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Constructing JIDEA 5.1 for Japan-China Bilateral Trade

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Introduction

Recent development of economic relation between Japan and China, especially the mutual dependence of these two countries, urged us to make closer analysis of both countries', particularly on ripple effect of each economic activities. Accordingly, we intend to link Japan and China models to make an analysis of both countries economic relation. For this purpose, Yinchu Wang joins to cooperate this project and we use MUDAN to link with JIDEA through trade components.

We discussed the structure of the new model, structure of data bank, the way of linking and simulation and each partners' responsibility, etc. We decided Japan and China do separately their work and on final stage, we link two models. The both model linking work will be done by Wang because of his broad experience. For the Japanese side, modification of JIDEA and estimation of new function are almost finished.

While we were waiting for the result of China model work, we made test simulation using BTM data on the effect of mutual tariff exemption between Japan and China, especially its effect on Japanese economy. For the information on Chinese tariff changes, we used the data made by Dr. Nyhus(2002) and the rest of data on the world trade, that is to say, Japanese import from China (=Chinese export to Japan), Chinese import from Japan (=Japanese export to China), Japanese import and export to the rest of the world, we take them out from BTM. The simulation result will be explained by Hasegawa(2004).

1. Structure of Japan-China bilateral model

As you know well, the INFORUM type model which is based on I-O table can link easily with other country models through foreign trade. This linkage method is realized by Dr. Nyhus as Bilateral Trade Model (BTM). BTM is based on trade matrix which is consisted of row data on each country's export and of column data on import. Through this matrix, each national model is linked with other countries as a flow of export or import.

This bilateral trade share matrix can be extended by regression equation explained by price, capital stock and time trend and which make possible to forecast the future trade flow of countries in the matrix. Dr. Nyhus has attested that such project as the analysis of Japan China FTA can be realized by BTM easily.

There are several reasons why we want to make another model like Japan China linked model separate from BTM. We found BTM is too huge and too complicated to use in the case of simple simulation. If we link only Japan and China, we can simplify the model itself by giving Japanese import from China to Chinese model as Chinese export to Japan. Needless to say, even in this case, other world trade data except Japan and China(RoW), we should prepare by some way, and effect of RoW after the changes of Japan and china trade is not cotained in the simulation, but for the object to simplify the model, we took these data from BTM as constant.

2. Constructing the model

JIDEA and MUDAN independently calculate optimized result for starting year and give its import data to the counterpart model as its export each other. Then each model recalculates its optimized solution based on new export data and again gives its import to counter part and finally we get converged results. The linked model will found convergence year by year. This approach to find convergence may another different point from BTM.

		Import		
		Japan	China	ROW
Export	Japan			
	China			
	ROW			

The structure of JIDEA model was explained in former report[1], so, it need to explain only the changed points. The model is intended to make simulation on tariff cut effect, we are careful to use at most the price information in the function. The function of Japanese import from China is consisted as follows.;

$$JAimpCN_i = f(CNpexJA_i / JApdo_i, JAdd_i),$$

where

$JAimpCN_i$: Japanese import from China by sector (in real)

$CNpexJA_i$: Chinese export price to Japan by sector

$JApdo_i$: Japanese output price

$JAdd_i$: Japanese domestic demand

i : sector number

Chinese model MUDAN also calculate import equation almost in same way. The main difference is in the number of sectors. MUDAN has 63 sectors (tradable sectors 59) and JIDEA has 100 (tradable sectors 63). Accordingly, each model has to change its real value into index and we should prepare convert table to adjust sectors. Import and export in JIDEA model are divided into two parts; one is for China and the other for ROW and these two imports added up one to make simulation. In the case of price, the import prices are separately calculated and afterwards added up with its wait.

Looking at the result of estimation of the trade function, we found the relative price among explanatory valuables is effective in estimating 47 sectors against 64 tradable sectors. Even though the Mexval is enough low, in the case of correct sign, we adopt such function. All the functions are of logarithmic form. The result of regression with relative price are shown in the table 1.

Table1. The estimation result of import function from China

	sectors	price	Mexval	Reg-Coef
1	Agriculture for crops			
2	Livestock raising and sericulture	x	4.3	-0.45296
3	Agricultural services			

[1] Sasai, Y. (2003), "General feasture of JIDEA5 – The structure and simulation results.", paper presented to the 11th INFORUM World Conference held at Russian Academy of Science, Institute of Economic Forecasting, Suzdal, September 8 – 12.

