

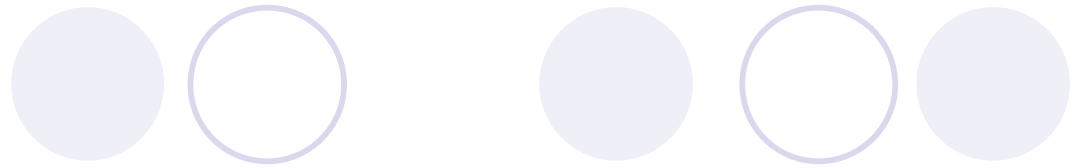
A Brief Review of Taiwan's Input-Output Tables and Their Applications

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Contents

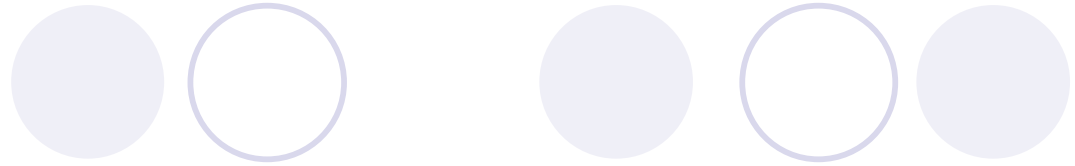
- 1. A Brief Review of Taiwan's Input-Output Tables**
- 2. Applications of Taiwan's Input-Output Tables**
 - 2.1 Application of I-O Analysis on Investment Project**
 - 2.2 Application of I-O Analysis on Trade Liberalization**
- 3. Applications of International Input-Output Tables**
 - 3.1 Application of IIO Analysis on Forward/ Backward Linkage Effects**
 - 3.2 Application of IIO Analysis on Spillover Effects of Innovation**
- 4. Concluding Remarks**

1. A Brief Review of Taiwan's Input-Output Tables

- The first national input-output tables for Taiwan was *The 1954 Input-Output Tables with 23 sectors*, published in 1960.
- In 1961, the Joint Commission on Rural Reconstruction constructed the second NIO Table (of 1955).
- From 1964, coordinating with *the timing of industry, commerce, and service census*, more detailed national input-output tables was published every five years.
- The most updated base year tables are *The 2006 Input-Output Tables* released in January 2009, which included 554 sectors.
- After 2006, a transactions table at purchasers' prices with 52 sectors is published every year.

A List of Taiwan's National Input-Output Tables

National Input-Output Tables	Year of the Tables	Release Year	Number of Sectors	The Institution/Person in Charge of the Compilation of National I-O Tables
1	1954 (Base Year Tables)	1960	23	Professor Mu-huan Hsing (邢慕寰)
2	1955 (Extended Tables)	1961	9	Joint Commission on Rural Reconstruction
3	1961 (Base Year Tables)	1964	37	Council for International Economic Cooperation and Development (CIECD)
4	1964 (Extended Tables)	1966	55	CIECD
5	1966 (Base Year Tables)	1969	76	CIECD
6	1969 (Extended Tables)	1971	76	CIECD
7	1971 (Base Year Tables)	1974	76	CIECD
8	1974 (Extended Tables)	1976	76	CIECD
9	1976 (Base Year Tables)	1979	99	CIECD
10	1979 (Extended Tables)	1981	99	CIECD
11	1981 (Base Year Tables)	January 1985	123	Directorate General of Budget, Accounting, and Statistics (DGBAS)
12	1984 (Extended Tables)	January 1987	123	DGBAS
13	1986 (Base Year Tables)	January 1990	123	DGBAS
14	1989 (Extended Tables)	January 1992	123	DGBAS
15	1991 (Base Year Tables)	January 1995	39, 150, 569	DGBAS
16	1994 (Extended Tables)	January 1997	39, 150	DGBAS
17	1996 (Base Year Tables)	January 2000	45, 160, 596	DGBAS
18	1999 (Extended Tables)	January 2002	45, 160	DGBAS
19	2001 (Base Year Tables)	January 2005	49, 162, 610	DGBAS
20	2004 (Extended Tables)	January 2007	49, 161	DGBAS
21	2006 (Base Year Tables)	January 2010	52, 166, 554	DGBAS



■ Editor:

∅ DGBAS, the Directorate General of Budget, Accounting, and Statistics, handles the budgets of public administration and state-run business organizations, national statistics, censuses, surveys, as well as governmental accounting management and final accounts.

■ Key Ideas in *The 2006 Input-Output Tables*: according to the compilation concepts of the 1993SNA, some revision have been made and bear the differences to previous editions.

∅ Expenditures on mineral exploration and computer software are reclassified from intermediate inputs to capital formation.

