



The 7th International Conference on Economic Structures

Date **March 18-19, 2023**

Venue **Hosei University**
(Ichigaya campus, Tokyo, Japan)

Organized by

**The Pan Pacific Association of Input-Output Studies
(PAPAIOS)**

Co-organized by

Hosei University

Contact

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Organizers

Chief of the General Organizing Committee:

Mikio SUGA (President of PAPAIOS), Hosei University, Japan

Chair of the Scientific Program Committee:

Ken ITAKURA, Nagoya City University, Japan

Time Table

18 March, 2023

	Venue A (S301)	Venue B (S302)	Venue C (S303)	Venue D (S306)
12:30- 12:50				Opening Session
13:00- 15:00	The Effect of Disaster and COVID- 19 to Economy	Macroeconomic Modeling and CGE	Regional Input- Output Analysis	Environment, Resource and Energy
15:20- 16:00				Keynote speech
16:10- 16:50				Klein Prize Awardee Speech

19 March, 2023

	Venue A (S301)	Venue B (S302)	Venue C (S303)	Venue D (S306)
10:00- 12:00	Organized session1	Organized session 3	Other Topics	Environment, Resource and Energy
13:00- 15:00	Theory of Input- Output Techniques	Macroeconomic Modeling and CGE	Organized session 4	Regional Input- Output Analysis
15:20- 16:40	Organized session 2	Other Topics	Other Topics	Compilation of Input-Output Table or SUT



Supported by Hosei University.

Conference Venue

Sotobori Building, Ichigaya Campus, Hosei University

Ichigaya Campus map: <https://www.hosei.ac.jp/english/about/maps/campus/ichigaya/>

Access to Ichigaya Campus: <https://www.hosei.ac.jp/english/about/maps/access/ichigaya/>

Floor Map

3rd Floor, Sotobori Building, Ichigaya Campus, Hosei University

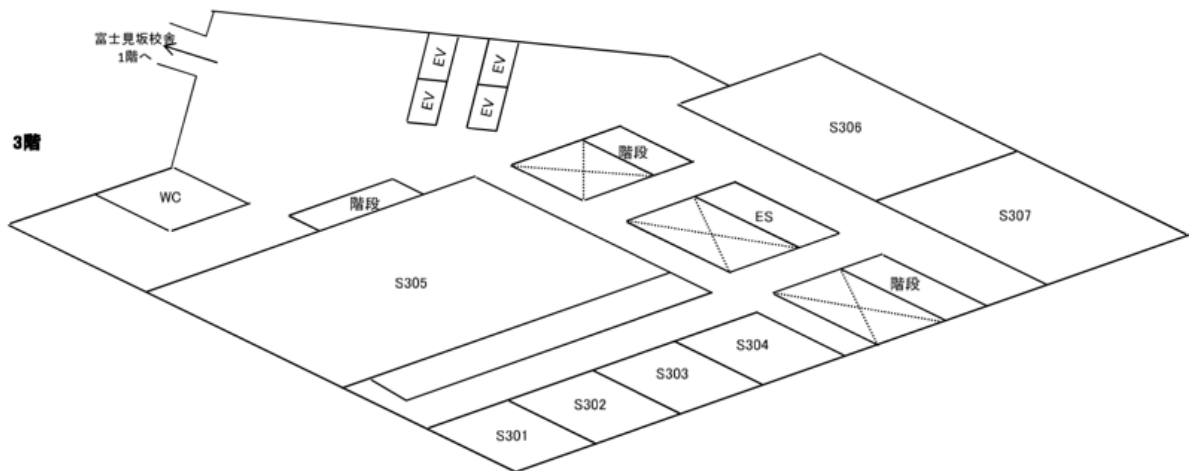
Venue A: S301

Venue B: S302

Venue C: S303

Venue D: S306

Reception: S304



Day 1 Events

Saturday, 18 March 12:30-12:50

Opening Session

Chair:	Yoshifumi Ishikawa	(Nanzan University)
Speaker	Mikio Suga (President of PAPAIOS)	(Hosei University)
Speaker	Jinmyon Lee (Secretary General of KESRA)	(Korea Institute for Industrial Economics and Trade)
Speaker	Ching-Cheng Chang (President of TAIOS)	(Academia Sinica)

Saturday, 18 March 13:00-15:00

Venue A (S301)

The Effect of Disaster and COVID-19 to Economy

Chair:	Kiyoshi Yonemoto	(Takasaki City University of Economics)
Title	How do global value chains expose the economy to shocks of Covid-19?	
Author	Lea Ortega	(Yokohama National University)
Title	The Regional Impact of the COVID-19 Pandemic in South Korea: Evidence from TERM-Korea Regional CGE model	
Author	Sang-Ho Nam	(Adelman Institute for Economics)

Saturday, 18 March 13:00-15:00

Venue B (S302)

Macroeconomic Modeling and CGE

Chair:	Ken Itakura	(Nagoya City University)
Title	Industrial Restructuring and Regional Resilience: A Dynamic Regional CGE Model Approach	
Author	Euijune Kim	(Seoul National University)
Co-author1	Jaewon Lim	(University of Nevada, Las Vegas)
Co-author2	Aaron Colletta	(University of Nevada, Las Vegas)
Title	A CGE Analysis of the Socioeconomic Effects of Digital Transformation focusing on the Korean Economy	
Author	Yeongjun Yeo	(National Assembly Futures Institute)
Title	Applying Climate Change Impacts to A Global CGE Model with Sub-national Regions of Japan	
Author	Ken Itakura	(Nagoya City University)
Co-author1	Akira Hibiki	(Tohoku University)

Saturday, 18 March 13:00-15:00

Venue C (S303)

Regional Input-Output Analysis

Chair:	Mitsuo Yamada	(Chukyo University)
Title	Compilation of the 2015 Input-Output Table for All Municipalities	
Author	Mikio Suga	(Hosei University)
Co-author1	Taku Ishiro	(Yokohama National University)
Co-author2	Natsumi Suhara	(University of Shimane)
Title	Country specific export Spillovers	
Author	Jiayang Wu	(Yokohama National University)
Co-author1	Taku Ishiro	(Yokohama National University)
Title	Input-output analysis on the economic contribution of small and medium-sized enterprises' production to regional economy	
Author	Mitsuo Yamada	(Chukyo University)

Saturday, 18 March 13:00-15:00

Venue D (S306)

Environment, Resource and Energy

Chair:	Yasushi Kondo	(Waseda University)
Title	Economic impact of the drought in Spain: measurement for the adoption of measures	
Author	Dary Beltran	(Universidad Loyola Andalucia)
Co-author1	Manuel Alejandro Cardenete	(Universidad Loyola Andalucia)
Co-author2	Paula Villegas	(Universidad Loyola Andalucia)
Title	Drivers of household carbon footprint within spatial and socioeconomic groups across EU regions	
Author	Jemyung Lee	(Research Institute for Humanity and Nature)
Co-author1	Yosuke Shigetomi	(Nagasaki University)
Co-author2	Keiichiro Kanemoto	(Research Institute for Humanity and Nature)
Title	Investigating carbon emission embodied in global value chain participation for China, Australia and Indonesia	
Author	Shuning Chen	(Kyushu University)
Co-author1	Masaru Kagatsume	(Kyoto University)

Saturday, 18 March 15:20-16:00

Venue D (S306)

Keynote speech

Chair:	Nobuhiro Okamoto	(Daito Bunka University)
Title	Designing Public Policies with Multisectorial Models: Present and Trends	
Speaker	Manuel Alejandro Cardenete	(Universidad Loyola Andalucia, and Georgetown University)

Saturday, 18 March 16:10-16:50

Venue D (S306)

Klein Prize Awardee Speech

Chair:	Mikio Suga	(Hosei University)
Title	Adding Country Resolution to EXIOBASE: Impacts on Land Use Embodied in Trade	
Speaker	Richard Wood	(Norwegian University of Science and Technology / University of Newcastle)

Day 2 Events

Sunday, 19 March 10:00-12:00		Venue A (S301)
Organized session 1: Challenging real-time economy through IO techniques		
Chair:	Kaya Akagi	(Chiba University of Commerce)
Title	What does e-invoice data bring to SNA and Real-Time Economy?	
Author	Kaya Akagi	(Chiba University of Commerce)
Title	Input-Output analysis using transaction data between companies	
Author	Takaya Ohsato	(Shiga university)
Title	An application of firm-level Input-Output analysis: tracking money stream and categorizations of firms	
Author	Junichi Ozaki	(Tokyo Institute of Technology)
Title	Production Accounting & Realtime Economy (RTE)	
Author	Hiroshi Deguchi	(Chiba University of Commerce)
Title	Micro-Macro Link in Agent-Based Modeling and Accounting Research for Real Time Economy	
Author	Takao Terano	(Chiba University of Commerce)

Sunday, 19 March 10:00-12:00		Venue B (S302)
Organized session 3: Development and policy impacts of climate mitigation in India using Input-Output techniques		
Chair:	Tejal Kaniitkar	(National Institute of Advanced Studies)
Title	Carbon implications of eradicating poverty in India	
Author	Nisarga R	(ESG Models and R&D, MSCI)
Title	An input-output based analysis of the labor impacts of clean energy transitions in India	
Author	Anjali Sharma	(Azim Premji University)
Title	A review of the EXIOBASE, EORA and WIOD Database using the case study of India	
Author	Joan Shilpa Kiran	(National Institute of Advanced Studies)

Sunday, 19 March 10:00-12:00		Venue C (S303)
Other Topics		
Chair:	Takashi Yagi	(Meiji University)
Title	The Counterpart of RAS Method	
Author	Vladimir Motorin	(National Research University)
Title	Impact of financial inclusion on economic growth in developing countries	
Author	Sumanta Kumar Saha	(Ritsumeikan University)
Title	Implications of AI innovation on economic growth: a panel data study	
Author	Julius Tan Gonzales	(Yokohama National University)

