Newsletter
International Input-Output Association (IIOA)
Number 18; May, 2012

Editorial

Recent Developments in the Australian Input-Output Tables

Gregory Legoff
Australian Bureau of Statistics

Dear IIOA member,

In Australia the national Input-Output (I-O) tables are used for a broad range of purposes including CGE modelling, state and regional policy analysis, environmental studies and impact analysis. Users of I-O tables include private and public institutions. In the past, the Productivity Commission in Australia has used the I-O tables to provide information for the measurement and evaluation of industry assistance and the impact of assistance in economic agreements with New Zealand. The Australian Treasury modelling of the Goods and Services Tax reforms (Value Added Tax) was using an I-O multiplier framework.

More recently the Australian Bureau of Statistics (ABS) has started a project to compile Greenhouse Gas (GHG) emissions accounts using an I-O framework. This experimental work aims to present direct and indirect GHG emissions in final use categories. It is planned that a progress paper will be presented at the June 2012 international I-O conference in Bratislava. Prior to 2008, the ABS I-O tables were produced on an irregular basis. The program was then restarted to support the modelling undertaken by the Australian Treasury on household effects of pricing carbon.

The tables have been produced annually since 2008. The ABS faced a number of challenges when reinstating its I-O program including staff capabilities, the obsolescence of the I-O compilation and dissemination systems and the lack of data to support the level of detail required by the I-O tables. Various strategies have been implemented to overcome these difficulties.

There was a strong need for I-O expertise when the team was constituted in 2008. Ex-ABS I-O experts were hired and a slow process of capability building begun. The knowledge management strategy was articulated around documentation and training. These strategies are still in place in 2012 to help maintain capability in a more fluid market.

The existing Excel-based computing system was not designed to produce I-O tables on a regular basis and there was an urgent need to redevelop it in a more stable and maintainable environment.

ABS Input-Ouput Analysis Section

A systems redevelopment project was started in 2010 and all its main applications should be operational by June 2012. The new architecture is based on an Oracle database with an Excel interface. The balancing strategy has been reviewed in conjunction with the IT redevelopment project. First, the tables are manually balanced at Purchasers' Prices. Then the Basic Price is derived using an automatic balancing process based on a traditional iterative proportional fitting method.

There is an acute need for detailed data to compile the ABS I-O tables which contain 1,284 products and 112 industries in their most disaggregated version. While the aggregates are provided by the rest of National Accounts, the lack of product details has been addressed

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in a context of limited resources. For this reason, in addition to large surveys covering the whole economy or large industries, the ABS also collects detailed product level information for targeted industries. This collection process called Case Studies, aims to collect data on Australian Production and Intermediate Use in order to inform the I-O balancing process. This program offers the flexibility to rapidly collect information where the need arises without running a large and costly survey. The ideal target coverage ratio is 70% and surveyed businesses are expected to contribute to this proportion or more of the total industry output. The actual coverage, however, can be lower depending on the market concentration. Detailed results from Case Studies are gradually integrated in the I-O tables and provide key information to the rest of National Accounts.

The ABS is now compiling the 2008-09 I-O data to be published in September 2012.

For more information on the ABS I-O tables, please see http://www.abs.gov.au/AusStats/ABS@.nsf/MF/5209.0.55.001

Tales from the I-O world

The Conclusion of the World Input-Output Database Project

Dear readers,

Over the past three years, about 15 researchers in an international consortium have spent considerable time on constructing a time-series of "world input-output tables", i.e. input-output tables that contain detailed, systematic information on trade flows between industries and final use categories within and between 40 countries. This World Input-Output Database project (WIOD, funded by the European Commission as part of its 7th Framework Programme) was concluded in April, in two stages. On April 16, the database was publicly launched at a high-level conference for policy-makers in Brussels (hosted by DG Trade). The final three-day conference, which was organized in Groningen on April 24-26, was mainly aimed at an academic audience.