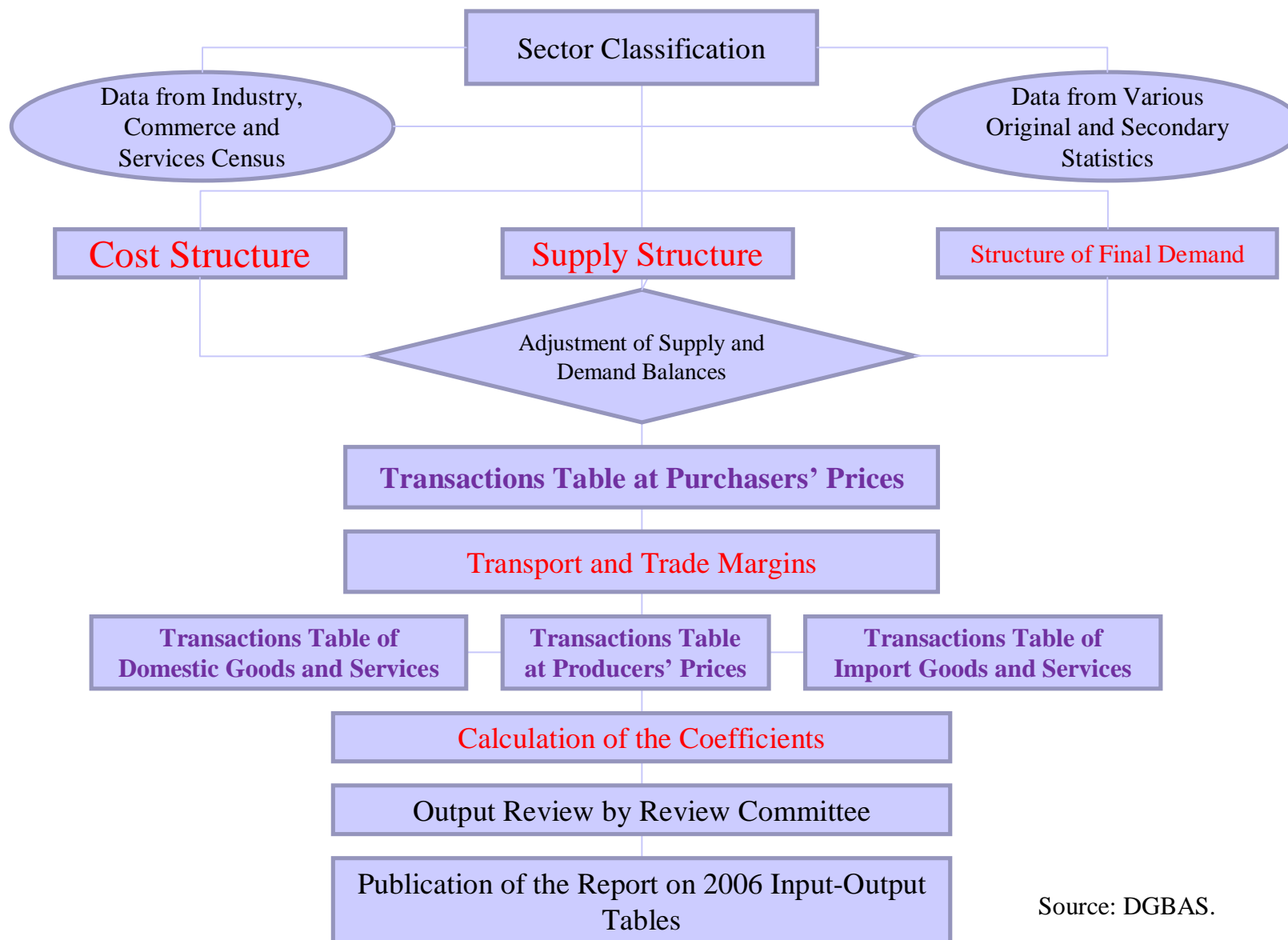
∅ The consumption of fixed capital on public infrastructure is included.

∅ The output of the central bank is also revised following the concepts of SNA 2008.

■ Main Accomplishment:

∅ It is the first time that the output of *The 2006 Input-Output Tables* is consistent with *the National Income Statistics*.

Procedure of Constructing the 2006 Input-Output Tables



Source: DGBAS.

The 2006 Input-Output Tables with 166 Sectors

No.	Title
1	Transactions Table at Producers' Prices(Excluding Net Import Duties)
2	Input Coefficients Table at Producers' Prices (A)
3	Impact Coefficients Table $(I-A)^{-1}$
4	Impact Coefficients Table $[I-(I-M)A]^{-1}$
5	Transactions Table at Purchasers' Prices
6	Transactions Table at Producers' Prices (Including Net Import Duties)
7	Transactions Table of Domestic Goods and Services
8	Input Coefficients Table of Domestic Goods and Services (D)
9	Domestic Impact Coefficients Table $(I-D)^{-1}$
10	Transactions Table of Import Goods and Services(C.I.F.+Net Import Duties)
11	Transactions Table of Import Goods and Services(C.I.F.)
12	Input Coefficients Table of Import Goods and Services(C.I.F.)
13	Transportation Margin Table
14	Trade Margin Table

2006 - 554 Sectors (zip files) - Windows Internet Explorer

http://eng.stat.gov.tw/Item.aspx?Item=25745&File=1650

2006 - 554 Sectors (zip files)

National Statistics
Republic of China(Taiwan)

2011 NOV 14 (Mon)

Statistics from Statistical Bureau | Statistical Standards | Statistics by Categories | Information Service

Home > Statistics from Statistical Bureau > I/O Tables > Statistical Tables

2006 - 554 Sectors (zip files)

