. *Economic Systems Research.*

This paper aims at evaluating the virtual water content in trade in an intra-country perspective and discussing potential tradeoffs between the use of natural resources and value added creation. We develop a trade-based index that reveals the relative water use intensities associated with specific interregional and international trade flows. The index is calculated considering the measures of water and value added embedded in trade flows associated with each regional origin-destination pair using an interregional input-output matrix for Morocco together with information on sectorial water use. We add to the literature on virtual water by encompassing the subnational perspective in a country that shows a clear 'climate divide'. Furthermore, we contribute to the literature by proposing an index that may be applied to different economies to evaluate multidimensional trade-offs associated with the pressure of specific economic flows to the use of natural resources relative to its economic relevance.

Allan, G. J., Connolly, K. and McIntyre, S. G. Developing an electricity satellite account (ELSA): an application to Scotland, UK. *Economic Systems Research.*

Within the system of national accounts the electricity sector is typically reported as a single entry representing generation, transmission, distribution and trade. The ways in which these components interact with the economy differ greatly, a feature lost within the standard accounting framework. In this paper we propose an Electricity Satellite Account (ELSA) approach to better understand the linkages between the electricity sector and economy, with a particular focus on generation technologies. In developing this framework, we draw parallels with Tourism Satellite Accounts (TSAs). To illustrate the practical steps in constructing ELSAs, we develop an ELSA for Scotland for 2012, and show how the ELSA framework gives an improved understanding of the economic contribution of the electricity sector, which is critical in improving the usefulness of such accounts for climate, energy, and economic policy.

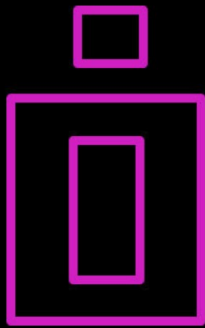**Reyes, F. A.** On growth regimes, structural change and input coefficients. *Economic Systems Research.*

The input-output (IO) model assumes that the technical coefficient matrix changes as an economic system develops, following either of two tendencies; one, the entries of the matrix shrink, due to increased efficiency on the production lines; two, they expand, while productivity gains concentrate in the use of factors. Further, the economic structure grows more complex, as industries become more tightly (vertically) integrated and the development process evolves. Both phenomena have seldom been analysed together, despite the apparent connections they may have with the evolution of economic structures and the development opportunities countries may face. This paper intends to examine the implications of these tendencies for the evolution of economic systems in regards to the dynamics the growth process may adopt. Two indicators are presented here useful to characterise such dynamics, later tested on the Mexican IO data.

Steenge, A. E. and Reyes, R. C. Return of the capital coefficients matrix. *Economic Systems Research.*

A core ingredient of post-disaster input–output recovery models is the reconstruction of lost production capacity. Therefore, one would expect a set of models endowed with capital coefficients matrices to be available for analysis. However, this is not the case, possibly due to earlier negative experiences with such models. Nevertheless, in this paper, we aim to show that there is a class of problems that can be addressed successfully with a dynamic input–output model with a fully functioning capital coefficients matrix. We put forward that if reconstruction is tightly planned, investment and therewith gross output essentially become pre-determined. This also means that traditional final demand becomes an endogenous residual, with the model being transformed into a distribution and allocation model. We begin with a reordering of variables and equations as proposed in Leontief's dynamic inverse, and then move on directly to the newly proposed model. Suggestions for further work are given.

Miroudot, S. and Ye, M. Decomposing value added in gross exports. *Economic Systems Research.*

Several papers using intercountry input-output tables have developed frameworks to decompose value added in gross exports and to remove potential double-counting in intermediate inputs. But these papers rely on different definitions for the domestic value added, foreign value added and double-counting terms, depending in particular on the perspective from which gross exports are decomposed (world level, country level or bilateral level). At this stage, it is very difficult for any user of value-added trade statistics to know what is calculated and which type of decomposition should be used. In this paper, we provide a general framework that relies on extraction matrices to unambiguously and consistently define domestic and foreign value-added terms in the world, country and bilateral perspective. This framework allows us to classify existing decompositions based on the perspective taken and their definition of double-counting. We also indicate the most relevant decompositions for different types of trade analysis.

