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## *Alternative ACROSS system*

### *for making time-series of Input-Output tables*

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#### **Released Input-Output tables in different definitions**

*Japanese Input-Output tables have been released in the three kinds of tables; the Linked table, the Base table, and the Extended table in the different definitions. Therefore, it is quite difficult to manage such data for the economic analysis hooking up in time series.*

*Extension tables for 1986, 1987, 1988, 1989, 1990 on the definition of 1985 were released in a form of the real and the nominal tables. Extension tables for 1992, 1993, 1994, 1995 on the definition of 1990 were released in a form of the nominal and deflator tables of domestic production, export, import and domestic demand. Extended tables for 1996, 1997, 1998, and 1999 exist in a same definition deflated for Base table in 1990.*

*The purpose of this paper explains how to make up the time series input-output tables with ACROSS method which compile (or recompile) and build the data in an absence of the input-output table or in an existence of the data in the different definition at the interval time period. Through 1985 to the last available table 1999, the following ACROSS methods build the smooth time series data in a same definition in 100 sectors of JIDEA5.0. The dynamic model of the input-output analysis will be elaborated in a same definition of the input-output tables.*

*ACROSS method developed by Clopper Almon<sup>1</sup> was adopted in JIDEA model previously.*

#### **ACROSS manipulation**

*The real data acquired as a result of the above manipulation has still a divergence even in the data classified with the same code at the base year; because of the definition change of the sectors, the change in the range and the method of compilation, or the appearance and disappearance of industrial sectors, etc. The differences in the definition year about three kinds of Input-Output tables by year are shown in column of the following table.*

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<sup>1</sup> Clopper Almon, Toshiaki Hasegawa, Yasuhiko Sasai, and Takeshi Imagawa, "Time Series Data of Japanese I-O Tables during 1975-1991", in **Proceedings of the 3rd World Conference, ABSOLWENT, Lodz, 1997.**

**Table 1 Japanese 3 kinds of Input-Output tables in different definitions**

	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
85	$B_{85}$	$E_{86}$	$E_{87}$	$E_{88}$	$E_{89}$	$E_{90}$									
90						$B_{90}$		$E_{92}$	$E_{93}$	$E_{94}$	$E_{95}$				
95											$B_{95}$	$E_{96}$	$E_{97}$	$E_{98}$	$E_{99}$
95	$L_{85}$					$L_{90}$					$L_{95}$				

We adopt Linked Tables for 1985 and 1990 defined in 1995, using same data source, in same coverage, and Extended Tables for 1986 to 1989 in the definition of 1985 Base Table to hook up between 1985 and 1990. Divergence of the data due to the definition year, ACROSS manipulation works to build the well-smoothed time series data. The above table shows us that there are three kinds of definitions, 1985, 1990, and 1995.

In order to manipulate time series data with ACROSS program, we explain the case of the data ranged from 1985 to 1990 as an example. The actual manipulation was done for the time period from 1985 to 1999.

Although there exists only 1985 and 1990 Linked tables defined in 1995, the data in the interplace are made up in a linear growth rate.

### **Almon's ACROSS method**

The following explanation is the original Clopper Almon's ACROSS method shown in our previous analysis<sup>2</sup>.  $a$  is the gap between the Linked table for 1985 defined in 1995 and the Base table for 1985 defined in 1985.  $b$  shows the gap between the Linked table for 1990 defined in 1995 and the Extended table for 1990 defined in 1985.

$$a = L_{85} - B_{85}$$

$$b = L_{90} - E_{90}$$

where  $a$  and  $b$  are the gaps to be spread over time,  $L_t$ ,  $B_t$ ,  $E_t$  denote the Linked table, the Base table, and the Extended table in the  $t$ -th year individually.  $A_t$  denotes the recompiled Linked table to fill the gap.

$$A_t = L_t + \{ 1 - (t - 1985) / 5 \} * a + \{ (t - 1985) / 5 \} * b,$$

where  $t = 1985, 1986, 1987, 1988, 1989, 1990$ .

### **ACROSS II in JIDEA50 method**

Since the data of Link tables defined in 1995 exist only in 1985 and 1990, the tables of interspace

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<sup>2</sup> Ibid.

between 1985 and 1990 are written as follows;

$$L'_t = L_{85} + (L_{90} - L_{85}) * (t - 1990) / 5 = L_{85} + c * \{ (t - 1990) / 5 \}$$

where  $1985 \leq t \leq 1990$ , and  $L'_t$  denotes the tentative Link table spread linearly in year  $t$ .