1. **PPCIF95.zip** Transactions Table at Producers' Prices (Excluding Net Import Duties)
2. **PPTAX95.zip** Transactions Table At Producers' Prices (Including Net Import Duties)
3. **PUR95.zip** Transactions Table at Purchasers' Prices
4. **DOM95.zip** Transactions Table of Domestic Goods and Services

554 Sectors
in 2006 NIO
Tables

Statistics from Statistical Bureau | Statistical Standards | Statistics by Categories | Information Service

Home > Statistics from Statistical Bureau > I/O Tables > Statistical Tables

2006 - 52 Sectors

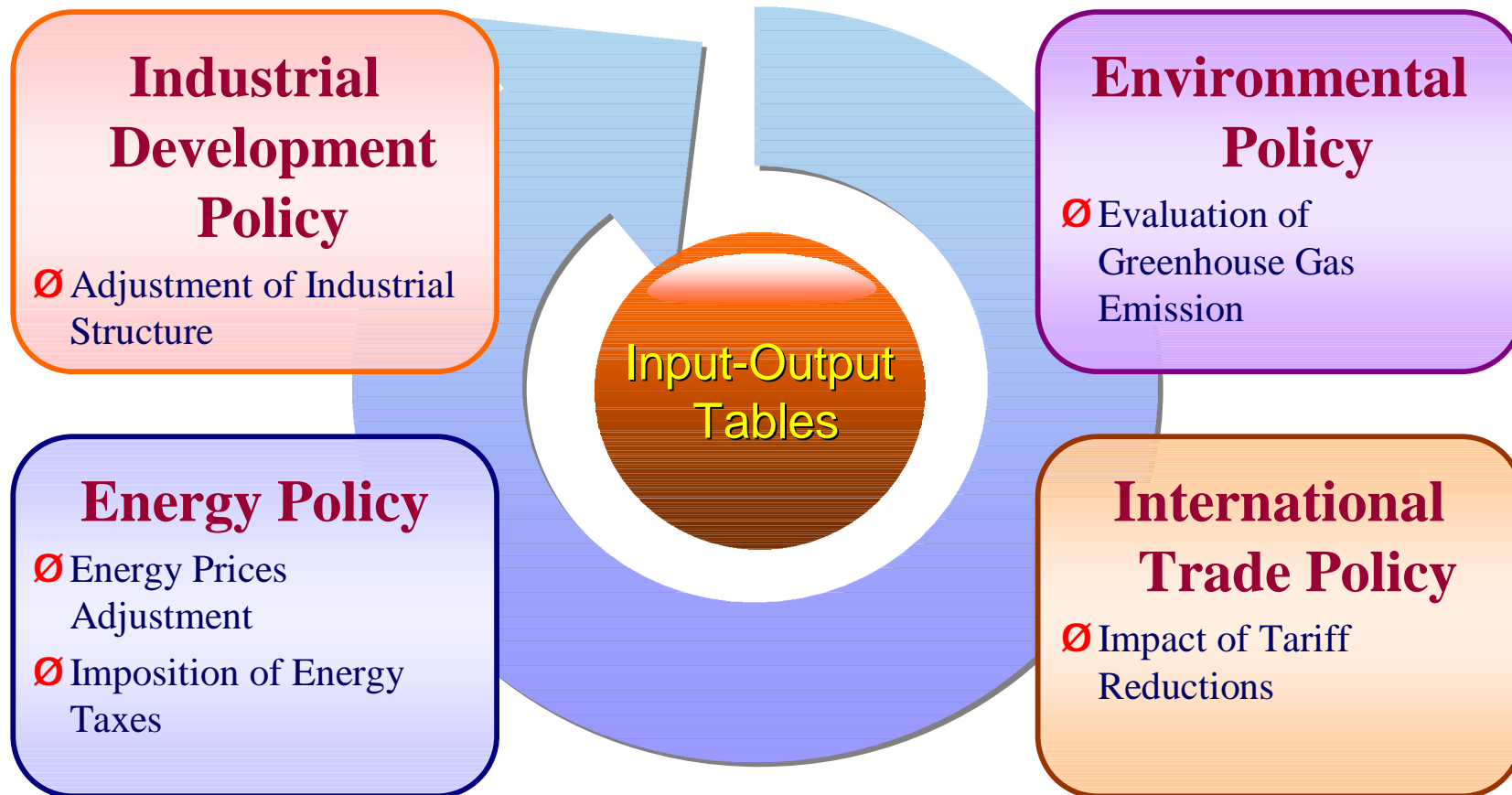
1. **Table1** Transactions Table at Producers' Prices(Excluding Net Import Duties)
2. **Table2** Input Coefficients Table at Producers' Prices (**A**)
3. **Table3** Impact Coefficients Table $(I - A)^{-1}$
4. **Table4** Impact Coefficients Table $[I - (I - \hat{M})A]^{-1}$
5. **Table5** Transactions Table at Purchasers' Prices
6. **Table6** Transactions Table at Producers' Prices(Including Net Import Duties)
7. **Table7** Transactions Table of Domestic Goods and Services
8. **Table8** Input Coefficients Table of Domestic Goods and Services (**D**)
9. **Table9** Domestic Impact Coefficients Table $(I - D)^{-1}$
10. **Table10** Transactions Table of Import Goods and Services(C.I.F.+Net Import Duties)
11. **Table11** Transactions Table of Import Goods and Services(C.I.F.)
12. **Table12** Input Coefficients Table of Import Goods and Services(C.I.F.)