Highlights in journals

Severini, F., Pretaroli, R., Socci, C., Zotti, J. and Infantino, G. The suggested structure of final demand shock for sectoral labour digital skills. *Economic Systems Research.*

International data seem to confirm that countries with a relative abundancy of highly-skilled labour with digital competences grow faster than others. For this reason, digital competences and skills in general are progressively assuming a central role in labour market policies. In this article, we show the potential of the disaggregated multisectoral analysis with the macro multipliers approach as a tool of economic policy. Such analyses allow identifying a set of endogenous policies in which specific objectives do not clash with growth objectives. The identification and the quantification of the macro multipliers is based on an extended multi-industry, multi-factor and multi-sector model, which accounts for the representation of the income circular flow as in the social accounting matrix (SAM). The SAM constructed for this exercise allows for a proper disaggregation of the labour factor by formal educational attainment, digital competences and gender for the case of Italy.

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Temursho, U. and Miller, R. E. (2020) Distance-based shared responsibility. *Journal of Cleaner Production.*

This paper presents the global multi-regional extension of the upstream and downstream shared responsibility input-output (IO) frameworks and proposes to use distance-based sharing parameters in their applications. The extent of producers' control over production processes is approximated by the inverse (function) of the average distance of producers from primary inputs providers along the entire input demand chain. Similarly, the extent of producers' influence over advertising and sales is approximated by the inverse (function) of the average distance of producers from final users along the output supply chain. Our empirical application of the shared responsibility approaches focuses on CO_2 emissions, using the 2005 world IO table available from WIOD. In the empirical tests of aggregation (in)variance of country-level shared responsibilities, it is found that the shared responsibilities are more robust to aggregation when the sharing parameters are pegged to distance rather than to value added or final demand. All in all, our results further substantiate the robustness of the shared responsibility accounting principle, and this is important if the principle is to become standard or alternative (complementary) reporting practice.

Lenzen, M. et al. (2020) Global socio-economic losses and environmental gains from the Coronavirus pandemic. *PLOS ONE.*

On 3 April 2020, the Director-General of the WHO stated: "*[COVID-19] is much more than a health crisis. We are all aware of the profound social and economic consequences of the pandemic* (WHO, 2020)". Such consequences are the result of counter-measures such as lockdowns, and world-wide reductions in production and consumption, amplified by cascading impacts through international supply chains. Using a global multi-regional macro-economic model, we capture direct and indirect spill-over effects in terms of social and economic losses, as well as environmental effects of the pandemic. Based on information as of May 2020, we show that global consumption losses amount to 3.8\$tr, triggering significant job (147 million full-time equivalent) and income (2.1\$tr) losses. Global atmospheric emissions are reduced by 2.5Gt of greenhouse gases, 0.6Mt of $PM_{2.5}$, and 5.1Mt of SO_2 and NO_x. While Asia, Europe and the USA have been the most directly impacted regions, and transport and tourism the immediately hit sectors, the indirect effects transmitted along international supply chains are being felt across the entire world economy. These ripple effects highlight the intrinsic link between socio-economic and environmental dimensions, and emphasise the challenge of addressing unsustainable global patterns. How humanity reacts to this crisis will define the post-pandemic world.
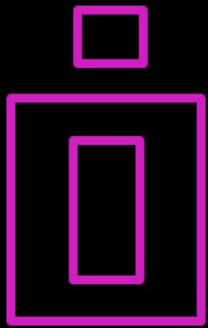
Wilting, H. C., Schipper, A. M., Ivanova, O., Ivanova, D. and Huijbregts, M. A. J. (2020) Subnational greenhouse gas and land-based biodiversity footprints in the European Union. *Journal of Industrial Ecology.*

Insights into subnational environmental impacts and the underlying drivers are scarce, especially from a consumption-based perspective. Here, we quantified greenhouse gas (GHG) emissions and land-based biodiversity losses associated with final consumption in 162 regions in the European Union in 2010. For this purpose, we developed an environmentally extended multi-regional input–output (MRIO) model with subnational European information on demand, production, and trade structures subdivided into 18 major economic sectors, while accounting for trade outside Europe. We employed subnational data on land use and national data on GHG emissions. Our results revealed within-country differences in per capita GHG and land-based biodiversity footprints up to factors of 3.0 and 3.5, respectively, indicating that national footprints may mask considerable subnational variability. The per capita GHG footprint increased with per capita income and income equality, whereas we did not find such responses for the per capita land-based biodiversity footprint, reflecting that extra income is primarily spent on energy-intensive activities. Yet, we found a shift from the domestic to the foreign part of the biodiversity footprints with rising popul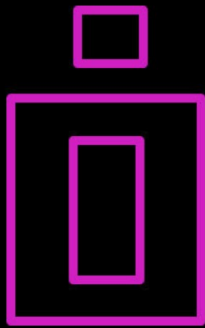ation density and income. Because our analysis showed that most regions are already net importers of GHG emissions and biodiversity losses, we conclude that it is increasingly important to address the role of trade in national and regional policies on mitigating GHG emissions and averting further biodiversity losses, both within and outside the region itself. To further increase the policy relevance of subnational footprint analyses, we also recommend the compilation of more detailed subnational MRIO databases including harmonized environmental data.