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Prof. Adrian Wood. Keynote speaker at the WIOD Conference

funded by the European Commission as part of its 7th Framework Programme) was concluded in April, in two stages. On April 16, the database was publicly launched at a high-level conference for policy-makers in Brussels (hosted by DG Trade). The final three-day conference, which was organized in Groningen on April 24-26, was mainly aimed at an academic audience. The next speaker, EC Commissioner of Trade Karel de Gucht underlined these observations and indicated that WIOD data show that the trade imbalance between the EU27 and China is actually 36% smaller than what conventional trade statistics suggest. Marcel Timmer gave an extensive talk about new measures of European competitiveness based on the new data, after which a high-level policy panel led by Bart van Ark (The Conference Board) discussed the importance of concepts like global value chains and trade in value added. The afternoon program was mainly aimed at employees of government organizations who might want to work with the data themselves. Consortium members from IPTS Sevilla, ZEW Mannheim, WIIW Vienna and the University of Groningen gave presentations about the data and empirical applications. The final academic conference (titled "The Causes and Consequences of Globalization") in Groningen drew an audience of slightly more than one hundred participants. Consortium members presented a number of studies based on preliminary versions of the WIOD database and others gave talks about related work, often based on data produced in other projects.

Robert Stehrer with Prof. Dale Jorgenson, keynote speaker at the WIOD Conference

Besides the dinners, the main highlights of the lively conference were the presentations of the three keynote speakers. Adrian Wood (Oxford University) started off with a very insightful presentations about the strengths and weaknesses of variants of the Heckscher-Ohlin model of international trade in a world that is increasingly characterized by global value chains. The day afterwards, Dale Jorgenson (Harvard University) discussed efforts to construct a consistent time series of input-output tables for the United States for the postwar period (from 1947 onwards) and showed how such tables can be used to quantify sources of output and productivity growth, both in periods of stagnation and rapid expansion. The conference was concluded by the keynote of Glen Peters (CICERO in Oslo), who provided very interesting insights into the estimation of carbon footprints (and changes therein) using different data sources.

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The International Input-Output Conference in Bratislava later this month will feature a number of special sessions on international input-output tables in general and WIOD in specific. Furthermore, all members of the input-output community are kindly invited to use the WIOD data for their own purposes. The data can be downloaded in the form of Excel-files from www.wiod.org.

Glen Peters. Keynote speaker

Bart Los

Economic Research Institute for ASEAN and East Asia Economist / Energy Economist

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Working Location:
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Published Papers in Input-Output Analysis and Related Methods.

In the next ESR issue

Economic Systems Research –

Journal of the IIOA

Volume 24, Issue 2 (June 2012)

http://www.tandf.co.uk/journals/titles/09535314.asp

CALCULATING ENERGY-RELATED CO2 EMISSIONS EMBODIED IN INTERNATIONAL TRADE USING A GLOBAL INPUT–OUTPUT MODEL. WIEBE K.S., BRUCKNER M., GILJUM S. and LUTZ C.

The Global Resource Accounting Model (GRAM) is an environmentally-extended multi-regional input–output model, covering 48 sectors in 53 countries and two regions. Next to CO2 emissions, GRAM also includes different resource categories. Using GRAM, we are able to estimate the amount of carbon emissions embodied in international trade for each year between 1995 and 2005. These results include all origins and destinations of emissions, so that emissions can be allocated to countries consuming the products that embody these emissions. Net-CO2 imports of OECD countries increased by 80% between 1995 and 2005. These findings become particularly relevant, as the externalisation of environmental burden through international trade might be an effective strategy for industrialised countries to maintain high environmental quality within their own borders, while externalising the negative environmental consequences of their consumption processes to other parts of the world. This paper focuses on the methodological aspects and data requirements of the model, and shows results for selected countries and aggregated regions.

SENSITIVITY AND UNCERTAINTY ANALYSIS IN MRIO MODELLING; SOME EMPIRICAL RESULTS WITH REGARD TO THE DUTCH CARBON FOOTPRINT. WILTING H.C.

Environmental multi-regional input–output(MRIO)models require large amounts of data that all have their specific uncertainties. This paper presents a sensitivity and uncertainty analysis in order to gain an understanding of the directions in which efforts should be made to reduce these uncertainties. The analyses were carried out for an MRIO model to calculate the Dutch carbon footprint. A sensitivity analysis of the technical coefficients showed that changes in the coefficients in the domestic blocks and in the Dutch import blocks had the largest effects on the calculated footprint. The uncertainty analysis consisting of a Monte Carlo simulation based on probability distributions around the model coefficients showed a relatively low degree of uncertainty in the total Dutch carbon footprint; uncertainties in the carbon emissions allocated to regions, sectors and products were larger. Both analyses showed that, in certain cases, it is justified to apply a partial MRIO analysis.

INTER-REGIONAL TRADE FLOW ESTIMATION THROUGH NON-SURVEY MODELS: AN EMPIRICAL ASSESSMENT. SARGENTO A.L.M., NOGUEIRA RAMOS P. and HEWINGS G. J.D.