52 Sectors
in 2006 NIO
Tables

The Main Sources of Input-Output Data

Sector	Data Sources	Institution in Charge
All	National Income Statistics Yearbook	DGBAS
	Report on Industry, Commerce and Services Census	DGBAS
Agriculture, Livestock, Forestry, and Fishery	Yearly Report of Taiwan's Agriculture	Council of Agriculture
	Taiwan Fisheries Yearbook	Fisheries Agency, Council of Agriculture
Mining and Quarrying	Yearbook of Mining Industry Statistics	Bureau of Mine, Ministry of Economic Affairs
	Financial Reports of CPC	CPC Corporation, Taiwan
Manufacturing	Yearbook of Earnings and Productivity Statistics	DGBAS
	Industrial Census Report	Department of Statistics, Ministry of Economic Affairs
Electricity, Gas , and Water Supply	Taiwan Energy Statistics	Bureau of Energy, Ministry of Economic Affairs
	Taipower Annual Statistical Report	Taiwan Power Company
Construction	The Construction and Planning Statistical Yearbook	Construction and Planning Agency, Ministry of Interior
	Report on the Survey of Family Income and Expenditure	DGBAS
Trade and Transport	Monthly Statistics of Transportation and Communications, R. O. C.	Department of Statistics, Ministry of Transportation and Communications
	Statistical Abstract of Transportation and Communications	Department of Statistics, Ministry of Transportation and Communications
Services	Report on the Enterprises Surveys	Department of Statistics, Ministry of Economic Affairs
	Financial Statistics Monthly	Central Bank

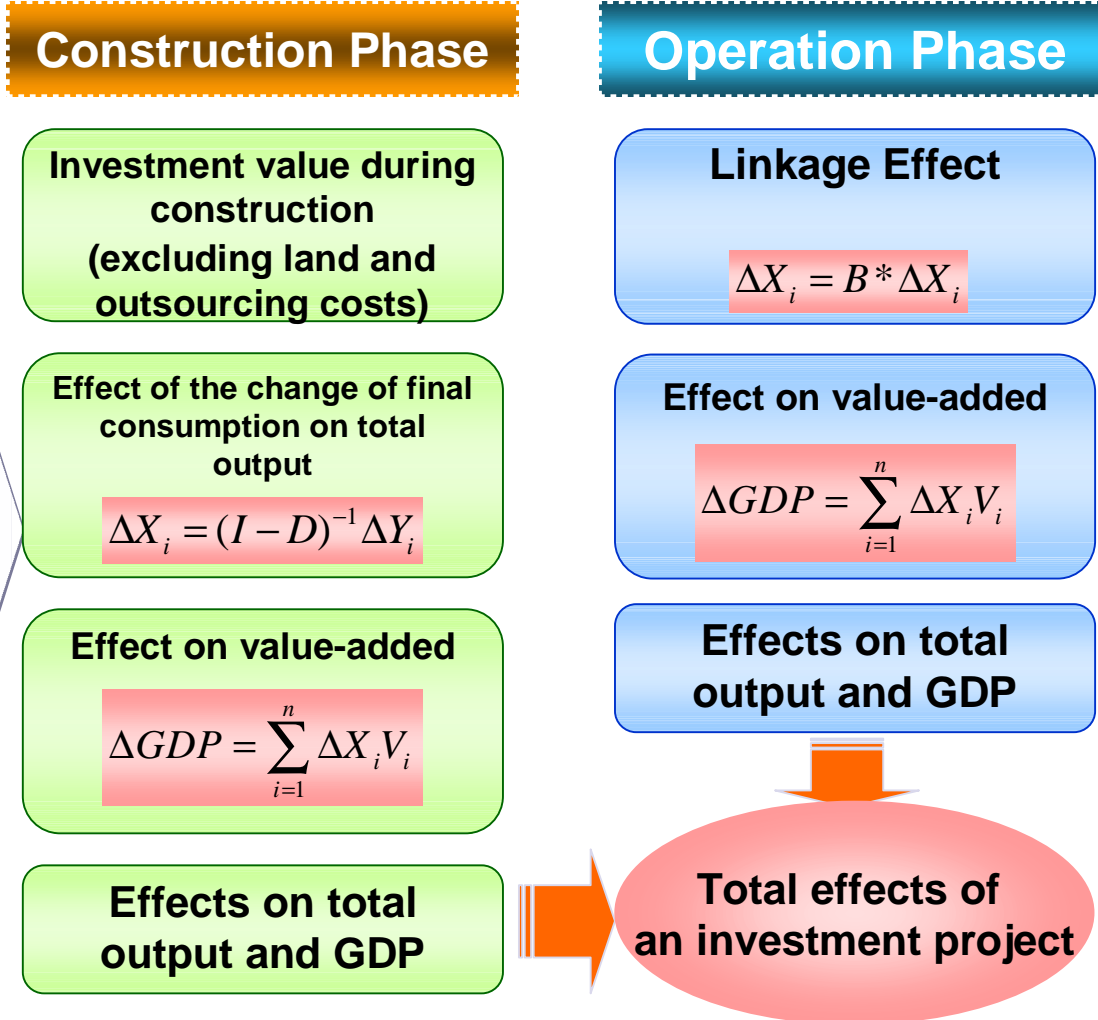
2. Applications of Taiwan's Input-Output Tables