Rocco, M. V., Guevara, Z., Heun, M. K. (2020) Assessing energy and economic impacts of large-scale policy shocks based on Input-Output analysis: Application to Brexit. *Applied Energy.*

The assessment of the prospective, economy-wide, economic and environmental impact of large-scale policy shocks is currently performed via general equilibrium models, relying on background input–output data usually characterized by a very aggregated definition of the energy conversion chain. Thus, such models are not always able to properly assess the impact of policy shocks on the energy conversion chain. On the other hand, empirical models based on physical data provide a detailed picture of the energy conversion chain but are unable to comprehensively address energy-economy interactions.

This paper introduces an approach to analyze the impact of large-scale policy shocks with special focus on international trade and global energy conversion chains. The approach relies upon an empirical meso-economic equilibrium model and a physical supply and use model of the energy conversion chain. The link between the models is provided by the Multi-Factor Energy Input-Output model.

The proposed approach is formalized and applied to assess the economic and energy impact of different Brexit scenarios, returning the related impact in terms of changes in value added generation, change in production of energy carriers and change in energy-related CO_2 emissions. It is found that a highly disaggregated picture of the energy supply chain provides fundamental insights to assess the physical viability of economic scenarios. Therefore, the proposed method reveals important synergies that may arise from the joint application of the economic and physical models, hence becoming a suitable candidate to provide insights and guidance for policy making.

Rocco, M. V., Golinucci, N., Ronco, S. M. and Colombo, E. (2020) Fighting carbon leakage through consumption-based carbon emissions policies: Empirical analysis based on the World Trade Model with Bilateral Trades. *Applied Energy.*
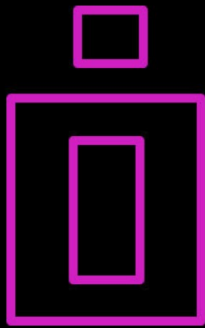
Policy initiatives towards reduction of CO_2 emissions implemented so far are grounded on the so-called Production-Based paradigm: this approach allocates responsibility of emissions to countries that directly caused such emissions, without taking into account all the indirect contributions to CO_2 emissions caused outside country's borders, eventually leading to the so-called carbon leakage phenomenon. In this paper, the alternative Consumption-Based approach is proposed, and its effectiveness assessed: according to this approach, policy initiatives allocates responsibility for CO_2 emissions proportionally to the CO_2 emissions embedded in goods and services required by industries as inputs for production. Global environmental and economic consequences of carbon emissions reduction policies, applied at the European level based on both Production- and Consumption-Based paradigms, are comparatively assessed based on the World Trade Model with Bilateral Trades. Results of this study suggest that defining CO_2 emissions policies based on a Consumption-Based paradigm seems to be the most effective way to reduce the global carbon emissions, avoiding the carbon leakage phenomenon which may occur in economies regulated by Production-Based policies. Indeed, an imposed reduction in CO_2 emissions embedded in EU final demand through a Consumption-Based Accounting policy would result in a global CO_2 emissions reduction up to almost 1.2 Gton. On the other hand, an imposed reduction in direct EU CO_2 emissions according to a PBA approach would result in an overall increase in global carbon emissions up to almost 0.8 Gton.

Sancho, F. (2020) The mitigation potential of eco-taxation on carbon emissions: income effects under downward rigid wages. *Environmental Economics and Policy Studies.*

Eco-taxation is the preferred market based tool for achieving mitigation of CO_2 emissions and fostering sustainability. It works through tax-induced changes in the price of polluting activities while ideally transferring the environmental cost to emitters and users. The initial eco-tax signaling is transmitted and further amplified to the rest of the economy through the structure of cost interactions. In particular, real-world economies work under wage adjustment rules that reflect downward rigidity in labor costs when facing rising prices. These common rules may affect the mitigation capacity of the eco-tax policies. We study this issue using an inter-industry model in which we overcome the classical dichotomy between prices and quantities thanks to the novelty of connecting consumption demand with the changes in private income levels that would follow from the enacted eco-tax. We isolate income effects by keeping the given productive structure of the economy as unaltered as possible. In this sense, the proposed model has a bit of a neo-ricardian flavor. We implement the model and check the mitigation effectiveness of two different eco-tax policies using recent tabular data for the Spanish economy in 2015. The main conclusion is that we would not observe double benefits, even when all eco-tax collections are recycled back into the economy.