Also, we can make up the tentative data base in the interspace using the linear growth rate of Extended tables,  $EB'_t$ .

$$EB'_t = B_{85} + (E_{90} - B_{85}) * (t - 1990) / 5 = B_{85} + d * \{ (t - 1990) / 5 \}$$

The ratio of the tentative Extended table to the actual Extended table is expressed as follows;

$$R = EB'_t / E_t$$

Finally, we could reach the recompiled Linked tables for  $t$ -period defined in 1995.

$$A_t = L'_t * R_t$$

## **Results**

Figures show three kinds of time series data: the original data, the recompiled data using the ratio (escalating weight piling up the block of the same size until the terminal time period proposed by C. Almon), and the recompiled data to adopt the escalating weight ratio (ACROSS II in JIDEA50.

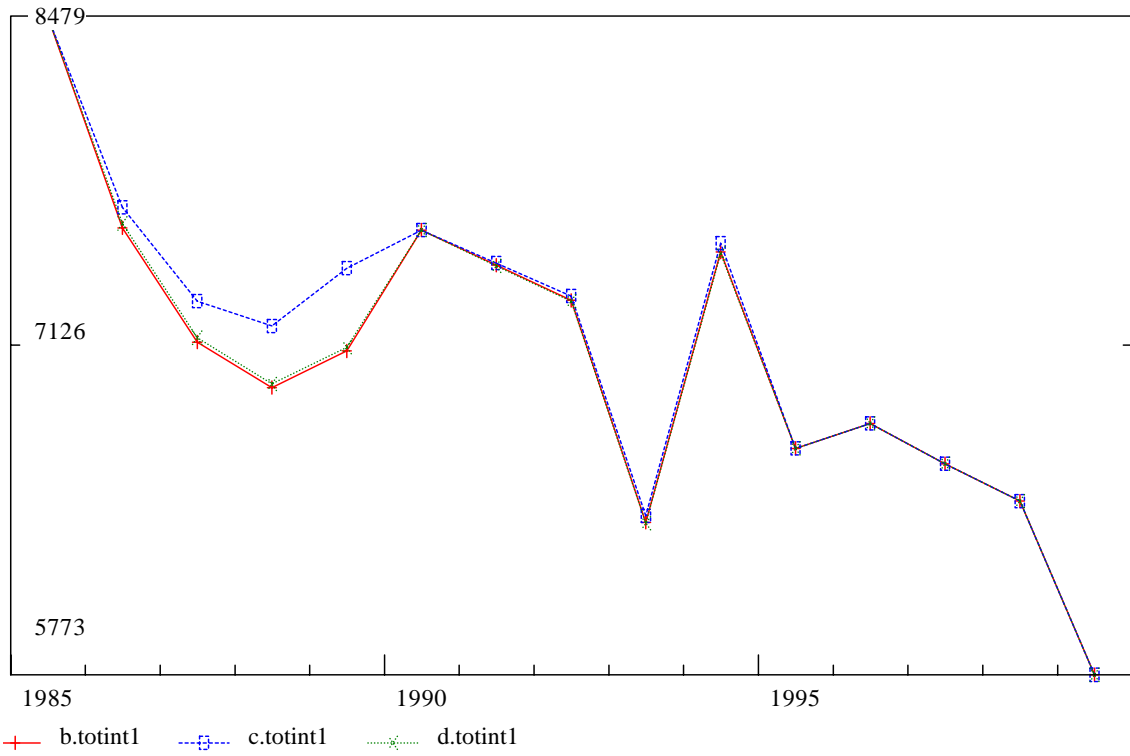
$b+++$  (in red) shows the line of time series (re)compiled in the original Almon's method,

$c***$  (in blue) shows the data trend (re)compiled by ACROSS II for JIDEA5.0, and

$d===$  (in green) shows the time series of original data in nominal term.

It seems that influence of escalating weight ratio in ACROSS II leads data more up or down rapidly at the final period to reach terminal data. However, at this moment, we do not have any positive criteria to evaluate whether the original Almon's ACROSS method or the ACROSS II for JIDEA5.0 is much preferable.

# 1 Agri crops



# 10 Food prod