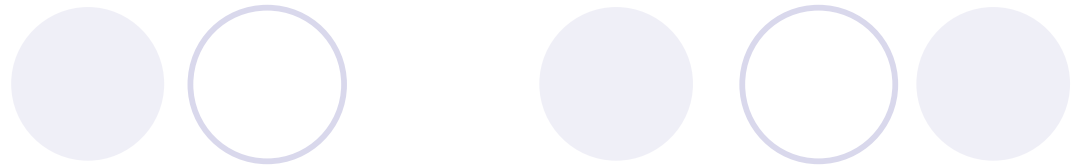


2.1 Application of I-O Analysis on Investment Project

Using I-O Tables to Assess the Impact of Investment in an Energy-Intensive Industry

- Characteristics of energy-intensive industries are
 - ∅ High energy consuming,
 - ∅ Low value adding,
 - ∅ High forward linkage effect, and
 - ∅ Stabilizing the domestic supply of raw materials.
- Apply input-output analysis to evaluate the effect of an investment project on total output and GDP.





■ Transform the Domestic Impact Coefficient Table

∅ $\Delta X = (I-D)^{-1} \Delta Y = B\Delta Y$

According to the equation, we can calculate the increases in input of sector j when final consumption of sector i increases.

∅ $\Delta X = (I-D)^{-1} \Delta Y = B^*\Delta X$

ü Transform B to B^* , where $b_{ij}^* = b_{ij} / b_{jj}$. The diagonal elements of B^* are 1.

ü When output value of sector i increases 1 unit, sector j needs to increase input b_{ij}^* units.

B

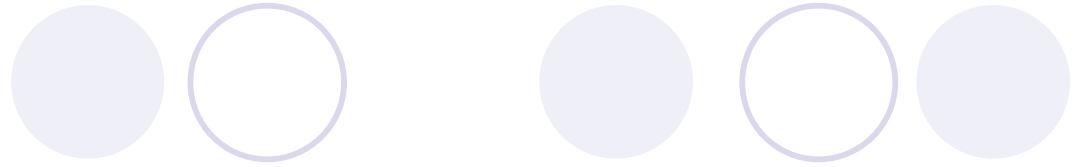
	1	.....	15	16	.....	52	Forward Linkage
1	1.221	.....	0.000	0.000	.....	0.001	1.713
.....
15	0.031	.....	1.057	0.154	.....	0.019	3.506
16	0.074	.....	0.004	1.605	.....	0.017	4.611
.....
52	0.001	.....	0.002	0.003	.....	1.009	1.318
Backward Linkage	1.521	.....	1.165	2.001	.....	1.481	

$b_{ij}^* = b_{ij} / b_{jj}$



B*

	1	.....	15	16	.....	52	Forward Linkage
1	1.000	.....	0.000	0.000	.....	0.001	1.425
.....	.....	1.000	.....	.....	.....	.....	.....
15	0.025	.....	1.000	0.096	.....	0.018	3.209
16	0.061	.....	0.003	1.000	.....	0.016	3.667
.....	.....	.....	.....	.....	1.000	.....	.....
52	0.001	.....	0.001	0.002	.....	1.000	1.280
Backward Linkage	1.246	.....	1.102	1.246	.....	1.468	



■ The Effects of an Investment Project on the Related Sectors

- ∅ According to *the 2006 Input-Output Tables- Transactions Table at Producers' Prices*, the ratio of export value to output of “*Petroleum and Coal Products Sector*” is 31.7%.
- ∅ For example, when we invest NTD 100 billion on “*Petroleum and Coal Products Sector*”, the backward linkage effect on output is NTD 110.2 billion.
- ∅ Applying the value-added factors, we can estimate the effect on value-added.

Unit: Billion NT\$

	Investment	Export	Domestic Consumption	Backward Linkage Effect On Output	Value-Added Increasing through Backward Linkage Effects
Code	A	B	C	$D=C*BL$	$E=\sum(X_jVAR_j)$
<i>Petroleum and Coal Products Sector</i>	100	31.7	68.3	110.2	16.8

2.2 Application of I-O Analysis on Trade Liberalization

Chen, Pi (2007)

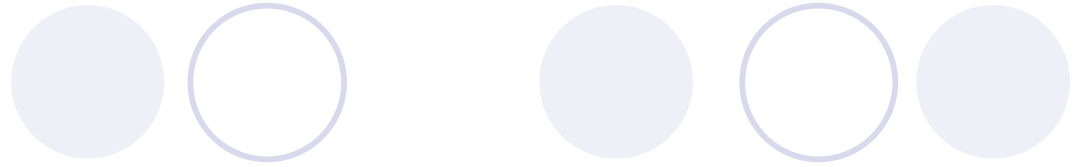
The Impact of Trade Liberalization with China on Taiwan's Economy (IDE, JETRO project)

■ Background

∅ China has been emerging as a regional as well as a global center of the supply and demand of commodities and even services.