Nansai, K. et al. (2020) Affluent countries inflict inequitable mortality and economic loss on Asia via PM2.5 emissions. *Environment International.*
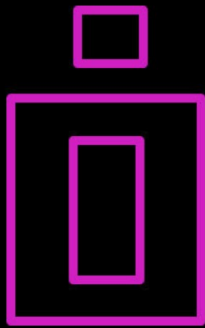
This research sets out to quantify the mortality and economic loss in individual Asian countries caused by the $PM_{2.5}$ emissions induced by the consumption of the world's five highest-consuming countries (US, China, Japan, Germany, UK). In 2010 alone, the economic impact of these five countries' consumption caused a loss of almost 45 billion US dollars due to the premature deaths of more than 1 million people in Asia, including 15 thousand children younger than 5 years old. The percentage ratio of economic loss to value-added driven by consumers via trade differed greatly among the impacted countries. For the US, the highest percentage loss was 4.1% in Laos, followed by 2.0% in Bangladesh, both markedly higher than the figures for the more developed countries, such as 0.21% for Japan and 0.18% for Korea. This reflects the inequitable value chain existing between consumer countries and impacted countries, and implies that developing countries are obtaining value-added in exchange for unintentionally increased health risks, delaying their development and potentially creating a vicious circle that hinders much-needed

improvements in areas like poverty reduction and public health. This inequitable situation needs to be redressed through introduction of clean energy and other types of technological assistance to help achieve United Nations Sustainable Development Goals 7, 10 and 13. Such as move is essential if premature infant deaths are to be curtailed.

Faturay, F., Vunnava, V. S. G., Lenzen, M. and Sing, S. (2020) Using a new USA multi-region input output (MRIO) model for assessing economic and energy impacts of wind energy expansion in USA. *Applied Energy.*

The share of wind energy in the US energy supply has been steadily increasing in the last two decades. With new wind energy farms being installed in various states of the country, local and multi-regional economic disruptions are bound to take place. The multi-regional economic impacts of installing new wind farms was determined using the US multi-region input-output (US-MRIO) model that has been developed, also called the USLab. Currently, there is a lack of multi-regional impact assessment of wind energy expansion in the US. In this article, we use the US-MRIO to determine regional and sectoral spill-over effects resulted from

installation of wind energy farms in 10 US states. The economic impacts were calculated by feeding the USLab with data obtained from the Jobs and Economic Development Impacts (JEDI) Wind model published by National Renewable Energy Laboratory (NREL). The JEDI wind model provides the change in local economic data such as the number of new jobs created and increase of energy-related products in each region in the final demand and value-added. The data about final demand and value-added change was used with the US-MRIO model to account for the multi-regional economic impact across US due to installation of wind energy farms. The year of wind farm installation was set to 2017 and a US-MRIO for 2017 was generated to calculate the economic impact. The total economic impact was found to be 26 billion dollars of which 3 billion dollars was associated with the states where no new wind energy capacity was installed. Installation of new energy production capacity also results in "change in energy consumption" across US. Using the US-MRIO model and the energy intensity of manufacturing sectors, the energy consumption increase due to addition of wind farms was found to be about 6952 trillion of btu for the total change in economic throughput. Primary metal manufacturing and Machinery manufacturing sectors stood out amongst other manufacturing sectors with considerable change in energy consumption with an increase of 3074 trillion of btu and 1537 trillions of btu.