Inter-regional trade estimation has been pointed out as a crucial problem when constructing a multiregional input–output system. Knowledge of inter-regional trade flows, at least of the pooled volume of exports and imports by commodity, is critical in accounting for important spillover and feedback effects deriving from inter-regional

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linkages. However, in most countries, there are no completely reliable survey-based statistics on inter-regional trade. Thus, this paper intends to evaluate the reasonability of using indirect inter-regional trade estimates, comparing different estimating methods and assessing the sensitivity of the model results. Based on our empirical comparisons we conclude that input–output models are not greatly affected by the insertion of different trade values. Thus, our results support the use of indirect estimates for inter- regional trade, whenever survey-based data are unavailable.

REAL-FINANCIAL LINKAGES IN THE CANADIAN ECONOMY: AN INPUT–OUTPUT APPROACH. LEUNG D. and SECRIERU O.

The recent financial crisis highlighted the importance of better understanding the interaction between macroeconomic and financial conditions. In this paper, we provide a financial social accounting matrix for the Canadian economy and use it to assess the strength of real-financial linkages by calculating and comparing multipliers with and without endogenous financial flows. It is found that taking into account financial flows increases the impact of a final demand shock on output by 4–11%. Moreover, between 2008 and 2009H1, the investment decisions of financial institutions together with the fact that non-financial institutions were unwilling or unable to increase their financial liabilities led to estimated declines in all GDP multipliers. The impact of a final demand shock on GDP declined 3–5%, while the impact of an increase in the availability of investment funds fell 30% and 55% for financial and non-financial corporations, respectively.

Highlights in journals

EWINGA B. R., HAWKINS T. R. , WIEDMANN T. O., GALLIA A., ERCINE A. E., WEINZETTEL J., STEEN-OLSENB K. (2012) INTEGRATING ECOLOGICAL AND WATER FOOTPRINT ACCOUNTING IN A MULTI-REGIONAL INPUT–OUTPUT FRAMEWORK. ECOLOGICAL INDICATORS 23, PP. 1–8.

Carbon, ecological, and water footprints (CF, EF, and WF) are accounting tools that can be used to understand the connection between consumption activities and environmental pressures on the Earth's atmosphere, bioproductive areas, and freshwater resources. These indicators have been gaining acceptance from researchers and policymakers but are not harmonized with one another, and ecological and water footprints are lacking in their representation of product supply chains. In this paper we integrate existing methods for calculating EF and WF within a multi-regional input–output (MRIO) modelling framework that has already been successfully applied for CF estimation. We introduce a new MRIO method for conserving the high degree of product detail found in existing physical EF and WF accounts. Calculating EF and WF in this way is consistent with the current best practice for CF accounting, making results more reliable and easier to compare across the three indicators. We discuss alternatives for linking the MRIO model and the footprint datasets and the implications for results. The model presented here is novel and offers significant improvements in EF and WF accounting through harmonization of methods with CF accounting, preservation of product-level detail, comprehensive inclusion of sectors of the global economy, and clear representation of flows along supply chains and international trade linkages. The matrix organization of the model improves transparency and provides a structure upon which further improvements in footprint calculation can be built. The model described here is the first environmentally extended MRIO model that harmonizes EF and WF accounts and aligns physical unit data of product use with standard economic and environmental accounting.

KOOPMAN R., WANGA Z., WEI S. (2012). ESTIMATING DOMESTIC CONTENT IN EXPORTS WHEN PROCESSING TRADE IS PERVASIVE. JOURNAL OF DEVELOPMENT ECONOMICS 99, 1, PP. 178–189.

For many questions, it is crucial to know the extent of domestic value added (DVA) in a country's exports, but the computation is more complicated when processing trade is pervasive. We propose a method for computing domestic and foreign contents that allows for processing trade. By applying our framework to Chinese data, we estimate that the share of domestic content in its manufactured exports was about 50% before China's WTO membership, and has risen to nearly 60% since then. There are also interesting variations across sectors. Those sectors that are likely labeled as relatively sophisticated such as electronic devices have particularly low domestic content (about 30% or less).