Sunday, 19 March 10:00-12:00		Venue D (S306)
Environment, Resource and Energy		
Chair:	Makiko Tsukui	(Tokyo International University)
Title	A Compilation of SEEA and Application to CGE Model	
Author	Keiji Ujikawa	(Yokohama National University)
Title	The potential effects of the carbon tax in Vietnam: A national CGE analyses	
Author	Thao Phuong Nguyen	(Ministry of Planning and Investment Vietnam)
Title	The extended multi-regional input-output analysis for the world mineral asbestos flow	
Author	Makiko Tsukui	(Tokyo International University)

Sunday, 19 March 13:00-15:00

Venue A (S301)

Theory of Input-Output Techniques

Chair: Kazuhiko Nishimura (Chukyo University)
Title: The Compilation and Analysis of the 2015 Input-output Table of Seoul Special City for the Cultural Industry
Author: Heming Zhang (Yokohama National University)
Title: Analysis of Industry Impact of Container Fare Fluctuations : Using the International IO(Input-Output) Table
Author: Junmin Lee (Korea Institute for Industrial Economics and Trade (KIET))
Co-author1: Jeonghyun Kin (KIET)
Title: Price Inducing Effect of the Increase in Import Prices
Author: Dongae Jo (Bank of Korea)

Sunday, 19 March 13:00-15:00

Venue B (S302)

Macroeconomic Modeling and CGE

Chair: Kiyoshi Fujikawa (Aichi Gakuin University)
Title: Global impacts of China's carbon tax and CO2 emissions trading
Author: Hikari Ban (Kobe Gakuin University)
Co-author1: Kiyoshi Fujikawa (Aichi Gakuin University)
Title: Tracking Global Value Chains using Global Unit Structure
Author: Masaaki Kuboniwa (Hitotsubashi University)
Co-author1: Yuichi Hasebe (Yokohama National University)
Title: Carbon Leakage in Carbon Taxes and CO2 Emissions Trading
Author: Kiyoshi Fujikawa (Aichi Gakuin University)
Co-author1: Hikari Ban (Kobe Gakuin University)

Sunday, 19 March 13:00-15:00

Venue C (S303)

Organized session 4: Analyses on main issues in Korean economy

Chair: Jinmyon Lee (Korea Institute for Industrial Economics and Trade (KIET))
Title: The Evolution of Embodied Services in Korean Goods Exports
Author: Gahyeon Cheon (KIET)
Co-author1: Youngho Lee (KIET)
Title: The R&D Spillover in Korea using Input-Output table
Author: Taehyun Kwon (Bank of Korea)
Title: The Effects of a Carbon Tax on the Korean Economy in a More Environment Conscious Era
Author: Yong Kyun Kim (National Assembly Budget Office)

Sunday, 19 March 13:00-15:00

Venue D (S306)

Regional Input-Output Analysis

Chair: Taku Ishiro (Yokohama National University)
Title: Multi-Regional Input-Output Analysis of Public Sector In Japan
Author: Kazuaki Sato (Tokyo Keizai University)
Title: Indirect Effects on the East Asian Steel Industry Arising From the World's Final Demand for Each Industry
Author: Kayo Shiode (Saitama University)
Title: Analyzing the Kanagawa Prefecture Economic Area Using Input-Output Tables for All Municipalities
Author: Taku Ishiro (Yokohama National University)

Sunday, 19 March 15:20-16:40 **Venue A (S301)****Organized session 2: Industrial policy evaluation in developing countries**

Chair:	Christian Otchia	(Nagoya University)
Title	Agriculture Development-led Industrialization and Economic growth	
Author	Christian Otchia	(Nagoya University)
Title	Impact of Special Economic Zone on Economic Development: Evidence From Laos Nightlight Analysis	
Author	Nilaphy Phommachanh	(Nagoya University)
Title	Do place-based policies foster structural changes? Evidence at the district level from Vietnam	
Author	Nguyen Thi Minh Thu	(Nagoya University)

Sunday, 19 March 15:20-16:40 **Venue B (S302)****Other Topics**

Chair:	Ayu Washizu	(Waseda University)
Title	International Remittances and Labour Force Participation in Nigeria: Do Educational Attainment and Household Income Matter?	
Author	Usman Alhassan	(Ritsumeikan University)
Title	The impact of sustainable diets and smart food services on environment and well-being: a case of Japanese households	
Author	Yiyi Ju	(Waseda University)
Co-author1	Ayu Washizu	(Waseda University)
Co-author2	Sayaka Ita	(Tohoku Gakuin University)

Sunday, 19 March 15:20-16:40 **Venue C (S303)****Other Topics**

Chair:	Kazuo Inaba	(Ritsumeikan University)
Title	"Can Historical Economic Growth Patterns be Traced in South Asian Countries as same as the Classical Theory shows?" : A sectoral approach using input-output analysis	
Author	Muhammad Tashfiq Huq	(Hiroshima University)
Co-author1	Masaru Ichihashi	(Hiroshima University)
Title	Information transparency, collateral problem and bank credit accessibility of small and medium enterprises in ASEAN countries	
Author	Ei Ei Thein	(Ritsumeikan University)
Co-author1	Atsushi Niigata	(Ritsumeikan University)
Co-author2	Kazuo Inaba	(Ritsumeikan University)

Sunday, 19 March 15:20-16:40 **Venue D (S306)****Compilation of Input-Output Table or SUT**

Chair:	Satoru Hagino	(Statistics Commission Office)
Title	Construction of Real Priced Global Input-Output Tables	
Author	Nagendra Shrestha	(Yokohama National University)
Title	Constructing regional input- output table in the context of data limitation- the case of Vietnam	
Author	Thao Thi Bich Dang	(University of Tsukuba)
Co-author1	Duong Lam Anh Tran	(University of Tsukuba)
Co-author2	Morito Tsutsumi	(University of Tsukuba)

Abstract

Abstract¹

Saturday, 18 March 13:00-15:00 (Venue A (S301))

The Effect of Disaster and COVID-19 to Economy

Chair: Kiyoshi Yonemoto (Takasaki City University of Economics)

Lea Ortega (Yokohama National University)

How Do Global Value Chains Expose the Economy to Shocks of Covid-19?

The Covid-19 crisis has increased the discussions of international fragmentation production or the global value chains (GVCs). Disruptions in the supply chains due to isolation measures and border controls during the Covid-19 outbreak stressed the interdependence and interconnectedness of economies through GVCs. This brought an increased attention in research and policy due to the changing costs and benefits of globalization and if the former had outweighed the benefits of globalization during the onset of Covid-19. Discussions and research had emphasized the shocks' transmissions associated with the supply chain disruptions and are mainly due to how economies were interconnected in the international production network. Using structural decomposition method through an input-output framework, this paper aims to examine the impact of the Covid-19 and the transmission of shocks among economies, and how the international production network or GVC had influenced the shocks exposure. This research employs the recent inter-country input-output data and GVC indicators from Asian Development Bank's multiregional input-output database. Structural decomposition of trade orientation using input-output data identified the trading relationships of economies and how Covid-19 had changed their GVC participation during the onset of the outbreak and post-outbreak. Analysis and comparisons were performed for different economies. Results suggest that countries experienced shocks differently from foreign supply and demand shocks in GVCs. The sources and transmission of shocks through global production network played a critical role in mitigating future related shocks associated to global supply chains.

Sang-Ho Nam (Adelman Institute for Economics)

The Regional Impact of the COVID-19 Pandemic in South Korea: Evidence from TERM-Korea Regional CGE model

¹ Abstracts listed here are extracted from the application form of the conference. Revised abstracts may be available from the registration system.

Abstract

Saturday, 18 March 13:00-15:00 (Venue B (S302))

Macroeconomic Modeling and CGE

Chair: Ken Itakura (Nagoya City University)

Euijune Kim (Seoul National University), Jaewon Lim (University of Nevada, Las Vegas), Aaron Colletta (University of Nevada, Las Vegas)

Industrial Restructuring and Regional Resilience: A Dynamic Regional CGE Model Approach

The private services producing industries in the U.S. accounts for roughly 68.2% of the U.S. GDP and 71.1% of total nonfarm jobs. Among the U.S. service sector industries, tourism-related businesses are one of the fastest growing industries, including recreational and cultural services. Unlike other types of private services, e.g., professional and business services, the large portion of the tourism-related services happen in tourism destinations. Consumers travel to a destination to spend and the tourism-related export service occurs in the origin point of the export. This benefits local economies through inter-industrial linkages within the tourism destination and broadly defined regional economy through inter-regional and inter-industrial linkages. This paper examines how the local economies of a popular tourism destination would respond to the job losses in local labor market from transition towards automation in service industry. Authors developed a Computable General Equilibrium (CGE) model to identify how the industrial restructuring in tourism industry in Nevada due to automation affects household income, regional resilience, and the overall welfare of Nevada. Based on counter-factual scenarios with the workforce retraining policies, this paper measures the absorption of shock through countervailing effects of the policy intervention. Findings in this paper provide the viable and adaptive policy paths to minimize the shock on local labor market by enhancing regional resilience.

Yeongjun Yeo (National Assembly Futures Institute)

A CGE Analysis of the Socioeconomic Effects of Digital Transformation Focusing on the Korean Economy

There have been few studies that quantitatively investigate the opportunities and risk factors driven by digital transformation. In addition, there has been a lack of quantitative research that estimates the impacts of policy interventions to resolve potential problems in the future digital transformation era. Against this background, this study attempts to explore the intrinsic characteristics of digital transformation-led technological changes. In addition, this study explores the long-run impacts of digital transformation on the socioeconomic system in terms

Abstract

of economic growth, employment, and distribution, using a computable general equilibrium (CGE) model. The results show that digital transformation has the potential to accelerate routine-biased and capital-biased technological changes. In this regard, we have found that economic growth driven by digital transformation disproportionately increases relative demand for capital and non-routinized cognitive tasks over routinized tasks. This shift in the value-added composition is found to have the potential to deepen income inequality, as higher income groups benefit from greater tasks premiums and capital earnings. Furthermore, the quantitative findings suggest that the promotion of the dynamic interaction between digital transformation-led technological change and lifelong learning may alleviate the potential risks induced by technological changes. Based on these findings, this study attempts to redefine the role of innovation policy in making a successful transition to the digital transformation era.