Wakiyama, T., Lenzen, M., Geschke, A. Bamba, R. and Nansa, K. (2020) A flexible multiregional input–output database for city-level sustainability footprint analysis in Japan. *Resources, Conservation and Recycling.*
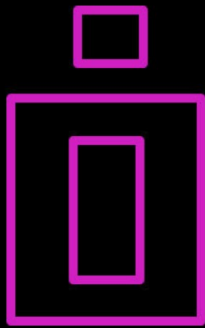
Understanding environmental and social footprints at the city level through multiregional input-output (MRIO) analysis is a key to designing policy aimed at mitigating the direct and indirect impacts of a city economy on sustainability. However, since the quantity of data required is substantial, compiling city-level MRIO tables in Japan and updating them yearly involves a huge amount of labor-intensive and time-consuming work. The authors have developed a cloud-computing platform called the Japan Industrial Ecology Laboratory (IELab) that is highly flexible in terms of its sectoral and regional resolution, which enables the user to build customized Japanese MRIO tables in accordance with the user's specific objectives. The Japan IELab embeds over 145 types of statistical information on regional economic activities, including input-output tables at the prefecture and city level. These data serve as constraints in the optimization process to build a customized MRIO table. With IELab, the user can freely select cities, sectors and years from 1894 municipalities and 4266 sectors for the years 2005 through 2016. As a case study, two MRIO tables were built at the prefecture and

city levels to demonstrate the usefulness and flexibility of the system. Their validity was confirmed by comparing results with the original statistics. The prefecture-level MRIO table accurately reflected the economic structure of Japan's 47 prefectures by identifying differentiating prefectural features, distinguishing between, for example, manufacturing-oriented and service-oriented prefectures. The city-level MRIO table appropriately characterized various economic activities and accurately reflected the locational features of a city within the prefecture. The role of stakeholders in data management and further improvement as well as possible applications of the Japan IELab, including life cycle assessment and disaster analysis, are discussed.

Rodríguez-Alloza, A. M., Heihsel, M., Fry, J., Gallego, J., Geschke, A., Wood, R. and Lenzen, M. (2020) Consequences of long-term infrastructure decisions—the case of self-healing roads and their CO2 emissions. *Environmental Research Letters.*

What could be the reduction in greenhouse gas emissions if the conventional way of maintaining roads is changed? Emissions of greenhouse gases must be reduced if global warming is to be avoided, and urgent political and technological decisions should be taken. However, there is a lock-in in built infrastructures that is limiting

the rate at which emissions can be reduced. Self-healing asphalt is a new type of technology that will reduce the need for fossil fuels over the lifetime of a road pavement, at the same time as prolonging the road lifespan. In this study we have assessed the benefits of using self-healing asphalt as an alternative material for road pavements employing a hybrid input–output-assisted Life-Cycle Assessment, as only by determining the plausible scenarios of future emissions will policy makers identify pathways that might achieve climate change mitigation goals. We have concluded that self-healing roads could prevent a considerable amount of emissions and costs over the global road network: 16% lower emissions and 32% lower costs compared to a conventional road over the lifecycle.

Wang, C., Malik, A., Wang, Y., Chang, Y., Lenzen, M., Zhou, D., Pang, M. and Huang, Q. (2020) The social, economic, and environmental implications of biomass ethanol production in China: A multi-regional input-output-based hybrid LCA model. *Journal of Cleaner Production.*
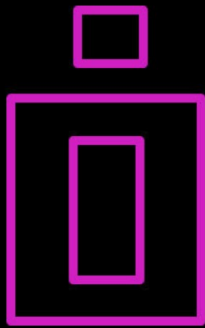
As an alternative to conventional liquid fuels, bioethanol holds the promise of transitioning to a clean and low-carbon energy future. China's bioethanol industry is at its nascent stage. In this study, we developed a hybrid life cycle assessment model that integrates the multi-regional input-output (MRIO) approach and specific production data to evaluate the social, economic, and environmental (i.e. the triple-bottom-line, TBL) impacts of the bioethanol sector in China's economic systems. The MRIO model was constructed using the 2012 MRIO table, and the data for the typical technologies of bioethanol production were leveraged. To be specific, we evaluated employment creation, economic stimulus, and energy use of bioethanol production in 28 scenarios in Henan province. The results show that compared to petroleum refining, bioethanol production is more effective for economic stimulus and energy saving, but less effective at job creation. The impact of bioethanol production varies by technologies. For every 1 million yuan of bioethanol

production in China' economic system, first-generation technology offers a projected 1.92 million yuan in economic growth and job creation of 2.06 full-time equivalent, while the second-generation technology offers a lower energy consumption (1.19 TJ). In most scenarios, the upstream sectors account for more than half of the TBL impacts of biofuel production. This study helps to quantify the TBL impacts associated with the gasoline-to-bioethanol transition in China, envisions the green opportunities for impact mitigation, and sheds light on the potential direction for robust planning and policy making to advance the bioethanol industry's development.