CIASCHINI M., PRETAROLI R., SEVERINI F., SOCCI C. (2012). REGIONAL DOUBLE DIVIDEND FROM ENVIRONMENTAL TAX REFORM: AN APPLICATION FOR THE ITALIAN ECONOMY. RESEARCH IN ECONOMICS, 66, 3, PP. 273–283

The greenhouse effect forces national Governments to design environmental tax policies for facing not only global warming but also the negative economic consequences resulting from the reduction of emissions such as a negative change of GDP. This paper aims at verifying the impact of an environmental fiscal reform able to attain both the reduction of greenhouse gas emissions and the regional double dividend. We have decided to follow the computable general equilibrium approach for modelling the multisectoral income circular flow in the case of a bi-regional economy as described by a Social Accounting Matrix we have built for this purpose. The tools of analysis we chose represent suitable and consistent instruments in order to quantify the effects of an environmental tax reform. They can in fact highlight the possible differences in responses between macro regions in terms of regional GDP changes, regional prices and regional employment rate. In fact, the extended multi-sectoral framework, on which the model is developed, represents economic activities, imperfect labour market and institutional sectors behaviours in each macro region. The simulations performed concern the introduction of a progressive and proportional green tax on each type of commodity according to the corresponding level of CO2 emissions. Furthermore all simulations introduce a recycling scheme of green tax revenues, whose aim is reducing both the income tax and the regional tax on activities (IRAP). The application is done on a bi-regional Social Accounting Matrix for Italy for the year 2003.

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OSHITA Y. (2012). IDENTIFYING CRITICAL SUPPLY CHAIN PATHS THAT DRIVE CHANGES IN CO2 EMISSIONS ENERGY ECONOMICS, 34, 4, PP. 1041-1050.

To address the problem of global warming, it is important to identify the supply chain paths that drive changes in life cycle CO2 emissions and provide both policy makers and decision makers with the information on the critical paths in order to efficiently reduce the CO2 emissions. In this article, I extract and analyze the factors and key supply chains involved in changes in CO2 emissions associated with Japan's overall demand from 1990 to 2000 using the Structural Path Decomposition (SPD) method applied to the 1990–1995–2000 linked Japanese environmental input–output tables at the four-digit commodity classification level. The results reveal that the volume of CO2 emissions increased as a result of changes in the input structure of the electricity of the services sector, such as "electricity → amusement and recreation facilities → household demand", "electricity → retail trade → household demand" and "electricity → public administration (local) → local government demand", indicating increasing dependence of services on energy input. I also find that the final demand shift changed CO2 emissions, for example the rise in demand for integrated circuits in exports has contributed to increasing CO2 emissions generated from electricity, the fall in demand for frozen fish and shellfish in household demand has contributed to decreasing CO2 emissions from marine fisheries.

JOÃO AMADOR (2012). ENERGY CONTENT IN MANUFACTURING EXPORTS: A CROSS-COUNTRY ANALYSIS. ENERGY ECONOMICS 34, 4, PP. 1074–1081.

This article compares the energy content in manufacturing exports in a set of 30 advanced and emerging economies and examines its evolution from 1995 to 2005, combining information from the OECD input–output matrices and international trade data in 17 manufacturing sectors. In addition, the article suggests a methodology to disentangle export structure and sectoral energy efficiency effects, presenting results according to technological categories. The article concludes that Brazil, India and, mostly, China, present a high energy content in manufacturing exports, which has increased from 1995 to 2005. Conversely, many advanced economies, notably in Europe and North America, which showed energy contents below the world average in 1995, reinforced their position as exporters with relatively lower energy usage. The contribution of export structure and energy efficiency effects to explain differences in the energy content of exports draws attention to the situation of China. This country increased its relative energy usage in the exports of all technological categories of goods. This effect was reinforced by the stronger export specialization in high-tech products and hindered by a comparatively lower specialization in medium-high-tech products.

KAPLANA I.C., LEONARD J. (2012) FROM KRILL TO CONVENIENCE STORES: FORECASTING THE ECONOMIC AND ECOLOGICAL EFFECTS OF FISHERIES MANAGEMENT ON THE US WEST COAST. MARINE POLICY 36, 5, PP. 947–954.

There is a need to better understand the linkages between marine ecosystems and the human communities and economies that depend on these systems. Here those linkages are drawn for the California Current on the US West Coast, by combining a fishery ecosystem model (Atlantis) with an economic model (IO-PAC) that traces how changes in seafood landings impact the broader economy. The potential effects of broad fisheries management options are explored, including status quo management, switching effort from trawl to other gears, and spatial management scenarios. Relative to Status Quo, the other scenarios here involved short-term ex-vessel revenue losses, primarily to the bottom trawl fleet. Other fleets, particularly the fixed gear fleet that uses pots and demersal longlines, gained revenue in some scenarios, though spatial closures of Rockfish Conservation Areas reduced revenue to fixed gear fleets. Processor and wholesaler revenue tracked trends in the bottom trawl fleet, which accounted for 58% of total landings by value. Income impacts (employee compensation and earnings of business owners) on the broader economy mirrored the revenue trends. The long-term forecast (15 years) from the Atlantis ecosystem model predicted substantial stock rebuilding and increases in fleet catch. The 15 year projection of Status Quo suggested an additional ~$27 million in revenue for the fisheries sectors, and an additional $23 million in income and 385 jobs in the broader economy, roughly a 25% increase. Linking the ecological and economic models here has allowed evaluation of fishery management policies using multiple criteria, and comparison of potential economic and conservation trade-offs that stem from management actions.