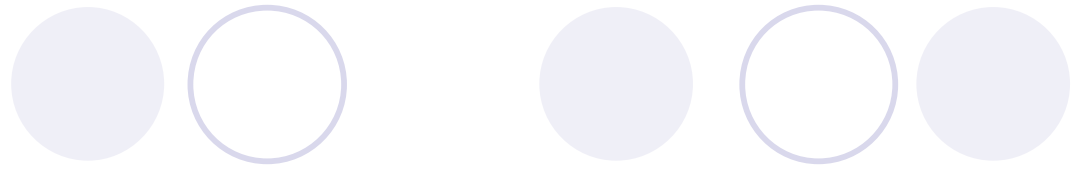
■ Questions

- ∅ What are the one-time permanent static macro effects of unilateral trade liberalization with China on Taiwan's total output, GDP, and employment?
- ∅ How the trade liberalization affects different industries from a micro point of view?



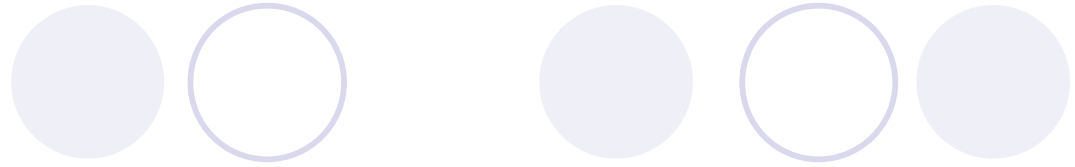
■ Assumptions

- ∅ Value-based input coefficients and physical-based import input coefficients are fixed.
- ∅ An increase in import fully substitutes domestic final goods.
- ∅ The current average nominal wage per hour relative to the pre-liberalization nominal wage is equal to the current labor productivity relative to the pre-liberalization productivity times the ratio of the current domestic price to the old domestic price.



■ Procedures

- ∅ Impute the hypothetical changes in **import prices** after trade liberalization.
- ∅ Calculate the direct and indirect effects of a decrease in import prices on **domestic prices** by using the import and domestic input coefficient tables.
- ∅ Develop methods to compute the subsequent changes in **imports, exports, and import input coefficients**.
- ∅ Measure the chain reaction in **total output** by using the calibrated changes in imports, exports, and import input coefficients.
- ∅ Employing value-added rates, together with the information on the change in total output, calculate **the change in GDP**.
- ∅ Teaming up labor input coefficients from the IO table and the change in total output will derive **the change in employment**.