Ninpanit, P., Malik, A., Wakiyama, T., Geschke, A., and Lenzen, M. (2019) Thailand's energy-related carbon dioxide emissions from production-based and consumption-based perspectives. *Energy Policy.*

Over the past few decades, Thailand has been one of the highly open economies and one of the most successful countries in applying the export-led growth model. At the same time, carbon dioxide (CO_2) emissions released in Thailand tripled between 1990 and 2015. To examine how international trade plays a role in shaping Thailand's CO_2 emissions inventory, we compare emissions under both production-based and consumption-based accounting over 1990–2015 and disaggregate total CO_2 emissions into traded

and non-traded parts. We also use a multi-regional input-output database for performing a structural decomposition analysis (SDA) to investigate the factors contributing to changes in CO_2 emissions. We find that Thailand continually stood out as a net carbon exporting country. CO_2 embodied in exports accounted, on average, for 40% of domestically produced emissions. Our SDA results suggest that traded and non-traded emissions grew mainly due to increasing per-capita consumption in Thailand and abroad. The retarding effect from energy efficiency improvement was significant but not sufficient to reduce emissions.

INTERNATIONAL
INPUT-OUTPUT ASSOCIATION

Michel, B., Hambÿe, C., Hertveldt, B. and Trachez, G. (2020) Extended supply and use tables for Belgium: where do we stand? An overview of achievements and outstanding issues. *Eurostat Review on National Accounts and Macroeconomic Indicators.*

The construction of extended supply and use and input-output tables has been presented as a means of addressing some of the current challenges for the national accounts that are induced by economic globalisation. Such tables take into account within-industry firm heterogeneity that is not related to product characteristics, through a disaggregation of industries by size, ownership, exporter status or other relevant criteria. Beyond their contribution to improving national accounts data, these extended tables also allow us to derive new results on the participation of categories of firms in domestic and global value chains. In this article, we give an overview of where we stand today in terms of the construction of extended supply and use and input-output tables (SUT and IOT) for Belgium: methodological choices, data used, tables that have already been constructed, and analytical results. This is designed as an input for organising future work on extended tables for Belgium, but it may also provide useful information for other countries that engage in the construction of extended SUT and IOT.

Database

Social and Financial Accounting Matrices for Brazil (2010-2017)

Erika Burkowski (UFF), Fernando Salgueiro Perobelli (UFJF) and Inácio Fernandes de Araújo Júnior (USP)
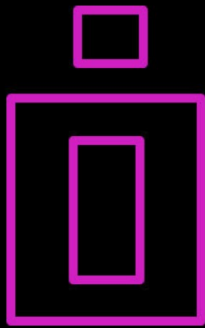
Description

The Social and Financial Accounting Matrices are available for the years 2010 to 2017. It considers:

- 128 Goods and Services;
- 68 Sectors;
- 3 Factors;
- 4 Institutional Agents in the Current Account;
- 4 Institutional Agents in the Capital Account;
- 8 Instruments in the Financial Account;
- Rest of the World Account.

See the database here.

LATES
LABORATÓRIO DE ANÁLISES TERRITORIAIS E SETORIAIS

ufjf

INTERNATIONAL INPUT-OUTPUT ASSOCIATION

Events

Next workshop

7TH PERMANENT WORKSHOP (WEBINARS EDITION)

Due to the global sanitary situation, the 7th permanent workshop of the SHAIO will be held, throughout 2020, in webinar format.

During the next few months, and within the framework of the workshop, a series of COVID-19-related online presentations will take place with the input-output analysis as the methodological protagonist.

The entire input-output community is invited to join these events. Just keep an eye on the website and our social media (Facebook - Twitter), where we will publish the dates and registration forms (totally free).

From SHAIO we wish all the best for you and your families.

The SHAIO Council.

Sociedad Hispanoamericana de Análisis
Input-Output

Next conferences

ERSA2020 Web Conference is a great opportunity to come together meet back colleagues and exchange on ongoing researches.

ERSA has decided to set **symbolic fees** to enable regional scientists from worldwide to gather again on our unique platform and benefit from the relevant and hot knowledge produced by ERSA extraordinary Community!

6 Keynote Lectures - 1 Round Table on Covid

48 Thematic Sessions - Over **150 Presentations** from

28 Countries across Europe and beyond

Registration   **Preliminary Programme Overview**