Ken Itakura (Nagoya City University), Akira Hibiki (Tohoku University)

Applying Climate Change Impacts to A Global CGE Model with Sub-national Regions of Japan

Our aim in this study is to apply climate change impacts to a recursively dynamic global computable general equilibrium (CGE) model which incorporates the sub-national regions of Japan. For this purpose, we modify the Global Trade Analysis Project (GTAP) model and database to accommodate the forty-seven prefectures, sub-national regions, of Japan. Energy-environmental version of the GTAP (GTAP-E) model and database is extended for the prefectures and for stock-flow dynamics of investment. Climate change impacts stemming from change in temperature are obtained from Roson and Sartori (2016) which classify the impacts into six groups; (1) sea level rise, (2) agricultural productivity, (3) heat effects on labor productivity, (4) human health, (5) tourism flows, and (6) households' energy demand. To quantify each of the climate change impacts, we construct a baseline scenario for the period of 2011 to 2100 and implement seven scenarios corresponding to each of the six climate change impacts and a combination of them. Tentative simulation results shows that heat effects on labor productivity and agricultural productivity are relatively larger as compared to other impacts, lowering the gross regional product (GRP) in real term. Interaction in domestic transactions between prefectures and in international trades across countries plays important role determining the direction of impact at industrial sector level.

Abstract

Saturday, 18 March 13:00-15:00 (Venue C (S303))

Regional Input-Output Analysis

Chair: Mitsuo Yamada (Chukyo University)

Mikio Suga (Hosei University), Taku Ishiro (Yokohama National University), Natsumi Suhara (University of Shimane)

Compilation of the 2015 Input-Output Table for All Municipalities

Suga (2019) compiled input-output tables for all municipalities by using micro data of the 2012 Economic Census Activity Survey and the 2011 Input-Output Tables. The study initiated by Suga (2019) was intended to raise public awareness of the just-launched Economic Census Activity Survey by having the results of the survey used for analysis in regions (municipalities) familiar to the respondent and by spurring examples of the use of analysis results to contribute to regional policy making. Some studies which utilized the compiled results provided by Suga (2019) were those from Yamada (2020), Yamada (2022), and Funabashi (2021). The 2016 Economic Census Activity Survey used 2015 as the reference year, and this study extends Suga's (2019) 2011 estimates to 2015. Essentially, this study used the micro data of the 2016 Economic Census Activity Survey to aggregate sales (revenue) by industry and municipality. Watanabe and Suhara were in charge of the estimation for the headquarters sectors. Ishiro and Inoda were in charge of estimating the agriculture, forestry and fisheries sector. Ide was in charge of estimating the household consumption sector. Finally, we compiled input-output tables for all municipalities using the 2015 Input-Output Tables. This study has been prepared as a teaching resource for training conducted at the Statistical Research and Training Institute and is part of a joint research project between the Institute and Suga.

Jiayang Wu (Yokohama National University), Taku Ishiro (Yokohama National University)

Country Specific Export Spillovers

As countries around the world are actively embracing regional and interregional cooperation, China launched an ingenious economic growth strategy called "One Belt, One Road" in 2013. Against the backdrop of this policy and focusing on the "Silk Road Economic Belt," the longest economic corridor in the world with the strongest growth potential, is the core region of the "Silk Road Economic Belt," Xinjiang Uygur Autonomous Region, which is said to be the window connecting east and west in the northwestern part of China. This paper will focus on Xinjiang Province of China and ten surrounding countries (Mongolia, Russia, Kazakhstan,

Abstract

Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan, Afghanistan, Pakistan, and India) as our sample region after the implementation of the "One Belt One Road" policy. Using the Xinjiang 2017 Input-Output table, Using the actual export data to each country obtained from customs, the export value column of the input-output table was divided by 10 countries. This step allowed us to summarize the various actual export data down to the industry level. The value of exports to each country is then further divided into two types of trade: general trade and frontier trade. This process makes it possible for this paper to separate the production inducement effect of exports into general trade and border trade. We will use the method of Input-Output analysis to calculate the spillover effects of Xinjiang's exports to analyze the trade structure and actual trade situation between Xinjiang and its neighboring areas, and to clarify its connections with other countries through exports.

Mitsuo Yamada (Chukyo University)

Input-output Analysis on the Economic Contribution of Small and Medium-sized Enterprises' Production to Regional economy

The success of SMEs is important for regional economic development. A company not only directly contributes to local economy through its value added and employment demand, but also influences the production of other companies through inter-company transactions. This indirect effect additionally induces value added and employment. Such ripple effects can be obtained by input-output analysis. The "hypothetical extraction method," which assumes that a certain sector does not exist and measure how much the economic spillover would be reduced by the sector's non-existence, is well known as a method measuring effect of a certain sector's economic activity on the economy. Since this method assumes that the activity of a specific sector, included in the input-output table, disappears, it is difficult to apply it to measure the contribution of a specific company's production activities to the regional economy. So, we use "hypothetical insertion method" that assumes a certain sector newly added, which is the opposite case of this setting. Taking Nishio City, Aichi prefecture as an example, we conduct a questionnaire survey to four SMEs on their production, material and other costs, and regional sales and procurements. Then each company's production and procurement are described as row and column vectors of one sector, which would be added to an input output table. We use 2011 Nishio City's interregional input-output table, with three regions: Nishio City, the rest of Aichi prefecture, and the rest of Japan, and 106 sectors for each region. Measuring increase of the ripple effects by adding SME's sector, we obtain regional contributions of its production. We calculate not only backward linkage effect of procurement of intermediate goods in the supply chain of the company in question but also the forward linkage effect through the product sales.

Abstract

Saturday, 18 March 13:00-15:00 (Venue D (S306))

Environment, Resource and Energy

Chair: Yasushi Kondo (Waseda University)

Dary Beltran (Universidad Loyola Andalucia), Manuel Alejandro Cardenete (Universidad Loyola Andalucia), Paula Villegas (Universidad Loyola Andalucia)

Economic Impact of the Drought in Spain: Measurement for the Adoption of Measures

The objective of this study is to estimate the economic impact of droughts in Spain to provide valuable information to decision-makers; such information would allow them to understand the macroeconomic scope of droughts to define mitigation measures and the impact on economic activity. Notably, there is a strong relationship between the productive structure of a given country or region and the natural resources that it consumes. The results show that water transactions are highly concentrated in a few sectors, mainly the agricultural sector, while being almost negligible in the rest. This work indicates how the economy reacts in terms of production or income and in terms of GDP, obtaining a drop of 2.6% for both indicators, which will allow us to obtain an approximation of the economic impact in the face of a drought situation in Spain with a water reserve falling by 39 %. In addition to the conclusions in quantitative terms, it is also interesting to consider other aspects such as, for example, social or political issues, as well as to reflect on the different possibilities available to try to tackle a very serious problem and a situation that is expected to worsen in the next few months and years.

Jemyung Lee (Research Institute for Humanity and Nature), Yosuke Shigetomi (Nagasaki University), Keiichiro Kanemoto (Research Institute for Humanity and Nature)

Drivers of Household Carbon Footprint within Spatial and Socioeconomic Groups across EU Regions

Carbon mitigation has been a key target for many cities to meet the Paris Agreement. Cities became active players in climate actions as many shreds of evidence indicate the responsibility of urban areas toward the accelerating climate change. Carbon Footprint (CF) captures the total contribution of nations, cities, or households to global emissions. Household-level CF accounts offer perspectives on the scales and drivers of CF of different regional, spatial, and socioeconomic groups crosscutting the country by linking multi-regional input-output (MRIO) tables and micro-data of household consumption. Here, we

Abstract

estimate the carbon footprints of 275,247 households in 2010 and 264,604 in 2015 across 62 EU NUTS1 regions by linking the Eora MRIO database and micro-consumption data. We employ Structural Decomposition Analysis to identify the driving factors of CF changes over time within different regional, population density, income, and CF emitting groups. We found that the drivers of carbon footprint largely depend on spatial and socioeconomic context. For example, medical care consumption drives wealthy households' CF only. In Bulgaria, reductions in durable goods consumption contributed to CF mitigation in the BG3 NUTS1 region, while decreased consumable product consumption in the BG4 NUTS1 region drove the CF reduction. It suggests the need for group-specific analysis and policy-making that reflects inside the national boundary.

Shuning Chen (Kyushu University), Masaru Kagatsume (Kyoto University)

Investigating Carbon Emission Embodied in Global Value Chain Participation for China, Australia and Indonesia

The Asia-Pacific region is currently becoming the most populated region and the main source of industrial greenhouse gas emissions. Complex production networks have been formed in this region within globalization and influenced emission intensity and composition variation across countries. We analyze the CO₂ emissions embodied in global value chains (GVCs) in three Asia-Pacific countries, China, Indonesia, and Australia, and conduct a comparative analysis of the impact of trade structure transition on emissions in the three countries. The GVC analysis provides a clear framework for understanding the emissions quantities and intensity embodied in different fragments of cross-border trade. The results of our analysis show that China and Australia have rising emissions intensities in GVC participation that gradually exceed domestic goods production. Despite Australia's more active participation in global emission reduction actions, its forward participation in GVCs has led to increase of its high-emission-intensity products being exported. At the same time, the backward GVC participation emission reflected by the domestic final consumption also shows the growing trend. On the other hand, China has become a "transit station" for emissions embodied in the GVCs. While Indonesia reflects slower growth in local emissions, more emissions come from global value chains. Our results imply that mitigation actions require cross-border cooperation and collaboration to ensure that low-carbon technologies are applied across borders of production networks rather than focusing on specific countries and high-emitting industries.