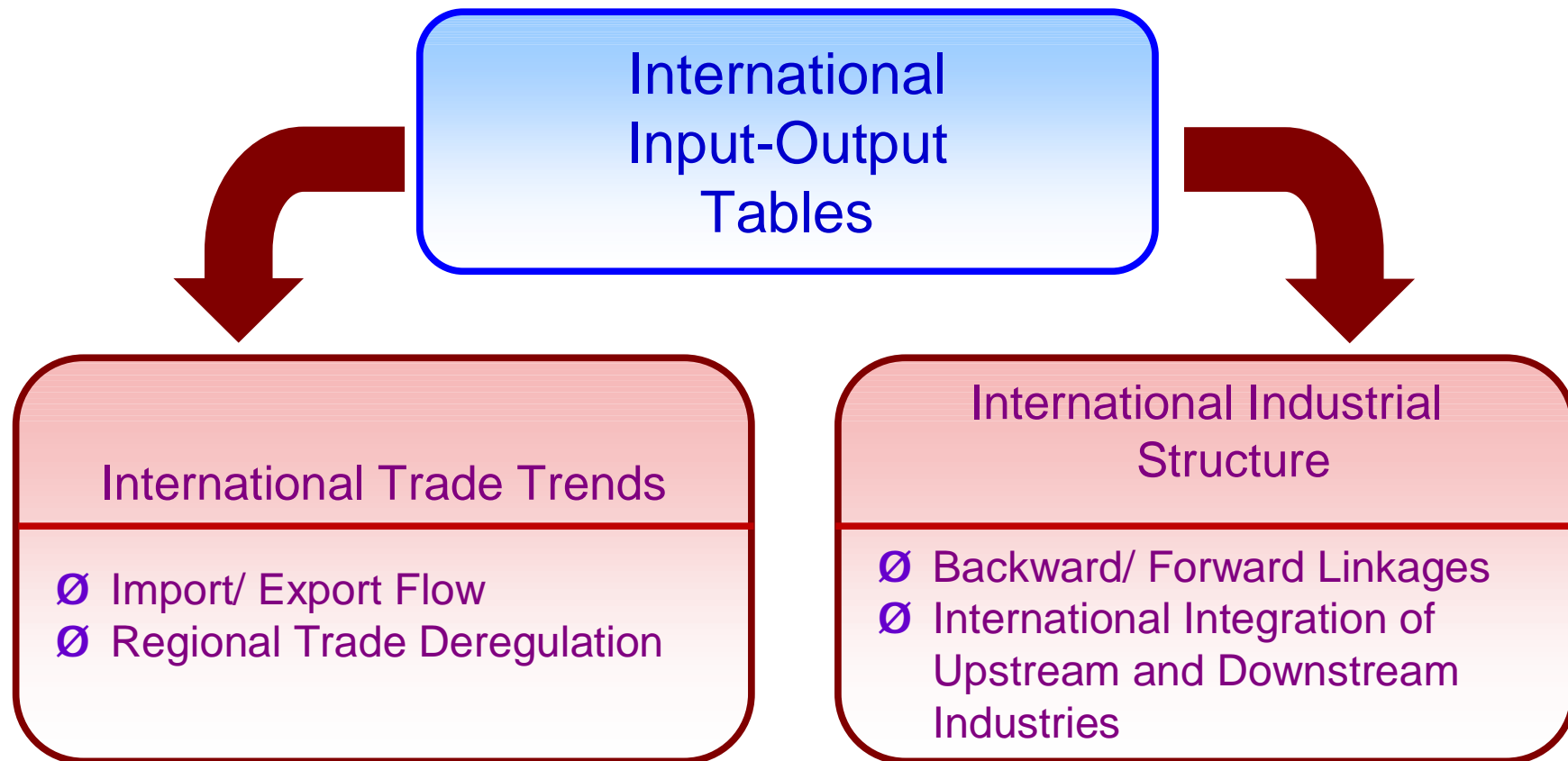


■ Results

- ∅ An open-up policy toward the exchange of commodities with China would be *slightly* harmful to Taiwan's economy. The total output and GDP would shrink.
- ∅ The distribution of cost and benefit across industries arisen from this policy would be uneven:
 - ü most industries in the “traditional” manufacturing sectors and the agriculture, livestock, forestry, and fishery sectors downsize and see some of their workers facing layoff,
 - ü On the other hand, industries such as the petroleum refining products and the computer products would benefit from it.

3. Applications of International Input-Output Tables

- International input-output tables offer time-series and corss-sectional data for policy analysis and impact evaluation.

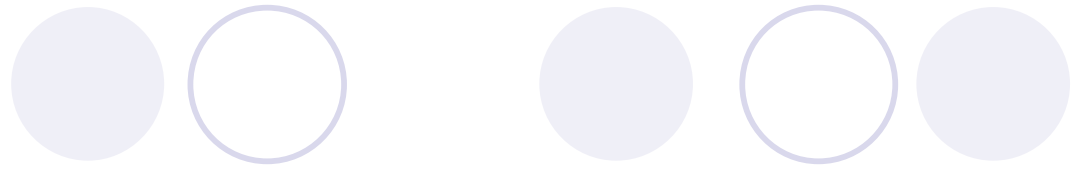


3.1 Application of IIO Analysis on Forward/ Backward Linkage Effects

Wu, Tsai-Yi and Hung-Chyn Chen (2006)

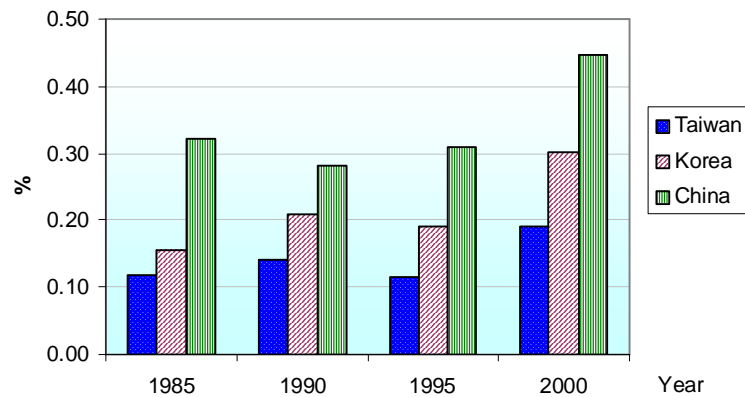
An Input-Output Analysis on Trade with Japan: Evidence from Taiwan, Korea, and China (IDE, JETRO project)

- Before 1980's, most East Asian countries imported raw materials and instruments from **Japan** and sold final goods to **the United States and Japan**.
- We review the economic growth, the ratio of export over GDP, and the ratio of export over import for four East Asian countries. We also examine **the intra-regional trade size in Japan's point of view**. The data show that the ratio of intra-regional import (export) values to total import (export) values gradually grew up from 1985 to 2000.



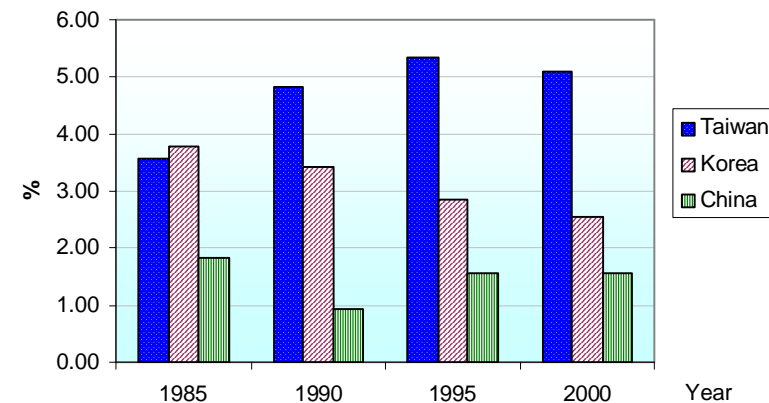
- Japan's BL to Taiwan, Korea and China were increasing while Korea's and China's BL to Japan were decreasing. Only Taiwan's BL to Japan is in a different pattern, which increased from 1985 to 1995 and then decreased in 2000.