4	Forestry and logging	x	43.0	-5.51474
5	Fishery			
6	Metal ores			
7	Non-metal ores	x	0.3	-0.13815
8	Coal and lignite	x	0.0	-0.04457
9	Crude petroleum & gas			
10	Food products	x	3.4	-0.82830
11	Beverages & tobacco			
12	Feeds and organic fertilizers	x	1.2	-0.38851
13	Fabricated textile products			
14	Wearing and other textile products	x	11.9	-0.87172
15	Timber and wooden products	x	30.4	-1.98100
16	Wooden & Metal Furniture, Fittings	x	5.1	-1.81121
17	Pulp and paper	x	67.6	-7.39241
18	Publishing and printing	x	59.2	-4.19119
19	Chemical fertilizer	x	0.0	-0.06143
20	Inorganic basic chemicals	x	7.9	-1.15805
21	Petrochemical basic products	x	30.6	-1.46928
22	Organic chemical products	x	19	-1.86758
23	Synthetic resin	x	66.2	-5.64360
24	Chemical fibers	x	11.1	-2.26339
25	Medicaments	x	3.9	-0.88825
26	Final chemical products	x	1.2	-0.70170
27	Petroleum refinery products	x	1.1	-0.29831
28	Coal products			
29	Plastic products	x	34	-6.01460
30	Rubber products	x	70.4	-4.65042
31	Leather & Fur products	x	14.5	-3.00580
32	Glass and glass products	x	3.3	-0.83068
33	Cement and cement products	x	0.0	-0.10630
34	Pottery, tiles and earthenware	x	1.5	-1.12630
35	Other ceramic, stone and clay products			
36	Pig iron and crude steel			
37	Steel bar and sheet			
38	Steel castings and forging			

39	Non-ferrous metals refinery products			
40	Processed non-ferrous metal products	x	59.3	-4.56809
41	Metal products for construction			
42	Heating equipment	x	3.6	-0.97995
43	Other metal products	x	0.5	-0.62703
44	General Machineery	x	29.1	-3.48300
45	Machine Tool & Robot	x	9.8	-2.35695
46	Special industry machinery	x	2.6	-1.09815
47	Other general machines and tools	x	4.5	-1.46933
48	Machinery for office and for vending	x	11.9	-5.17687
49	Machinery for service	x	1.1	-2.05868
50	Household electric & electronic equipment			
51	Electronic computing equipment and accessories	x	1.1	-2.52921
52	Communication equipment	x	0.0	-0.14782
53	Electronic appliances & measuring equipment	x	25	-3.90304
54	Semi-conductor devices and integrated circuits			
55	Electronic Parts	x	9.2	-2.23028
56	Heavy electrical equipment, Generators, Motors, etc.	x	1.2	-0.79414
57	Electric illuminator, batteries & other light electric app.	x	15.9	-5.57541
58	Motor vehicle			
59	Ships and repair of ships	x	89.6	-9.41502
60	Railway equipment	x	219.2	-14.06231
61	Air plane & repair	x	26.7	-11.77239
62	Other transportation equipment	x	1.3	-2.10717
63	Precision instruments, Medical instrument, etc.	x	60.1	-6.98155
64	Miscellaneous manufacturing products	x	2.6	-0.73808

For the import and export function of ROW, we used original export and import function of JIDEA5. Needless to say, they are re-estimated by the new data without China.

3. Making simulation

The idea for Japan-China linked model simulation can be easily understood when you look at following “runall.bat” file. There are two CPP programs; “modicfg.cpp” and “comjacn.cpp”. The first is to start model to prepare configuration of both JIDEA51 and MUDAN21. The last one is to judge if these two models iteration is converged or not year by year.

＜runall.bat＞

```
rem the starting year and finishing year in both country models' dyme.cfg file should
rem    be the same
rem to change the speed of convergence, just change the value in the file "control.dat"
rem which is relative difference between old and new GDP values
rem path = ¥pdg;
copy ¥jidea51¥dyme.cfg dyme.kep
copy dyme.kep dyme.cfg
copy ¥chinat25¥mudan90¥mudan98.cfg mudan98.kep
copy mudan98.kep mudan98.cfg
:start1
modicfg
pause "after modifying"
copy mudan98.cfg ¥chinat25¥mudan90¥mudan98.cfg
copy dyme.cfg ¥jidea51¥dyme.cfg
if exist "finish" goto end
:start2
del notok
g oldvalue.add
rem deal with data exchange
rem ¥model¥jidea51¥run ???
rem ¥chinat25¥mudan90¥mudan98
g newvalue.add
compjacn
pause "comparison"
if exist "notok" goto start2
goto start1
:end
del finish
```

```
copy mudan98.kep ¥chinat25¥mudan90¥mudan98.cfg
copy dyme.kep ¥jidea51¥dyme.cfg
echo "The running has finished"
```

＜oldvalue.add＞

```
bank ¥chinat25¥mudan90¥mudan98
tdate  2011  2011
save oldvalue
ty gdpR
bank ¥jidea51¥jidea
ty gdpr
save off
q
```

＜newvalue.add＞

```
bank ¥chinat25¥mudan90¥mudan98
tdate  2011  2011
save newvalue
ty gdpR
bank ¥jidea51¥jidea
ty gdpr
save off
q
```

Reference

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