Abstract

Saturday, 18 March 15:20-16:00 (Venue D (S306))

Keynote Speech

Chair: Nobuhiro Okamoto (Daito Bunka University)

Manuel Alejandro Cardenete

(Universidad Loyola Andalucia, and Georgetown University)

Designing Public Policies with Multisectorial Models: Present and Trends

Saturday, 18 March 16:10-16:50 (Venue D (S306))

Klein Prize Awardee Speech

Chair: Mikio Suga (Hosei University)

Richard Wood

(Norwegian University of Science and Technology / University of Newcastle)

Adding Country Resolution to EXIOBASE: Impacts on Land Use Embodied in Trade

Abstract

Sunday, 19 March 10:00-12:00 (Venue A (S301))

Organized Session 1:

Challenging Real-time Economy Through IO Techniques

Chair: Kaya Akagi (Chiba University of Commerce)

Kaya Akagi (Chiba University of Commerce)

What Does E-invoice Data Bring to SNA and Real-Time Economy?

Governments are planning to utilize big data for economic statistics. The large volume, high velocity, and variety of information define big data. In the context of statistical application, the volume and variety of accounting data, especially e-invoice data, have attracted much attention. The e-invoice data is being digitized mainly in Europe to detect VAT fraud. However, accounting data contains almost all the information on economic entities that make up the SNA. Therefore, by utilizing the accounting data, the government will be able to grasp various economic indicators that have been difficult to handle at the granularity of the firm level. At the same time, frequently updated information such as e-invoice data is attracting attention worldwide to acquire velocity, i.e., speeding up statistics and renewing them in real-time, called the "Real-Time Economy". In contrast, there has been no theorization and verification of the estimation method of SNA with e-invoice data. Therefore, this study discusses the benefits of utilizing e-invoice data for economic statistics, especially for Input-Output Tables, and the feasibility and the obstacles associated with using e-invoice data. The advantages of e-invoicing data include the improvement of the granularity of statistical information and the frequency of updating. We also discuss the possibility of understanding inter-industry relations as a logistics network beyond the framework of the existing tables. On the other hand, to use invoice data, it is necessary to design a legal and information system for e-invoice data. As for these institutional and system issues, we compare the situation in Japan and advanced e-Government countries such as Estonia. In addition, there are some problems with the invoice data in estimating the Input-Output Tables, such as the inability to grasp transaction relationships and margins within the same company. This paper pointed up these problems and their solutions.

Takaya Ohsato (Shiga University)

Input-Output Analysis Using Transactions between Companies Data

The Japanese invoice system is scheduled to be launched in 2023, and transactions among firms are expected to be formalized and utilized in the input-output table. However, specialized companies conduct credit checks on companies, and information on transaction

Abstract

data between companies is collected including small and medium-sized companies.

In this study, before the transaction data through the invoice system, the transaction data at TEIKOKU DATABANK LTD. was used to represent logistics. Credit surveys are conducted on head offices to grasp the flow of money transactions between companies, and do not capture transactions by product at production and distribution centers. On the other hand, the Input-Output table is compiled from statistical information such as the Economic Census, the Current Survey of Production, and prefectural governments' commodity distribution surveys, and represents logistics by commodity. There is a large discrepancy between the two statistics depending on the purpose of the survey. This problem also occurs in the use of invoice information for making the input-output table. This study attempted to represent the logistics supply chain by combining transaction information between headquarters and business location information to solve this problem.

The supply chain tends to be aggregated by trading companies in the corporate data, making it difficult to reproduce a complete input-output table. To find the value of an aggregate corporate supply chain information table, this study takes Ichikawa City, Chiba Prefecture, as an example and examines dynamic changes in industrial structure in a small region through time-series comparisons.

Junichi Ozaki (Tokyo Institute of Technology)

An Application of Firm-level Input-Output Analysis: Tracking Money Stream and Categorizations of Firms

Recently, economic big data has attracted much attention because it is used for renewing the census or statistics of the economy in higher resolution. For instance, private-sector big data and e-invoice data are discussed to be utilized to capture both the firm and inter-firm trading status, leading to comprehensive Input-Output analysis, which can track any flow in the economy. Here, we propose an application of an Input-Output analysis that can utilize the big data of the firm-level granularity. We use private-sector big data provided by Teikoku Databank to estimate the money flow between firms through the gravity interaction model for money transport as an example of firm-level granularity data in this study.

The new perspectives from these kinds of big data are not limited to the economic ripple effect analysis. First, we define the basin of money: the upstream and downstream. The money stream is tracked on the firm level; where the outflow goes and where the inflow comes from are estimated for each firm. The influence on any industry type or region is calculated by summing up the basin. Next, we propose a method of categorization of firms using the upstream and downstream of money. The influence on each industry type, estimated by summarizing the upstream and downstream, directly captures the industry categorization of the concerned firm. If we define a distance between the basin vector, we

Abstract

categorize the firms into several groups with a dendrogram and detect temporal changes in the firm activity. This represents a new perspective on firms' categorization and activity analysis.

Hiroshi Deguchi (Chiba University of Commerce)

Production Accounting & Realtime Economy (RTE)

In this presentation, we introduce a new concept of accounting called production accounting. For this purpose, we extend the accounting postulate for focusing on the multi-dimensional measurement of account titles on the production process as an input-output system, where the input is recognized as the credit side, and the output is recognized as the debit side. Therefore, traditional financial accounting regards an enterprise as the boundary of a system, whereas production accounting regards a production process as the boundary of a system. A production process, including service production, consists of several tasks and their ordered connection as a project. Each task is characterized as an input-output system. Materials, work-in-processes, human capital services, and physical capital services are recognized as inputs for the credit side, and products, byproducts, and work-in-processes are recognized as outputs for the debit side. A production project is characterized as an aggregated input-output system of tasks that construct the project. These processes can be described by an algebraic double-entry multi-dimensional bookkeeping system called exchange algebra.

By connecting products among firms and households on a transaction chain, we can characterize the commodity flow by algebraic multi-dimensional double-entry state space, which is the essential state space for RTE(Real Time Economy).

In this stage, RTE is only one perspective of an economic system where the economic system is recognized as a real-time captured commodity and service flow among firms and households, including B2B and B2C transactions. The flow is characterized by algebraic multi-dimensional double-entry state space. In a firm, a service or goods production and an investment of human and physical capital are made. In a household, life services are produced and consumed simultaneously.

How we can develop the life service level under the stable development of the commodity and service network under the real time observation and control of the network. We have to construct the state space of the network by introducing production accounting to the firms. Without constructing new realities of multi-dimensional double-entry state space, we cannot construct the RTE system as an observable and manageable system.

Abstract

Takao Terano (Chiba University of Commerce)

Micro-Macro Link in Agent-Based Modeling and Accounting Research for Real Time Economy

Agent-Based Modeling (ABM in short) is one of emerging modeling techniques to uncover complex characteristics of social and economical complex adaptive systems. ABM treats the minimum components of a society as groups of individuals. It will model systems from the bottom up using multiple actors called 'agents', each with an internal state, decision-making and/or problem-solving capabilities, and communication ability, and then to analyze the resulting generative phenomenon and scenarios based on their interactions. In accounting research, therefore, an agent is can 1) be a model of a firm with some accounting capabilities, 2) communicate with each other in a firm network, and 3) a component of a Real Time Economy (RTE) system.

ABM has several unique characteristics as follows.

- 1) At the micro level, agents have individual internal states, and behave and adapt autonomously in their attempts to exchange information and solve problems.
- 2) Macro-level properties of the target system emerge from the collective actions of the agents.
- 3) Micro–macro links are created between agents and the surrounding environment, and the system state changes as they affect each other.

This approach is useful in analyzing macro phenomena created by agent–agent interactions at the micro level, as well as the phenomenon of micro–macro links whereby agents are subject to top-down effects. In this respect, ABS is applicable to the system of coevolutionary interaction between firms. Therefore, the research on both ABM and RTE should be integrate in a seamless manner.

This presentation introduces the concepts of ABM and its relationship between RTE and accounting systems. As an example, we will show the study of constitutive analyses of structural changes in subsystems in a rapidly changing external environment using agent simulations. Mukai et al. developed functions of an agent for the inter-business trading structure model, an inter-business trading structure model in which a group of firms spontaneously constructs and reorganizes their trading networks by changing production items and trading relationships.

Abstract

Sunday, 19 March 10:00-12:00 (Venue B (S302))

Organized Session 3:

Development and Policy Impacts of Climate Mitigation in India Using Input-Output Techniques

Chair: Tejal Kanitkar (National Institute of Advanced Studies)

Nisarga R (ESG Models and R&D, MSCI)

Carbon implications of eradicating poverty in India

Poverty eradication and stabilizing climate change are the primary challenges of sustainable development. Eradicating poverty results in an increase of household consumption which leads to more GHG emissions at current levels of technology. Annex-I nations have historically emitted majority of the GHGs causing climate change. This further constrains the carbon space available for developing nations. There have been limited quantitative analyses examining the compatibility of these goals, particularly for large developing countries such as India. This study analyses if eliminating poverty by 2030 at different poverty thresholds puts India at the risk of overshooting the available carbon budget. Household consumption from the NSSO's consumption expenditure survey is integrated with an environmentally extended, multi-regional input output model (MRIO) to estimate the additional emissions than can be attributed to poverty eradication. The findings show that eliminating extreme poverty (<\$1.9 per capita a day at PPP) and poverty below \$3.2 per capita a day does not jeopardize climate goals. However, the ambitious poverty threshold of \$5.5 could make it challenging to limit GHGs. Poverty eradication is crucial to build resilience against the impacts of climate change and hence must be centered as a developmental priority.