Japan's Backward Linkages to Selected Countries

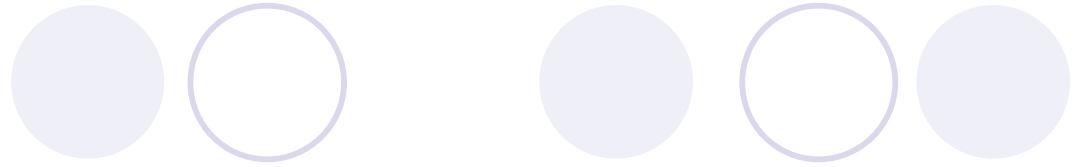


Source: IDE, Jetro.

Selected Countries' Backward Linkages to Japan



Source: IDE, Jetro.



- The increase of Japan's private consumption had larger effects on other countries' gross output than the increase of Japan's capital formation. It is also shown that **both impacts of Japan's private consumption and capital formation decreased.**
- On the other hand, the impacts of the three East Asian countries' final demand on Japan's gross output fluctuated a lot. Only the increase of Taiwan's and Korea's private consumption had larger effects on Japan's gross output than the increase of their capital formation.

3.2 Application of IIO Analysis on Spillover Effects of Innovation

Chen, Po-Lu (2011)

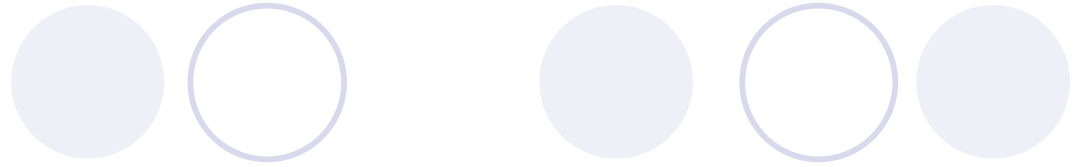
Industrial Networks between Taiwan and the Countries in the Asia-Pacific Region with a Focus on Spillover Effects of Innovation (IDE, JETRO project)

■ **Background**

∅ Devoting resources to encourage innovation in industries that have stronger spillover effects is more efficient for economic growth.

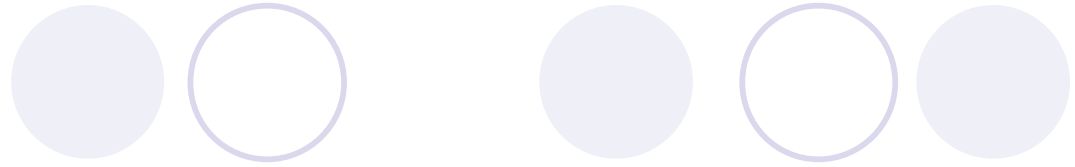
■ **Question**

∅ What are the industrial linkages between Taiwan and Asia-Pacific Countries with a focus on the spillover effect of innovation?



■ Procedures

- ∅ Measure the intra-industry trade.
- ∅ Calculate the revealed comparative advantage index (RCA).
- ∅ Calculate the forward linkage (index of sensitivity of dispersion) and the backward linkage (index of power of dispersion) between Taiwan and China.
- ∅ Measure the spillover effects of process innovation and product innovation.



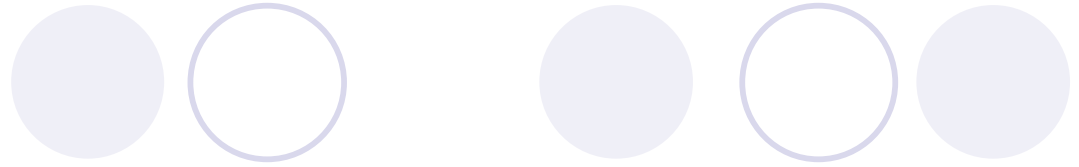
■ Results

- ∅ Spillover effects of process innovation are stronger than spillover effects of product innovation for all countries listed in the AIIO table.
- ∅ Asia-Pacific countries are similar in spillovers of process innovation, but are heterogeneous in spillovers of product innovation.
- ∅ China's spillover effect of product innovation is significantly higher than that of other Asia-Pacific countries'.
- ∅ Reducing trade barriers in industries with high spillover effect of product innovation may generate more benefits for countries in the Asia-Pacific region, and multilateral trade negotiation regarding this particular industry should have higher priority.
 - ü Television Sets, Radios, Audios, and Communication Equipment (sector 49)
 - ü Electronic Computing Equipment (sector 50)
 - ü Knitting (sector 20)

4. Concluding Remarks



- Since joining APEC in 1991, Taiwan (aka Chinese Taipei) has played an active role in related activities and taken charge of several working groups.
- In the future, the free trade agreement (for example, Trans-Pacific Partnership Agreement, TPP) will have an extensive influence on the region.
- We believe that input-output analysis will be an important and practical tool to understand the impact of regional policy on international trade of goods and services.



*Thank you very much
for your kind attention!*