Book Review

ZHANG YAXIONG. CHINA MULTI-REGIONAL INPUT-OUTPUT MODELS FOR 2002 AND 2007. CHINA STATISTICS PRESS, 2012.

State Information Centre (SIC, 2005) developed China 1997 8-region, 30-sector multiregional input-output (CMRIO) model, using survey data and non-survey methods. However, since 1997, China's economy has experienced tremendous changes and has leapt to a new stage, and interregional trade and economic link has strengthened, so it's increasingly urgent to update and develop China's 2002 and 2007 CMRIO models. We summarize experience in developing 1997 CMRIO model and study methods on estimating interregional trade coefficients, then we propose a new estimation model. Also, we modify the method and procedures on developing CMRIO model. Based on more standardized theory and methods, 2002 and 2007 CMRIO models are successively developed.

In order to be comparable with sectoral classifications in 1997 CMRIO model, there are 8-region, 29-sector in 2002 and 2007 CMRIO models. Compared with 1997 CMRIO model, there are some features in developing 2002 and 2007 IRIO models.

First, the entire development is based on 30 provinces, various regional versions of CMRIO model can be made after aggregating different province groups, according to needs of regional plan and policy design.

Second, in CMRIO core work—estimating interregional trade coefficient, we propose specific model and estimation method, based on entropy maximizing and gravity models.

Third, incorporating trade data published by China Customs, each province's input-output table are adjusted as non-competitive inflow-import IO table.

Fourth, we modify interregional trade matrix, adopting the basic survey data reflecting inter-province inflow and outflow in "National Input-Output Survey 2007".

Fifth, Each province's table are fully used. When conducting balance adjustment, in total control that the sum of all provinces' tables equals country table.

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Upcoming conferences

Industrial organization and spatial economics

October 10-13, 2012.

Saint Petersburg, Russia

The HSE Center for Market Studies and Spatial Economics is organizing a conference "Industrial organization and spatial economics"
Topics of interest include: industrial organization, spatial economics, imperfect competition, international trade, urban economics, and new economic geography. The language of the conference is English. Economists working in the above fields are invited to submit papers for presentation at the conference. Both empirical and theoretical papers will be considered. Papers focusing on mathematical modeling are most welcome.
Papers or extended abstract should be submitted to the website up to July 31. The acceptance of papers will be notified by August 31.

No registration fees.

July 31, 2012 Deadline for submission of papers or extended abstracts

August 31, 2012 Notification of acceptance

September 15, 2012 Deadline for the submission of the final papers

Further info at: http://ces.hse.ru/en/2012/10/10/-13/conference

3rd Annual International Conference on Qualitative and Quantitative Economics Research

20th to 21st May 2013

Bangkok, Thailand

The QQE conference is dedicated in providing researchers, academicians and students with a thorough understanding of the core techniques of quantitative and qualitative economics as well as their strengths and limitations. We also welcome participants to include their understanding of the qualitative and quantitative application to test economic theories and measure magnitudes relevant for economic policy and other decisions.

Full Paper Submission: **23rd November 2012**

Author Notification: **7th December 2012**

Final Paper (Camera-Ready) Submission: **15th January** 2013

Early Bird Registration: **15th March 2013**

Late Registration: **22nd April 2013**

XXXVII Simposio de la Asociación Española de Economía-Spanish Economic Association (SAEe)

Dec 13 - 15, 2012

Vigo, Spain

Universidad de Vigo is pleased to host the XXXVII Simposio de la Asociación Española de Economía-Spanish Economic Association (SAEe), to be held in Vigo, Spain, on 13-15 December 2012. The Simposio is the annual conference of the Spanish Economic Association and brings together experts in all fields of economics every year in December. The Spanish Economic Association Job Market, intended for PhD graduates in economics, also meets during the Simposio.

Paper Submission: **Jun 10**, 2012

Registration: **Dec 15**, 2012

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