Anjali Sharma (Azim Premji University)

An Input-Output Based Analysis of the Labor Impacts of Clean Energy Transitions in India

This paper presents an analysis of the impact of clean energy transitions on employment generation in India. The inevitability of climate action means that India needs to rapidly transition to a low-carbon economy while working towards its development goals. In this paper, I specifically look at the development target of employment generation and explore the labor impacts of clean energy transitions in the power sector. The Indian government has announced ambitious plans for renewable energy deployment in the country. However, data on current levels of employment in renewable energy (RE) sectors remains scarce and

Abstract

scattered. Moreover, employment projection studies for the power sector mainly focus on estimating direct employment in solar and wind sectors, and do not provide economy-wide projections for the whole power sector.

In this paper, I first present a review of the labor estimates RE sectors in India, based on primary and secondary data sources such as industry surveys, and government reports. Then, I present estimates for economy-wide employment from power generation in India for the year 2030 under different decarbonization scenarios. The results show that that the total job creation in scenarios with accelerated RE deployment is relatively lower than business-as-usual scenarios on account of lower total power generation in the former scenarios, and greater economy-wide labor impacts associated with the coal sector. Moreover, even with accelerated RE deployment, coal jobs constitute 65-75% of the total jobs from power generation as coal remains the major fuel for power generation in India for the next decade. Majority of the jobs in RE sectors are created from solar generation. Estimates for total number of jobs from solar PV under different scenarios with accelerated RE deployment vary between 1.2-3.3 million, whereas wind jobs vary between 0.3-0.4 million.

Joan Shilpa Kiran (National Institute of Advanced Studies)

A Review of the EXIOBASE, EORA and WIOD Database Using the Case Study of India

Global Multi-Region Input-Output databases are used extensively in economic, energy and environment analyses. While the construction of these tables is complex, the databases built using different methods produce different outcomes and results. In this paper, I review three of the widely used databases- EXIOBASE, World Input-Output Database (WIOD) and the EORA database. The paper delineates the primary characteristics of each of these databases and compares the mains constituents of these tables such as the methodology of construction, sector detail, data coverage etc.

The robustness of these databases is investigated using India as an illustrative example. The extent of divergence of each of these tables from the national Input-Output (IO) table for India is investigated. Further, an impact analysis is conducted for India on the national IO table and on the IO tables from each of these databases. The results obtained from the national IO and each of these databases are compared as well as results obtained across the databases are also compared to outline the different analytical outcomes obtained. The results are used to identify and explore the factors underlying the variations. The study will help in augmenting the robustness of these databases. This will in turn help in improving the credibility of environmental and developmental policies framed based on analyses conducted on these databases especially for developing countries like India.

Abstract

Sunday, 19 March 10:00-12:00 (Venue C (S303))

Other Topics

Chair: Takashi Yagi (Meiji University)

Vladimir Motorin (National Research University)

The Counterpart of RAS Method

Well-known and widely used in input-output studies, RAS method is closely associated with a more general notion of the non-negative function called the Kullback - Leibler divergence that is used in the information theory for comparing “true” and “test” probability distributions. This function actually expresses the difference between the cross-entropy of two distributions and the entropy of “true” probability distribution. At the same time, however, the Kullback - Leibler divergence is not a distance function really, because the symmetry condition and triangle inequality condition do not hold for it. The RAS method emanates from a conditional minimization of Kullback - Leibler divergence under not-so-evident choice of the initial matrix as a data array for “test” distribution and the target matrix as another array for “true” distribution (so all elements of initial and target matrices are implied to be nonnegative). More natural (from viewpoint of information theory) opposite order of arguments in Kullback - Leibler divergence function generates an other method of matrix updating that can be called a counterpart of RAS method, or simply “CRAS method”. In the paper the optimal solution of corresponding constrained minimization problem with Kullback - Leibler divergence as an objective function is determined by the system of nonlinear equations, and two iterative algorithms for estimating the target matrix by the proposed CRAS method are developed. Special attention is paid to exploration of some properties of CRAS method in comparison with regular RAS method. Several illustrative numerical examples are given.

Sumanta Kumar Saha (Ritsumeikan University)

Impact of Financial Inclusion on Economic Growth in Developing Countries

This study analyzes the impact of financial inclusion on economic growth in 104 developing countries during the 2004–2019 period. We construct a novel composite financial inclusion index and apply the two-step system generalized method of moments (GMM) panel estimation method to examine the impact of financial inclusion. The results indicate that financial inclusion positively correlates with economic growth in developing countries but not in high-income countries. This study shows that financial inclusion affects economic growth primarily by expanding opportunities for lower-income people. With increased financial

Abstract

access, those in the lower-income bracket can expand their economic activity, which results in economic growth in developing countries. The study supports this argument by showing that financial inclusion contributes to poverty and income inequality reduction in developing countries by opening up different opportunities for previously financially excluded lower-income people. In high-income countries, access to financial services is already high, and financial inclusion may not offer new opportunities to a larger population segment. The study also compares financial inclusion and financial development and analyzes their impact on economic growth using the two-step system GMM method. The study finds that financial inclusion contributes to financial development in developing countries by enhancing the depth and access to financial services. Besides financial inclusion, the efficiency of financial institutions and capital markets also influences a country's financial development level. The findings recommend that policymakers in developing countries may use financial inclusion to increase economic growth.

Julius Tan Gonzales (Yokohama National University)

Implications of AI Innovation on Economic Growth: A Panel Data Study

The increasing application of artificial intelligence (AI) across firms and industries naturally warrants a line of research focused on determining its overall effect on economic variables. As a general-purpose technology, for example, AI helps in production, marketing, and customer acquisition of firms, thereby increasing their productivity and consumer reach. Aside from these, other general effects of AI include enhanced quality of services, improved work accuracy and efficiency, and an increased overall customer satisfaction. Hence, this paper hypothesizes a significantly positive relationship between AI and economic growth. In connection with this, this study aims to gauge the impact of AI on the economy, specifically on long-run economic growth, in a panel dataset of countries from 1970 to 2019, using the number of AI patents as measure of AI. To generate the AI variable, a text search query is performed to distinguish AI patents from other types of innovations in a public database, distributed across countries and time periods. With fixed effects and GMM estimation, this paper finds a positive relationship between AI and long-run economic growth, which is higher than the effect of the total population of patents on growth. In addition, further results indicate that AI's influence on growth is more robust among advanced economies, and more evident towards the latter periods of the dataset.

Abstract

Sunday, 19 March 10:00-12:00 (Venue D (S306))

Environment, Resource and Energy

Chair: Makiko Tsukui (Tokyo International University)

Keiji Ujikawa (Yokohama National University)

A Compilation of SEEA and Application to CGE Model

Recently, SNA and the System of Environmental-Economic Accounting (SEEA), which is an application to the environment, have become an international statistical standard as a means of analyzing integrated policies regarding circular economy / climate change issues and the interaction with the economy. In 2017, the United Nations Statistical Commission approved SEEA as statistics for applying the SDGs to policies. In this research, based on SEEA, which is an international statistical standard, we compile a statistical framework for physical and monetary evaluation of circular economy and decarbonized society scenarios that also supports SDGs, based on the stock and flow of materials and energy. Specifically, based on sectoral environmental data (greenhouse gas, energy input, waste emissions), a part of SEEA's air emission account, energy account, and material flow account corresponding to the SNA supply use table will be compiled. We compile a SEEA material / energy account and estimate the supply use table for analysis on circular economy / decarbonization society. Based on SEEA, we will compile an Environmental Extended Social Accounting Matrix (SAM), which will compile a model for SDGs / Applied General Equilibrium (CGE) analysis. In this model, each substance will be incorporated into the model as variables at the same time, and scenario analysis of a circular economy / decarbonized society will be performed in correspondence with the policy targets. Currently, SEEA is widely used to provide information on related policies for policy issues such as circular economy, climate change, and green growth, mainly in EU countries. In addition, a similar statistical framework makes it possible to apply various indicators of international environmental policies. The development of SEEA-related indicators has been incorporated into the green growth strategy in recent years, and it can be expected that its utilization will contribute to environmental policy in many cases.

Thao Phuong Nguyen (Ministry of Planning and Investment Vietnam)

The Potential Effects of the Carbon Tax in Vietnam: A National CGE Analyses

The long period focusing on pure economic development has brought Vietnam remarkable economic growth. However, at the same time, carbon emissions in the country increase significantly. The rising concern about increasing carbon emissions promotes the

Abstract

government rethinking its strategy. In 2020, Vietnam has introduced carbon pricing in the new Environmental Law. Until now, an emission trading system is planned whereas carbon tax is still under discussion. This research will simulate the effects of a carbon tax on the economy and environment. The carbon price of \$10/tCO₂ will be adopted in this research while the targeted sectors of a carbon tax will be selected based on their carbon emission intensity. A carbon tax on output will be modeled under a national static computable general equilibrium framework (CGE). The initial results show that carbon tax would lead to a decrease in GDP and welfare at different levels depending on targeted sectors. In detail, the carbon tax on all sectors is more effective in terms of emissions reductions than in the case of only imposing the carbon tax on the high-carbon intensive sector but not too much. The carbon tax causes obstacles in terms of economics and welfare. More sectors targeted for carbon tax results in higher negative effects on the economy and welfare. At the sectoral level, electricity and carbon-intensive industries are the main contributors to emission reductions due to the dramatic reduction in their output. In addition, using carbon tax revenue in financing government activity or reducing income tax would relieve the negative impacts of the carbon tax on GDP and welfare, but reduce the effect of the carbon tax on emissions.

Makiko Tsukui (Tokyo International University)

The Extended Multi-Regional Input-Output Analysis for the World Mineral Asbestos Flow

Asbestos has been widely used as an industrial material. However, a serious health risk for asbestos has been gradually recognized due to long-term exposure at high concentrations. Although the WHO has recommended banning asbestos, around 153 developing and semi-developed countries continue using asbestos. In those countries, serious health risks and social issues are concerned. Most developed countries have already banned asbestos; however, they have indirectly induced asbestos mining via a global supply chain. In this study, we extended the OECD Inter-Country Input-Output (ICIO) Tables in 2014 with the world flow of mineral asbestos to clarify the contribution of asbestos-banned countries to asbestos mining. Asbestos is mainly produced in Russia, China, Kazakhstan, and Brazil. Mineral asbestos is used as an industrial material for ""Other non-metallic mineral products"" such as cement, ""Textiles, wearing apparel, leather, and related products,"" ""Motor vehicles, trailers and semi-trailers"" such as brake lining, and ""Paper products and printing ""in 22 countries. Our estimation results show that asbestos-banned countries induced 204,927 tonnes of asbestos in 2014, which accounted for 10 % of the world's asbestos mining. EU induced 36,000 tonnes of mineral asbestos mining, and the USA induced 32,000 tonnes, which is not negligible. Banning the asbestos issue is not only for asbestos-using countries but also for asbestos-banned countries. Our results encourage international cooperation in

Abstract

banning asbestos together with asbestos-using countries and asbestos-banned countries.

Sunday, 19 March 13:00-15:00 (Venue A (S301))

Theory of Input-Output Techniques

Chair: Kazuhiko Nishimura (Chukyo University)

Heming Zhang (Yokohama National University)

The Compilation and Analysis of the 2015 Input-Output Table of Seoul Special City for the Cultural Industry

Korea's experience in developing the cultural industry has been remarkable and unique in terms of its scale and speed. The Oscar awards movie "Parasite", the globally popular Korean band BTS and BLACKPINK, and numerous K-dramas with worldwide records on platforms like Netflix, have shown the success of Hallyu, the Korean wave, made by the Korean government in order to globalize and upgrade its economy. Given that the cultural industry sectors are mainly located in Seoul, the capital of Korea, this paper aims to analyse the economic effect of the cultural industry of Seoul by the 2015 Input-output table of Seoul Special City. The 11 sectors cultural industry sectors of Seoul are separated from the original Input-output table with 165 sectors according to the definition and classification of the cultural industry from the Cultural Industry Promotion Framework Act enforced by Korean government in 2021. Different from the definition of cultural industry of other regions the author researched before, Korea's cultural industry is centred on the creative contents sectors, which means there are less manufacturing sectors but more service and high-tech sectors in Korea's cultural industry. Results reveal that the cultural industry of Seoul Special City has the characteristic of high influence coefficient and relatively low sensitivity coefficient, which is the same as the status of most cultural industry with creative contents sectors being dominant.

Junmin Lee (Korea Institute for Industrial Economics and Trade (KIET)), Jeonghyun Kin (KIET)

Analysis of Industry Impact of Container Fare Fluctuations: Using the International IO (Input-Output) Table

Marine container transportation deals with a wide range of products, including food and household goods, as well as capital goods such as materials, intermediate goods of parts, and machinery, and its importance as a means of transportation is increasing as the global

Abstract

value chain is established. But container fares and their volatility have risen sharply since the COVID-19 pandemic, adding to global inflationary pressure, raising uncertainties in the domestic and overseas shipping markets and hampering growth across the domestic industry, which relies on sea freight for 99.7 percent of its import and export cargo. Therefore, this study analyze the impact of a sharp rise in container fares on prices in Korea and major economic regions around the world using a price model based on the International IO(Input-Output) Table. A simultaneous scenario in which container fares in all regions rise 100% at the same time and individual scenarios in which fares in each region rise 100% individually, focusing on seven economic regions in Korea, the United States, China, Japan, ASEAN, EU, and other countries, were analyzed. As a result of the analysis, in the case of a simultaneous rise scenario, inflationary pressure of 0.8% was induced worldwide, and the impact on Korean prices was relatively small compared to other regions. In the case of individual rising scenarios, when container fares in other countries, China, and the EU rose, the impact on Korean prices was relatively bigger. And Korea's container fare rise had the smallest impact on own prices. In addition, the impact of the increase in container fares for each region was differentiated by industry. These results suggest the necessity of establishing a monitoring and prediction system for container fares in major regions and measures to mitigate price shocks by industry.

Dongae Jo (Bank of Korea)

Price Inducing Effect of the Increase in Import Prices

We analysed price inducing effect of the increase in import prices on Korean PPI and CPI using the input-output table. In this study, it was assumed that the import price inflation rate in the first quarter of 2022 continued for a considerable period of time. As a result, we found that the rise in crude oil, bituminous coal and natural gas prices had huge impacts on PPI and CPI.

Abstract

Sunday, 19 March 13:00-15:00 (Venue B (S302))

Macroeconomic Modeling and CGE

Chair: Kiyoshi Fujikawa (Aichi Gakuin University)

Hikari Ban (Kobe Gakuin University), Kiyoshi Fujikawa (Aichi Gakuin University)

Global Impacts of China's Carbon Tax and CO2 Emissions Trading

We analyze the global impacts of industry-specific carbon taxes and domestic CO2 emissions trading in China using a multi-regional computable general equilibrium model. We run several industry-specific carbon tax scenarios and domestic CO2 emissions trading scenarios for such energy intensive industries as electricity, non-metallic mineral products, nonferrous metals, iron and steel, chemical products, paper and publishing, petroleum and coal products, and air transportation in China. Here, we focus on sectoral impacts on production, imports and exports, and CO2 emissions in each country and region. As a result of simulations, the effects on each industry in China can be summarized as follows. (1) Regardless of the introduction of a carbon tax or CO2 emissions trading, CO2 emissions decrease in the industries with CO2 reduction target. (2) The prices rise accompanied by lower exports, higher imports, and lower production in the industries with carbon reduction targets. However, the exceptions are paper and publishing and nonferrous metals in which the share of petroleum and coal products in intermediates inputs is relatively small. (3) Output in the majority of non-targeted industries declines, while there are some industries where the export and output increase because of the international relative price change. As to foreign countries and regions, production of paper and publishing, air transportation, nonmetal minerals, chemical products, and iron and steel increases in most of them. On the other hand, production of electronics and textiles decreases in all foreign countries and regions though those in China increases. Since China relies on Central Asia/Caucasus and ASEAN for most of gas imports, gas production increases in those regions. China's carbon reduction policy has a negligible impact on GDP neither in China nor foreign countries and regions. However, it does have some impacts by industry, resulting in carbon leakage. This implies the necessity of border carbon taxes.

**Masaaki Kuboniwa (Hitotsubashi University and Yokohama National University),
Yuichi Hasebe (Yokohama National University)**

Tracking Global Value Chains Using Global Unit Structure

Exports of a country bring about its domestic value added. Usually, they also need imports, which induce foreign value added generated in partner countries. This results in trade in

Abstract

value added (TiVA) with global value chain (GVC) through production sharing. The importance of TiVA and GVC has been addressed by major international organizations, including the OECD, the WTO, the World Bank and so on, since around 2010. Armed with Ozaki's insight, we define a new concept of "global or international unit structure (GUS or IUS)" for an Isard-type inter-country input-output system. Employing this concept and aggregated OECD's inter-country input-output tables (ICIO2021) with 13-country (area), we visually follow up on variances and invariances of the global value chain during the period of 1995-2018. Further, we generalize GUS/IUS through augmenting value added (primary input) into the global Leontief inter-country matrix to track changes in the global value chain as measured by "unit GVC." We focus on machinery sectors such as the automobile industry and computer industry when using multi-sector input-output tables. We also demonstrate the results of panel regressions concerning the relationships between economic growth and changes in unit GVC, based on the Leontief multipliers, for some country groups such as the world (67-country), Europe and so on.

Kiyoshi Fujikawa (Aichi Gakuin University), Hikari Ban (Kobe Gakuin University)

Carbon Leakage in Carbon Taxes and CO2 Emissions Trading

In China, various measures have been taken in recent years to achieve carbon emissions peaking out by 2030 and carbon neutrality by 2060, one of which is emissions trading. In July 2021, China launched a national emissions trading system for the power sector. When ready, emissions trading will be expanded to include petrochemicals, chemicals, construction materials, steel, non-ferrous metals, paper, and aviation. This paper analyzes the economic and environmental impacts of an industry-specific carbon tax and domestic CO2 emissions trading on the Chinese economy using a computable general equilibrium model. In particular, this paper focuses on carbon leakage and the impacts of expansion of sector coverage. The following findings were obtained as a result of the simulation analysis. (1) Introduction of emissions trading mitigates the negative impacts on GDP and equivalent variation, (2) Emissions trading covering all sectors has the smallest economic burden. (3) If emissions trading is implemented in eight sectors as is planned in China, the economic burden may be reduced when petroleum and coal products are excluded. Furthermore, it was confirmed that the expansion of sector coverage has an impact on carbon leakage. While lower coal price leads to carbon leakage to non-targeted sectors (conventional carbon leakage), CO2 emissions reductions in non-targeted sectors (so-called negative carbon leakage) was observed. For example, the reduction in coal demand of the electricity sector promotes carbon emission reductions in the coal sector and the price hike in the petroleum and coal products sector reduces CO2 emissions in the transportation sector and households. The effect of the former exceeds the effect of the latter to cause positive carbon

Abstract

leakage in China when energy-intensive sectors are not targeted. As more energy-intensive sectors are included in targeted sectors, the effect of the latter offsets the former to eliminate carbon leakage.

Sunday, 19 March 13:00-15:00 (Venue C (S303))

Organized session 4:

Analyses on Main Issues in Korean Economy

Chair: Jinmyon Lee (Korea Institute for Industrial Economics and Trade (KIET))

Gahyeon Cheon (KIET), Youngho Lee (KIET)

The Evolution of Embodied Services in Korean Goods Exports

Although various services are embodied in export goods, it is impossible to grasp their value with existing service statistics. This study estimates the embodied services in Korea's recent exports as it seeks ways to improve the export competitiveness of the manufacturing industry. The results of the research carry the following implications. First, it is necessary to deal with this issue because the estimation method proposed in the previous study involves the problem of calculating goods inputs in generating a value for embodied services. Second, it is estimated that 15 to 19 percent of services are embodied in Korea's export goods, which means that the role of the service industry is critical to the competitiveness of the manufacturing industry. Third, in the manufacturing industry, the proportion of embodied services is relatively high in sectors such as automobiles, semiconductors and related devices, basic chemical products, electrical equipment, electronic signal equipment and textiles and apparel. However, even in these industries, the importance of embodied services was found to be different. This implies that in order to improve the export competitiveness and productivity of the manufacturing industry, it is necessary to accurately grasp the services embodied in the sector and to devise policy measures to improve productivity in the service sector matched to the characteristics of each industry.

Taehyun Kwon (Bank of Korea)

The R&D Spillover in Korea Using Input-Output Table

Strengthening R&D capabilities is a very important task in the Korean economy, which is highly dependent on foreign countries and has a large portion of high-tech products exports like semiconductor. As of 2020, Korea still remains very active in R&D, with the total amount

Abstract

of R&D ranked 5th in the world and the scale accounted for a percentage of 4.8% of GDP, the second highest after Israel. This kind of R&D is being conducted mainly in Korea's main manufacturing industries and it is meaningful to measure the spillover of R&D in each industry and examine the characteristics.

To this end, the redistribution matrix analysis was applied to Korea's input-output table to measure the R&D spillover. In order to apply this method, there is a work that needs to be preceded. Korea implemented 2008 SNA from 2010 IO table. One of the 2008 SNA implementations is that R&D is treated as an investment. So this study is to transfer R&D investment to intermediate demand. For this, I used KISTEP and Korea's BS statistics. As a result of the 2019 analysis, 8 out of 33 sectors benefited relatively more from R&D and these 8 sectors are electronics, automobiles, machinery and equipment, chemicals, electrical equipment, automobiles and ship. On the other hand, the electronics sector, despite receiving the greatest benefits, does not significantly benefit other industries in Korea while other sectors appear to benefit other industries in Korea through R&D. This characteristic of R&D in the electronics sector is thought to be attributable to the fact that the output of intermediate goods such as semiconductors is large and the demand in this sector is highly dependent on exports. It can be inferred that R&D in the electronics sector has a large spillover on the overseas sector.

Yong Kyun Kim (National Assembly Budget Office)

The Effects of A Carbon Tax on the Korean Economy in A More Environment Conscious Era

This paper looks at how levying a carbon tax affects the economy and the industrial sectors that comprise the said economy. The detrimental effects the anthropogenic activities have on the natural environment are most evident. As a carbon tax is a very cost effective GHG emission mitigation policy instrument, it is a meaningful exercise to investigate the economic effects of such a tax. This study utilizes a CGE model that incorporates an 'industrial organization' feature in allowing for imperfect competition to analyze the economy. The levying of a carbon tax of 10 USD per tCO₂e on fossil fuels is shown to lead to a lesser total GHG emission reduction for the economy in 2018 than in 2010. It appears that the economy and the industrial sectors of 2018 have lesser room for economic maneuverability to reduce GHG emissions than 2010. Also, maneuverability in strategic decision making under the imperfect competition assumption leads to a greater degree of change in sectoral outputs in response to an external shock. This in turn leads to a slightly greater degree of GHG emissions reduction for the market engaged in imperfect competition.

Abstract

Sunday, 19 March 13:00-15:00 (Venue D (S306))

Regional Input-Output Analysis

Chair: Taku Ishiro (Yokohama National University)

Kazuaki Sato (Tokyo Keizai University)

Multi-Regional Input-Output Analysis of Public Sector in Japan

This study uses a Multi-Regional Input-Output Table to identify the different impacts of government sector economic activity in different regions. Economic activity in the government sector is categorized as 1) government final consumption expenditure and gross fixed capital formation (public), 2) an increase in private final consumption expenditure due to cash benefits such as pensions, and 3) a decrease in private final consumption expenditure through a decrease in disposable income due to taxes. The results of the analysis are as follows: 1) direct effects are relatively larger in rural areas than in urban areas, but indirect economic ripple effects are concentrated in Tokyo through the headquarters and pharmaceutical sectors; 2) increased private final consumption expenditures due to cash transfers are relatively larger in rural areas than in urban areas, but indirect economic ripple effects are larger than in urban areas; and 3) decreased private final consumption expenditures through reduced disposable income due to taxes and other factors. The indirect economic ripple effects are even more concentrated in Tokyo than in 1). In contrast, both the direct and indirect effects of 3) are found to be concentrated in Tokyo. When examining these effects together, it is important to note that the degree of interregional redistribution through the government sector varies depending on the assumption of the average income propensity with respect to 2) and 3).

Kayo Shiode (Saitama University)

Indirect Effects on the East Asian Steel Industry Arising from the World's Final Demand for Each Industry

This paper develops a model that uses international input-output tables to measure the indirect production-induced effects on a country's own iron and steel industry that occur when other countries demand the final goods of each industry. Using this model, an analysis is also conducted for the major East Asian steelmaking countries of Japan, China and South Korea. The attempt to understand the impact of final demand in other countries on the steel industry in their own country is based on the concept of indirect exports in the iron and steel industry. The iron and steel industry uses an indicator called indirect exports to accurately determine the demand for steel. This concept considers that when goods are exported, the

Abstract

steel used for those goods is also exported at the same time. This paper uses international tables to estimate the indirect effects on the iron and steel industry of other countries' demand for the final goods of each industry. I attempted to apply the method of estimating indirect exports of steel products using one-country tables proposed in Shiode (2022) to international input-output tables. The analysis showed that what could not be captured in an analysis of a country's input-output table could be identified in an analysis of an international table. The analysis of the international tables shows that there is a significant indirect effect of final demand from the construction industry in other countries. The international tables enable a detailed understanding of the impact of final demand in other countries on the iron and steel industry in the home country.

Taku Ishiro (Yokohama National University)

Analyzing the Kanagawa Prefecture Economic Area Using Input-Output Tables for All Municipalities

Input-output tables today are created and published for all Japanese prefectures and cities designated by government ordinance. However, analyzing the circumstances within each prefecture using a prefectural level analysis is difficult as industrial and agricultural regions include various economic areas (e.g., cities or suburban areas). Conversely, there are many examples of the creation and analysis of municipal input-output tables that analyze municipalities within prefectures to address the mentioned problem ((e.g., Ishiro (2016), Ashiya (2017), and Nozaki (2018)). Particularly, the Japan Statistics Research Institute at Hosei University creates input-output tables for every municipality. In Ishiro and Eto (2020), I created municipal input-output tables for Kanagawa Prefecture and analyzed the characteristics of each region. However, I did not categorize and tabulate the Yokohama and Kawasaki Wards in these tables, and the analysis did not categorize all municipalities. In this study, using nationwide municipal input-output tables created during joint research with Hosei University, I focus on the municipalities in Kanagawa Prefecture and aim to clarify its internal structure. In this study, I calculated specialization coefficients to explore the overall economic structure of Kanagawa Prefecture and Yokohama and their municipalities and economic zones, respectively. Based on these calculations, I then introduce analysis results in this paper.

Abstract

Sunday, 19 March 15:20-16:40 (Venue A (S301))

Organized session 2:

Industrial Policy Evaluation in Developing Countries

Chair: Christian Otchia (Nagoya University)

Christian Otchia (Nagoya University)

Agriculture Development-led Industrialization and Economic Growth

The purpose of this study is twofold. The first objective is to develop a new index of Agricultural Development-led Industrialization (ADLI) based on recent data from 100 countries over the period 1960 - 2018. The second intention is to use the new index to evaluate ADLI's possible effects on economic growth empirically. Industrial development and industrial policy have revived interests across developing countries and Africa in particular. While there is a consensus on industrialization in developing countries, the strategy to adopt is less clear and still subject to debate. Hence, some scholars suggest ADLI as an alternative industrial strategy. The concept of ADLI is a national development on agriculture as the primary industry with a strong emphasis on agriculture-industry linkages and interactions. Although the definition is less ambiguous, the practical implementation of the strategy varies across countries. Despite the merits vowed by the pro-ADLI, its economic impact is less investigated in developing countries. Therefore, this study will contribute to the industrial policy debate and provide empirical evidence of ADLI's impact on economic growth. Also, it will provide policy recommendations to strike an appropriate balance between agriculture and industrial expansion in developing countries.

Nilaphy Phommachanh (Nagoya University)

Impact of Special Economic Zone on Economic Development: Evidence from Laos Nightlight Analysis

Special economic zones (SEZs) have become one of the most widely used industrial policies among many developed and developing countries worldwide in the past decades. However, their impact on the economy is still inconclusive, especially in developing countries where the lack of data availability presents a challenge. This study examines the causal effect of SEZ on the economy of Laos using the harmonized nightlight satellite data as a proxy for the economic activities of 148 districts from 1992-2021. Using the generalized synthetic control method, this study found that districts with SEZ are associated with a statistically significant increase in economic growth. The paper further disaggregates the effect of different SEZ sectors and finds evidence to suggest that the clustering of industrial and

Abstract

tourism sector SEZs is associated with the highest level of economic activity. Additionally, the paper examines the effect of a prominent SEZ policy enacted in 2010 and finds that the district with SEZs created after 2010 shows a higher level of economic growth than those established before 2010.

Nguyen Thi Minh Thu (Nagoya University)

Do Place-based Policies Foster Structural Change? Evidence at the District Level from Vietnam

While existing literature has illustrated the role of structural change as a key driver to economic development, developing economies worldwide attempt varied policies to enhance structural transformation. Among the policies at hand, place-based policies, with the establishment of Special Economic Zones (SEZ) as the core, seem to be at the front. Several studies have shed light on the impacts of SEZs on economic structural transformation in India and China, but no empirical evidence has been found in Vietnam yet. Our study is about to fill in the gap. We rely on newly developed staggered differences in differences (DID) frameworks to examine the causal effects of SEZ establishments on structural changes at the district level in Vietnam. Our dataset covers 708 districts from 1992 to 2020. Land cover and harmonized nighttime satellite data are used as proxies for agricultural and non-agricultural economic activities in Vietnam, respectively. Our results suggest that SEZ establishments have contributed positively to the industrialization in Vietnam, i.e., fostering non-agricultural activities while decreasing agricultural performances. Further analyses allow us to discover heterogeneities in the impacts of SEZs, which are essentially constructed by such SEZs' characteristics as zone locations and developers. The study contributes to advancing the understanding of SEZs' impacts in Vietnam and might provide governments of other developing and transitional countries with policy implications for their industrialization-based economic development.

Abstract

Sunday, 19 March 15:20-16:40 (Venue B (S302))

Other Topics

Chair: Ayu Washizu (Waseda University)

Usman Alhassan (Ritsumeikan University)

International Remittances and Labour Force Participation in Nigeria: Do Educational Attainment and Household Income Matter?

Existing studies often predict that international remittances reduce labour supply among receiving households due to their moral hazard or reservation wage increment effects. This study investigates the labour supply decisions of individuals in remittance-receiving households in Nigeria across three occupational choices – self-employed agriculture, wage employment, and self-employed non-farm enterprise – at both the extensive and the intensive margins. Furthermore, it assesses the heterogeneous effect across individuals' educational attainment and their household income levels. We extract data for a sample of 61,000 Nigerians of working age from the Nigerian living standard measurement survey of 2018-2019 and applied the instrumental variable PROBIT and TOBIT techniques to address the problem of endogeneity and the Heckman selection model to address selection bias. Our findings show evidence of an occupational switch from agriculture to non-agricultural occupations. Specifically, receiving remittances decreases both the probability of working and the hours worked in agricultural self-employment but increases labour supply to wage employment and non-farm self-employment. Furthermore, our heterogeneous effect analysis shows that the likelihood of working in both wage employment and non-farm self-employment is higher among those without formal education while post-secondary educated Nigerians are more likely to reduce labour supply to agricultural activities. Individuals in the lowest income quartile are less likely to work in agricultural self-employment activities while those in the highest income quartile are more likely to work in wage employment. Lastly, we show that increasing labour supply to non-farm enterprises increases enterprise revenue, especially for enterprises in the informal sectors. These findings hold important cues for policymakers to promote remittance-based enterprises by reducing remitting costs and targeting recipient households with policies and programs that ease enterprise establishments.

Yiyi Ju (Waseda University), Ayu Washizu (Waseda University), Sayaka Ita (Tohoku Gakuin University)

The Impact of Sustainable Diets and Smart Food Services on Environment and Well-being: a Case of Japanese Households

Abstract

Sustainable diets and smart food services can be effective solutions to achieving SDG 12.3. The establishment of a smart food system covering more regions is also essential to an aging society. Given such context, we conducted a questionnaire survey to investigate the impacts of sustainable diets and smart food services in Japan. The survey covers around 6,000 households nationwide and collects the responses of dinners in 3 days. The questions include the number of menus, the number of all ingredients (22 types), the expenditure on such ingredients, the amount of discharged kitchen and plastic waste, the heating time of each meal, as well as the attitudes towards household cooking (13 questions) and acceptance to PCs and smartphones (10 questions). Based on the survey results, for all meals from all respondent families, we quantified the indicator of cooking effort, the convenience food usage intensity, the direct and indirect CO₂ emission from ingredients and cooking, as well as the waste. We also investigated how attitudes toward household cooking and the acceptance of PCs and smartphones may affect such indicators. The results reveal the impacts of sustainable diets and smart food services on the environment and well-being in Japan. **Keywords:** sustainable diets; smart food services; household survey; cooking effort; convenience food usage intensity

Sunday, 19 March 15:20-16:40 (Venue C (S303))

Other Topics

Chair: Kazuo Inaba (Ritsumeikan University)

Muhammad Tashfiq Huq (Hiroshima University), Masaru Ichihashi (Hiroshima University)

“Can Historical Economic Growth Patterns be Traced in South Asian Countries as same as the Classical Theory shows?”: A sectoral approach using input-output analysis

According to the classical theory of economic development like Akamatsu's Flying Geese model, many countries would have similar development patterns from agriculture-based sectors to processed or labor-intensive industries as a long-run development. This paper identifies some common development patterns in 6 South Asian Lower Income Developing Countries (LIDCs), using three periods of the input-output table with a novel decomposition technique derived from a conventional way. Our results show that labor-intensive and light manufacturing sectors along with some high-value-added service sectors are the most promising sectors in these countries. Food, Basic metal & Textiles sectors are found to be commonly growing manufacturing sector in most countries. Service sectors like Construction, Electricity and Transport are also steadily surging. Among our targeted South Asian

Abstract

countries, only Vietnam has been developing many types of diversified sectors in manufacturing from traditional labor-intensive sectors to high technology-oriented sectors. It means that Vietnam might achieve to advanced stage faster than other Asian countries. Additionally, we have found some prospective accelerating sectors like- Manufacturing & Recycling, NEC; Basic Metal; Rubber etc. for these countries which could not be identified as key sectors through traditional Structural Decomposition Analysis (SDA). It indicates these countries have started to diversify their industries which are different from their traditional key sectors, which is in accordance with Flying Gees model.

Ei Ei Thein (Ritsumeikan University), Atsushi Niigata (Ritsumeikan University), Kazuo Inaba (Ritsumeikan University)

Information Transparency, Collateral Problem and Bank Credit Accessibility of Small and Medium Enterprises in ASEAN Countries

Financial constraint is one of the biggest obstacles which harm the growth of small and medium enterprises (SMEs) especially in developing countries. Information asymmetry leads banks to rely on collateralized lending and hinders SMEs from accessing bank loans. Information and communication technology (ICT) and audited financial statements (FSs) can bring SMEs' information towards banks. The previous studies pay less attention to the relation of ICT and FSs to SME financing. This study investigates whether ICT adoption and FSs can improve SME financing and whether they influence collateral requirements in accessing bank loans in eight ASEAN countries, based on the World Bank Enterprise Survey data. The data analysis shows that in ASEAN region, about half of the SMEs which apply for a loan cannot achieve bank credit. 78.7% of SME loans are collateralized loans. Only 56.9% of SMEs in the sample use ICT and 33.7% keep audited FSs. The analyses reveal that ICT adoption and preparing FSs have a positive significant contribution to SMEs' bank credit accessibility. SMEs with ICT and FSs have less probability of collateral requirement in accessing bank loans than those without. The results show that SMEs can enhance their financial availability by improving their qualifications; ICT adoption and preparing FSs. Since the audited FSs supply reliable data for tax collection, supporting SMEs to keep audited FSs will be beneficial to not only SMEs but also tax authorities. The results expose significant policy implications for promoting SME financing in ASEAN countries. This study will also conduct robustness tests and investigate the differences in the impacts of ICT and FSs between SME financing and large business financing. Key words: Collateralized lending, bank credit accessibility, information and communication technology, financial statements

Abstract

Sunday, 19 March 15:20-16:40 (Venue D (S306))

Compilation of Input-Output Table or SUT

Chair: Satoru Hagino (Statistics Commission Office)

Nagendra Shrestha (Yokohama National University)

Construction of Real Priced Global Input-Output Tables

This paper attempts to estimate Global Input-Output Tables valued at 2005 price. We use Inter-Country Input-Output (ICIO) Tables published by Organization for Economic Co-operation and Development (OECD), United Nation's Comtrade Database (UN Comtrade), industry-specific producers price indices collected from various sources, Exchange rate data from the World Bank, and industrial output and value-added data published by United Nations Industrial Development Organization (UNIDO) to construct Real priced Global Input-Output (RGIO) Tables for years 2000 to 2018. The new RGIO tables cover 15 manufacturing industries, and 9 Asian, 7 European, three North American countries among others. The new RGIO and nominal priced GIO tables are used to analyze how changes in gross output and value-added are affected by price and exchange rate changes along with the final demand change and technological change (in precise, change in Leontief inverse matrices) based on International Structural Decomposition Analysis (SDA). The preliminary results show that price and exchange rate changes affect significantly on the gross output and value-added for manufacturing industries, which may not be explained by results based on nominal valued tables only. It is simply because the nominal table uses current year price and common currency valuation (in most of the cases US\$) such that the changes in price and exchange rate may not be explicitly addressed.

Thao Thi Bich Dang (University of Tsukuba), Duong Lam Anh Tran (University of Tsukuba), Morito Tsutsumi (University of Tsukuba)

Constructing Regional Input-Output Table in the Context of Data Limitation: the Case of Vietnam

The inter-regional input-output table is not commonly available in many countries except for Japan because of several reasons. Among three common methodologies to construct the inter-regional input-output table, while the survey and hybrid methodologies are costly, the non-survey methodology usually encounters the problem of unavailable inter-regional data.

In this paper, the inter-regional input-output table of Vietnam 2020 is constructed in the context of limited data. The table includes 7 regions and 16 sectors. The methodology requires limited data including (i) national input-output table, (ii) labor data divided by regions

Abstract

and sectors, (iii) value-added data divided by regions and sectors and (iii) distance between centroids of seven regions.

Different methodologies are applied for intra and inter-regional estimates. The intra-regional estimates are based on the well-known FLQ methodology. The common methodology for inter-regional estimates is gravity modelling. However, this methodology requires trade flow data of at least one year in the past which is not available in Vietnam. Instead of using gravity, a mathematical programming model is used, in which transportation cost is minimized giving constraints of regional supply and demand. This methodology allows interregional cross-hauling. The methodology is tested using Japan regional input-output table 2005 which shows good estimates, before applying for Vietnam case.



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